



North Carolina Department of Environment and Natural Resources

Beverly Eaves Perdue  
Governor

Dee Freeman  
Secretary

**MEMORANDUM**

TO: ENVIRONMENTAL REVIEW COMMISSION  
The Honorable David Rouzer, Chair  
The Honorable Mitch Gillespie, Co-Chair  
The Honorable Ruth Samuelson, Co-Chair

JOINT LEGISLATIVE COMMISSION ON GOVERNMENTAL OPERATIONS  
The Honorable Thom Tillis, Speaker of the House of Representatives  
The Honorable Phil Berger, President Pro Tempore

FROM: Kari Barsness *KKB*  
Director of Legislative and Intergovernmental Affairs

SUBJECT: North Carolina Coastal Habitat Protection Plan Annual Report

DATE: October 1, 2012

Pursuant to General Statute 143B-279.8, an annual report for the Coastal Habitat Protection Plan (CHPP) shall be submitted to the Environmental Review Commission and the Joint Legislative Commission on Governmental Operations, by September 1 of each year. The CHPP was completely rewritten, revised and adopted in 2010 by the cooperating regulatory commissions. The 2011-2012 CHPP Annual Report is attached and has been presented to the four regulatory commissions primarily responsible for the implementation of the CHPP. The submission has been delayed slightly due to the meeting schedule of the four commissions. The Marine Fisheries Commission met and endorsed the Annual Report on August 24, 2012. The Coastal Resources Commission endorsed the report on August 30, 2012. The Wildlife Resources Commission received the report on August 30, 2012, but took no further action. The Water Quality Committee of the Environmental Management Committee (EMC), the committee granted authority by the EMC to deal with matters pertaining to the CHPP, endorsed the CHPP Annual Report on September 12, 2012.

If you have any questions or need additional information, please contact me by phone at (919) 707-8618 or via e-mail at [Kari.Barsness@ncdenr.gov](mailto:Kari.Barsness@ncdenr.gov).

cc: Assistant Secretary David Knight  
Assistant Secretary Robin Smith  
Linda Pearsall, Director, Office of Conservation, Planning and Community Affairs  
Louis Daniel, Director, Division of Marine Fisheries  
Braxton Davis, Director, Division of Coastal Management  
Kristin Walker, Fiscal Research Division

Lanier McRee, Fiscal Research Division  
Mariah Matheson, Research Division

# **NORTH CAROLINA'S COASTAL HABITAT PROTECTION PLAN**

**2011 - 2012**

## **ANNUAL REPORT**

TO THE

ENVIRONMENTAL REVIEW COMMISSION

AND THE

JOINT LEGISLATIVE COMMISSION ON GOVERNMENTAL OPERATIONS

OF THE

NORTH CAROLINA GENERAL ASSEMBLY

FROM

NORTH CAROLINA MARINE FISHERIES COMMISSION,  
NORTH CAROLINA COASTAL RESOURCES COMMISSION,  
NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION, AND  
NORTH CAROLINA WILDLIFE RESOURCES COMMISSION  
AND  
NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

September 2012

# **Introduction**

## **Fisheries Reform Act**

The North Carolina General Assembly established the Coastal Habitat Protection Plan program within the North Carolina Department of Environment and Natural Resources (DENR) with passage of the Fisheries Reform Act of 1997. The act (G.S. 143B-279.8) requires preparation of Coastal Habitat Protection Plans (CHPPs) for critical fisheries habitats in the coastal area. The act states “[t]he goal of the Plans shall be the long-term enhancement of coastal fisheries associated with each coastal habitat.” Within DENR, the divisions of Marine Fisheries, Water Quality, and Coastal Management are designated as the lead agencies for implementing the CHPP program. Many other DENR agencies also participate in CHPP work. By law, the CHPP must describe and evaluate the functions, values, status and trends of all habitats, identify existing and potential threats, and recommend actions to protect and restore the habitats.

## **Role of the Commissions**

The Coastal Resources, Environmental Management, and Marine Fisheries commissions adopted the CHPP in December 2004. The CHPP was adopted, along with implementation plans by each of the three original commissions in June and July 2005 (see Implementing the North Carolina Coastal Habitat Protection Plan 2005). The second iteration of the plan and updated recommendations were approved by these same commissions, as well as the N.C. Wildlife Resource Commission in 2010. Rule making and policy actions taken by all three commissions are to comply “...to the maximum extent practicable” with the plan.

The commissions with membership on the CHPP Steering Committee are to report by Sept. 1 each year to the Environmental Review Commission, and as of 2012, to the Joint Legislative Commission on Governmental Operations on their progress in implementing the Coastal Habitat Protection Plan. This document reports on the progress made by the respective commissions and their supporting agencies, as well as other DENR agencies and agencies in the North Carolina Department of Agriculture and Consumer Services, in implementing the CHPP during the year beginning in September 2011 and ending in August 2012. Attachment 1 lists the members of the CHPP Steering Committee for the 2011-12 year.

## **North Carolina Coastal Habitat Protection Plan (CHPP)**

The CHPP focuses on six basic fish habitats: water column, shell bottom, submerged aquatic vegetation (SAV), wetlands, soft bottom and hard bottom. A chapter is devoted to each type. Each of the habitat chapters is organized to provide the information specified in the act.

The CHPP describes the functions of habitats necessary for production of economically important fish stocks and the links between those habitats and various life history stages of the fish. The CHPP also discusses the various types of threats to the habitats upon which productive coastal fisheries depend. Moreover, the plan summarizes the institutional structures for management of fisheries habitat, adjacent lands, water quality, and fisheries in eastern North Carolina. Finally, the plan includes numerous management recommendations to address identified threats. The recommendations are addressed to DENR as well as the Coastal Resources Commission, Environmental Management Commission, Marine Fisheries Commission and the Wildlife Resources Commission.

The CHPP also identifies four primary goals that help focus available resources on habitat protection. The four goals are to: improve effectiveness of existing rules and programs protecting coastal fish habitats; identify, designate and protect strategic habitat areas; enhance habitat and protect it from physical

impacts; and enhance and protect water quality. Each goal is broken into recommendations with each recommendation having a series of associated action items. These action items are the key components to the two-year CHPP Implementation Plan.

# Annual Highlights

## September 2011 – August 2012 CHPP Accomplishments

### Goal 1: Improve effectiveness of existing rules and programs protecting coastal fish habitats

- Shellfish closure maps are complete and available on the N.C. Division of Marine Fisheries' website, and our shellfish classifications GIS data are available on the NC One Map.
- DMF staff regularly attends festivals and outreach events to educate the public on DMF activities including habitat conservation, the oyster shell recycling program, and the life history, habitat use, and threats to important fishery species.
- DMF's Fish Eye News, a web-based publication, featured articles addressing CHPP implementation, obstacles to anadromous fish spawning migrations, endocrine disrupting chemicals, and beach water quality (see <http://portal.ncdenr.org/web/mf/fish-eye-news-0811>).
- The DMF habitat section hosted Operation Medicine Drop events in Morehead City and Wilmington and supported another event in Manteo to educate the public on proper disposal methods of unwanted medications to keep endocrine disrupting chemicals out of our waterways.
- The National Estuarine Research Reserve (NERR) implemented an education and outreach campaign focusing on estuaries and sea level rise in the Albemarle-Pamlico system funded by the Albemarle-Pamlico National Estuary Program (APNEP).
- Estuarine Shoreline Stabilization workshops were held April 24, 2012 in Beaufort and May 2, 2012 in Wilmington. The workshops emphasized the importance of fringing marsh habitats and explained alternatives to vertical control structures. The same workshop was hosted in Nags Head in September 2011 as part of the education and outreach campaign funded by APNEP. The "Weighing Your Options: How to Protect Your Property from Shoreline Erosion" booklet was distributed at the workshops.
- A realtor workshop on Estuarine Shoreline Stabilization is being developed and will be approved for four continuing education credits by the N.C. Real Estate Commission. The workshop will be offered in 2013.
- The CHPP habitats are addressed during Reserve K-12 student field trips, teacher/educator workshops, summer public field trips, and summer camps conducted by the NERR. Discussions include why these habitats are important to coastal North Carolina and how they benefit plants and animals.
- An activity booklet entitled "Our Living Estuaries" was produced in 2011 through funding from a Cooperative Institute for Coastal and Estuarine Environmental Technology (CICEET) grant. CHPP habitats are included in the booklet.
- The N.C. Division of Coastal Management has completed mapping of the estuarine shoreline resulting in a digital representation of the shoreline by type, modifications, and an inventory of structures. The division will be contracting with East Carolina University to assist in further analysis of the project data to identify regional development trends along the shoreline and to better understand the distribution of coastal structures and natural resources.
- New coastal buffer rule changes effective July 1, 2011 affect construction of single family residences on existing lots (lots of two acres or less that were platted and recorded in the appropriate county register of deeds prior to Aug 1, 2000). The rule applies to the following counties in the Neuse and Tar-Pamlico river basins: Beaufort, Hyde, Carteret, Craven, Dare, Onslow, Pamlico and Washington.
- There is a strong promotional effort underway this year that encourages green infrastructure and low-impact development techniques in new development and retrofitting existing development.

- Review by the N.C. Wildlife Resources Commission of Wildlife Action Plan (WAP).Habitat vulnerability sections for upcoming WAP revision are underway.
- WRC staff participated in U.S. Department of Agriculture's (USDA) multi-agency discussion on *Hydrilla* in the Albemarle Sound (March 5, 2012).
- "*Home Is Where the Habitat Is...*" posters and brochures continue to be available and distributed to the aquariums, environmental education centers and through Partnership for the Sounds. Educators and guides reference these documents and the CHPP in their presentations.
- During 2011, the N.C. Forest Service (NCFS) recorded more than 880 instances in eastern North Carolina in which the agency assisted with the use of best management practices (BMP), identified BMPs that were being used, or made recommendations for using BMPs. Work continued to develop a comprehensive, new data collection and analysis program for conducting detailed BMP site survey evaluations.
- Development of a monitoring strategy for the Albemarle-Pamlico ecosystem is underway, designed to align with APNEP's 2012 CCMP.
- Annual N.C. Association of Soil and Water Conservation Districts held education contests for posters, essays, speeches, computer designed posters and computer designed slideshows. The 2011-12 contest theme was "Wetlands are Wonderful."
- A draft report providing technical information on such issues as estuarine shoreline stabilization, water availability, monitoring and enforcement, and sanitary sewer outflows is anticipated for released by the end of 2012

## **Goal 2: Identify, designate and protect strategic habitat areas**

- Mapping of benthic habitat in deep estuarine bottom has occurred in current oyster sanctuary locations and proposed oyster sanctuary locations.
- The DMF bottom mapping program has mapped and sampled: Newport River, Harlowe Creek, Back Sound, Harbor areas on the Eastern side of Harkers Island, Davis Bay and other areas on the Western side of North River in Carteret County; the Lower Lockwood Folly intercostal waterway in Brunswick County.
- Region 2 Shellfish Habitat Areas (SHAs) were approved by the Marine Fisheries Commission. The SHA designations were completed in partnership with a N.C. Sea Grant and DMF shared Marine Fisheries Management Fellow. The final report is posted on the DMF website.
- Emergent marsh monitoring was initiated in three of the four NERR sites.
- The joint Reserve-N.C. Sea Grant coastal research fellowship funded a UNC-IMS graduate student examining the impact of algae on intertidal oyster reefs at the Rachel Carson Reserve in 2011.
- The submerged aquatic vegetation (SAV) imagery, captured in 2007, has been fully interpreted and is housed with the National Oceanic and Atmospheric Administration, or it can be accessed through the APNEP website.
- The Ecosystem Enhancement Program (EEP) developed and proposed a framework of comprehensive research questions to systematically identify and prioritize North Carolina's submerged aquatic vegetation restoration research needs. The table is intended to be used by the Restoration Subcommittee to propose a short and long-term research plan that may inform an SAV restoration strategy for the state.
- The SHA priorities are now a standard data layer incorporated into EEP River Basin Restoration Priorities plans for applicable coastal regions.

### **Goal 3: Enhance habitat and protect it from physical impacts**

- Oyster Sanctuary development is continuing at Gibbs Shoal using reef ball and rip rap provided through Coastal Recreational Fishing License (CRFL) funding.
- In the Little Creek Oyster Sanctuary (Lower Neuse River), the U.S. Army Corps of Engineers (USACE) funded a project to compare reef ball, rip rap, reef pyramid, and concrete block material in the creation of oyster sanctuaries. The project is in the final stages of permitting.
- CRFL grant money funded one fishing reef/oyster sanctuary in each of the northern, central and southern regions of the coast. The siting criteria included access from existing boat ramps and considered recreational fish species and oyster recruitment.
- Received CRFL funds to create two informational brochures and an educational video describing the process of building oyster reefs and how shell recycling helps oyster populations.
- As part of the shrimp FMP process, DMF updated GIS datasets of no-trawl areas and included areas that are temporarily closed through proclamations to get accurate acreage estimates of areas closed to trawling throughout the year.
- The N.C. Division of Coastal Management (DCM) has completed mapping of the estuarine shoreline including inventory of structures such as docks and piers. Data can be used in analysis of the cumulative shading impacts of these structures on SAV.
- DCM has completed mapping of the estuarine shoreline resulting in a digital representation of the shoreline by type, modifications and an inventory of structures. The division will be contracting with East Carolina University to assist in further analysis of the project data to identify regional development trends along the shoreline and to better understand the distribution of coastal structures and natural resources.
- DCM and DMF have initiated a broader department-level effort to address estuarine shoreline stabilization that may advance the use of marsh sills and other alternative stabilization structures.
- An alternative shoreline stabilization demonstration site was installed on the Carrot Island portion of the Rachel Carson Reserve in June 2012. The demonstration project is part of the reserve's ongoing "Sustainable Estuarine Shoreline Stabilization: Research, Education and Public Policy in North Carolina" project funded by CICEET.
- DCM management has established a detailed shoreline, for non-regulatory purpose, that can serve as a basis for analyzing policy language that has been adopted by the Coastal Resources Commission within North Carolina's estuarine and ocean system areas of environmental concern. DCM designed a methodology and rules for digitizing a complete estuarine shoreline and all structures that exist along the shoreline. The shoreline delineation methodology was designed to address issues DCM and other stakeholders face when managing the estuarine shoreline.
- The CRC continues development of a sea-level rise policy focusing on identifying specific needs for additional research, monitoring and education, and planning assistance. The commission is expected to send the draft policy to public hearing at its August 2012 meeting.
- A market analysis of publicly-funded outreach professionals was conducted to assess sea level rise education and outreach activities, which will be used for future coordination on sea level rise messaging and outreach.
- WRC staff selected two creeks in the Albemarle Sound region known for an historic herring run to sample weekly with boat electrofishing. A draft report of the results is being reviewed.



- Work is underway between APNEP and Virginia's Department of Conservation and Recreation (DCR) that explores the shared waters of the Meherrin River and the Chowan River in North Carolina as part of the Virginia Healthy Waters Initiative. This work will help local governments identify navigation and stream restoration projects.
- The N.C. Division of Soil and Water Conservation (DSWC) is working with DMF to obtain SHA Region 1 and Region 2 maps in a format usable for local soil and water conservation districts when ranking cost share projects.
- The N.C. Forest Service (NCFS) continues to work with partners at North Carolina State University (NCSU) to develop a long-term monitoring study proposal that can be used to solicit and obtain necessary funds for more in depth monitoring.
- During this fiscal year, EEP has been collaborating with the N.C. Department of Transportation (NCDOT) to assess the potential for barrier and dam removal, specifically on a test-case basis in the Chowan River Basin. EEP presented barrier removal scenarios to the interagency review team and is discussing crediting strategies with members during the most recent and the upcoming bimonthly meetings.
- EEP is using the River Herring FMP and the prioritization document River Herring Habitats (N.C. Environmental Defense 2010) as a basis for field assessments of obstruction removal sites in the Chowan River Basin on a test case basis. Restoration projects pursued by EEP in the Chowan River Basin will be focused in areas that promote improved fisheries habitats in addition to traditional mitigation measures.

#### **Goal 4: Enhance and protect water quality**

- DMF received two grants - from the Clean Water Management Trust Fund (CWMTF) and the Albemarle-Pamlico National Estuary Program (APNEP) and have completed the grant requirements for each. The CWMTF grant was for developing a comprehensive plan to reduce stormwater runoff at the DMF headquarters. The APNEP grant was for a rain garden, stormwater re-route, and marsh plantings. DMF plans to seek additional funding to complete other suggestions in the plan such as the installation of cisterns.
- DCM worked with DWQ to incorporate power washing BMPs into the update of the Clean Marina Best Management Practices (BMP) Manual and has included additional power washing guidance based on that input.
- DCM has developed the North Carolina Clean Boater program as an important part of the North Carolina Clean Marina program. Both programs protect coastal resources through the use of best management and operation practices. To become a North Carolina Clean Boater, boaters read "A Boaters' Guide to Protecting North Carolina's Coastal Resources," commit to clean boating by signing the pledge card located in the Clean Boater brochure, mail a pledge card to the North Carolina Clean Boater Program office, and receive a North Carolina Clean Boater sticker to display on their vessel.
- DCM has completed mapping of the estuarine shoreline resulting in a digital representation of the shoreline by type, modifications and an inventory of structures.
- DCM has incorporated funds for Clean Marina Coordinator in the division's 2012-13 NOAA cooperative agreement.
- Power washing BMPs have been incorporated into the Clean Marina Manual as of June 2011.

- DWQ is continuing to issue and re-issue Phase II stormwater permits to coastal and non-coastal local jurisdictions and military bases. DWQ is working closely with them to help them design and develop programs to better control stormwater and also develop strategies to address existing impaired waters.
- Improving wastewater/stormwater management at coastal marinas has been an ongoing activity for much of 2011 and 2012.
- WRC is funding a study on endocrine disrupting chemicals and intersex fish in North Carolina waters including the Roanoke River.
- For fiscal 2011-12, approximately \$212,000 were allocated to local soil and water conservation districts for BMP implementation. A \$125,000 grant received from the Environmental Enhancement Grants program in 2011 for BMP implementation in the Cape Fear, Neuse, Tar-Pamlico, and White Oak river systems. The DSWC will continue to pursue grant funds to supplement the state allocation.
- There has been no action in the coastal counties this past year regarding alternatives to waste lagoons and spray fields systems. However, an anaerobic digester was completed in Yadkin County. The system captures the methane and able to produce enough electricity to run the system and part of the farm itself. Individuals are exploring the possibility of replicating a similar system in the coastal counties in the future.
- The NCFS has organized an internal work group to address potential issues related to timber harvesting in bottomland/muck/swamp systems, regarding how to minimize water quality impacts during these operations and promote successful tree regeneration.
- Funding is available to fund one more project for the Swine Buyout Program. The project is in Craven County, and the division is awaiting an appraisal before moving forward.

## **Major Overall Accomplishments of the CHPP Implementation Plan**

After the CHPP was formally adopted in December of 2004, the commissions, their administrative divisions, and DENR developed and adopted implementation plans during the summer of 2005 and again in 2007. These implementation plans detail more than 100 specific steps the agencies involved would take during the identified fiscal years to implement the CHPP recommendations. The accomplishments of the CHPP have been reported annually since 2006 through a CHPP Annual Report.

In 2009, the CHPP Team began reviewing and revising the original CHPP document as required by the Fisheries Reform Act of 1997. The act mandates the review of each management plan at least once every five years. With staff from the N.C. Division of Marine Fisheries as the lead writers, a complete revision of the CHPP has been carried out over the past year and a half. Recommendations that were accomplished under the 2005 CHPP or no longer significant were removed. New scientific findings and studies that occurred during the past five years have been included in the revised document. A number of new recommendations have been included in the re-written plan. Also included in the 2010 CHPP are new, emerging issues affecting North Carolina's coastal habitats. These emerging issues include: pharmaceuticals and endocrine disruptors, climate change and sea level rise, energy infrastructure (oil), invasive species, and alternative energy issues. The 2010 CHPP was adopted by all four commissions in the fall of 2010 and is currently being used by each agency to direct their coastal habitat initiatives.

Overall, the 2005 CHPP and the 2010 revised CHPP have been largely successful in implementing plan recommendations. To date, the majority of accomplishments have been non-regulatory. Prior to making large management changes, positions and funding were needed to assess compliance of existing environmental rules, complete mapping of fish habitats, and to educate the public on environmental issues. Multiple large grants have been awarded to state agencies and universities to conduct research or projects in support of the CHPP. Examples include DCM receiving funding for the Beach and Inlet Management Plan, shoreline mapping, and the Cooperative Institute for Coastal and Estuarine Technology (CICEET) project looking at shoreline stabilization; APNEP coordinating the pooling of resources to map SAV coast wide; and universities receiving Fishery Resource Grants (FRGs) and Coastal Recreational Fishing License (CRFL) grants to collect needed habitat information. Much has been done in those areas, but work still remains.

The passing of the coastal stormwater rules marks the largest regulatory change that the 2005 CHPP influenced. It occurred through the hard work of numerous DENR staff, commissioners and CHPP supporters such as environmental organizations. The CRC also implemented sediment criteria rules for beach nourishment and other rule changes to minimize habitat impacts from water dependent activity. Regulatory changes for habitat protection tend to take longer to implement because scientific information is needed to support the change, discussions are needed among agencies, or educational outreach to stakeholders is required. Some of the new scientific information needed to support these changes is part of the 2010 CHPP.

In spite of the difficult economic times, significant progress in improving and protecting coastal habitats continues as agencies move forward with the recommendations found in North Carolina's plan. These accomplishments are noted in pages four through eight of this report. Of significant interest and accomplishment over the past year was the completion of the Strategic Habitat Area 2 (SHA2) analysis and its adoption by the MFC. This area encompasses the Pamlico Sound and its main tributaries. Also of significant note to the DMF was the ability to maintain the Oyster Sanctuary Program even through tough economic times. Partnerships with organizations outside state government were instrumental in maintaining this program. These partnerships attest to the importance of maintaining this significant habitat and resource.

The Division of Coastal Management focused their efforts this past year on education extensively using the National Estuarine Research Reserve system to promote the importance and the significance of maintaining North Carolina's precious coastal habitats. With funding from APNEP, the Division of Coastal Management implemented an education and outreach campaign focusing on the estuaries and the potential effect of sea level rise primarily in the Albemarle-Pamlico system. A large part of the education effort focused on alternatives for shoreline stabilization with several workshops being held along the coast. The NERR also produced a booklet entitled "Our Living Estuaries" which was published through a grant from the Cooperative Institute for Coastal and Estuarine Technology (CICEET) and the booklet included all of the habitats identified in the CHPP. A second booklet entitled "Weighing Your Options" was produced in 2011 to help property owners understand shoreline stabilization options available to them, how they work, and the cost/benefits of each option through funding from a CICEET grant.

DCM also completed mapping of the estuarine shoreline. This effort resulted in a digital representation of the shoreline by type, modifications, and an inventory of structures. The division will be contracting with East Carolina University to assist in further analysis of the project data. This analysis will identify regional development trends along the shoreline and will help to better understand the distribution of coastal structures and natural resources. DCM also secured funding for a Clean Marina Coordinator through its 2012-13 NOAA cooperative agreement.

The Division of Water Quality made changes in the coastal buffer rules that came into effect on July 1 of this year. These rule changes are applicable to Neuse and Tar-Pamlico counties of Beaufort, Hyde, Carteret, Craven, Dare, Onslow, Pamlico and Washington in order to conform with S.L. 2011-394, Section 17. The rule changes now allow for development that would have been prevented by previous Neuse and Tar-Pamlico Buffer rules. Affected development will still be back from the high water level a minimum of 30 feet, the maximum feasible distance back designed to minimize encroachment into the protected riparian buffer. New stormwater generated by the affected development must still be treated and flow must still diffuse through the buffer. Also in these rule changes, no septic tank or drain field may encroach on the buffer. DWQ also rewrote the chapter regarding permeable pavement in the Best Management Practices manual. This revision now clarifies the level of credit for this type of pavement and provides guidance on its proper design standards.

In preparation for the upcoming revision of its Wildlife Action Plan (WAP), the Wildlife Resources Commission's staff has completed the vulnerability sections for habitats identified in the CHPP. The WAP and the WRC's Green Growth Toolbox promote habitat conservation and help educate residents of North Carolina as to the importance of habitat for wildlife and fisheries. The WRC has also selected two creeks in the Albemarle Sound region for weekly sampling in an effort to determine herring abundance in those once productive tributaries.

The interpretation of the submerged aquatic vegetation photography, which was photographed in 2007 and 2008, has been completed and the information is now available for researchers and those involved with the permitting process. NOAA personnel in Beaufort have the meta-data, and color schematics are available through the APNEP website.

The Community Conservation Assistance Program (CCAP) was appropriated \$212,000 for fiscal 2012. These funds will be allocated to the local Soil and Water Conservation Districts for implementation of best management practices (BMPs). The Division of Soil and Water Conservation received an Environmental Enhancement Grant for \$125,000 for BMP implementation in the Cape Fear, Neuse, Tar-Pamlico and White Oak river basins. The Association of Soil and Water Conservation Districts held a contest during the 2011-2012 school year. The contest included posters, essays, a speech competition, a computer designed poster and a slideshow. The theme for the contest was "Wetlands are Wonderful."

In 2011, the N.C. Forest Service (NCFS) recorded more than 880 instances in eastern North Carolina in which the agency assisted with BMP use, identified BMPs that were being used, or made recommendations for using BMPs. Collectively these activities encompassed almost 54,500 acres across eastern North Carolina. Work continued to develop a comprehensive, new data collection and analysis program for conducting detailed BMP site survey evaluations. BMP surveys will begin in the summer of 2012 across the state. The NCFS executed a new memorandum of understanding (MOU) with the Division of Land Resources regarding the inspection, monitoring, education, and enforcement of the Forest Practices Guidelines. The two agencies are developing an indicator list that can be referenced when agency personnel are determining if a land-disturbing activity is for forestry or non-forestry purposes.

The Ecosystem Enhancement Program (EEP) proposed and developed a comprehensive research questions framework to systematically identify and prioritize SAV restoration research needs in North Carolina. The table is intended to be used by the SAV Restoration Subcommittee to propose short- and long-term research plans that may inform an SAV restoration strategy for the state. The SHA priorities are now a standard data layer incorporated into EEP River Basin Restoration Priorities plans for applicable coastal regions. The inclusion of SHAs in the RBRP prioritizations elevates the scores for full-delivery projects sought for mitigation by EEP in target areas.

**ATTACHMENT 1.**  
**CHPP STEERING COMMITTEE MEMBERS, 2011 – 2012**

*Marine Fisheries Commission*

Dr. Allyn Powell	Gloucester	<a href="mailto:apowell66@ec.rr.com">apowell66@ec.rr.com</a>
Dr. Chris Elkins	Gloucester	<a href="mailto:captchrismfc@gmail.com">captchrismfc@gmail.com</a>

*Environmental Management Commission*

Dr. Charles H. Peterson	Morehead City	<a href="mailto:cpeters@email.unc.edu">cpeters@email.unc.edu</a>
Mr. Tom Ellis	Raleigh	<a href="mailto:tellis3@bellsouth.net">tellis3@bellsouth.net</a>

*Coastal Resources Commission*

Ms. Joan Weld	Currie	<a href="mailto:jgweld@gmail.com">jgweld@gmail.com</a>
Mr. Bob Emory	New Bern	<a href="mailto:bob.emory@weyerhaeuser.com">bob.emory@weyerhaeuser.com</a>

*Wildlife Resources Commission*

Mr. Durwood Laughinghouse	Raleigh	<a href="mailto:dslaugh@aol.com">dslaugh@aol.com</a>
Mr. Mitch St. Clair	Washington	<a href="mailto:mitchstclair@suddenlink.net">mitchstclair@suddenlink.net</a>

## **ATTACHMENT 2.**

### **NORTH CAROLINA COASTAL HABITAT PROTECTION PLAN STEERING COMMITTEE**

North Carolina has a number of programs in place to manage coastal fisheries and the natural resources that support them. The Coastal Habitat Protection Plan (CHPP) has identified gaps in the protection provided for important fish habitats under these programs, and also notes that these habitats would benefit from stronger enforcement of existing rules and better coordination among agencies. The focus of the CHPP, per the Fisheries Reform Act of 1997, is on activities regulated by the Marine Fisheries, Coastal Resources, Environmental Management and Wildlife Resources Commissions. During the summer of 2011, each commission and the Department of Environment and Natural Resources (DENR) adopted a fourth two-year set of plans to implement the recommendations found in the 2010 CHPP. Once again, the focus of those plans was on actions that could be taken based on existing resources and within the 2011-2013 budget cycle. There continues to be a basic understanding among agencies that all recommendations and their associated actions will be supported regardless of lead agency. Listed in this attachment are the agencies and their respective commissions with voting status on the CHPP Steering Committee.

#### **Department of Environment and Natural Resources**

DENR is the lead stewardship agency for the preservation and protection of North Carolina's outstanding natural resources. The department, which has offices from the mountains to the coast, administers regulatory programs designed to protect air quality, water quality, and the public's health. Through its natural resource divisions, DENR manages fish, wildlife, forestland and wilderness areas. The DENR implementation plan focuses on coordination among the commissions and the department, as well as ensuring that all DENR Divisions are taking actions consistent with the goals and recommendations of the CHPP.

#### **Marine Fisheries Commission and Division of Marine Fisheries**

The Marine Fisheries Commission (MFC) and Division of Marine Fisheries (DMF) manage the commercial and recreational fisheries in North Carolina's estuarine and ocean waters. These waters, including their specific physical habitats (water column, wetlands, sea grasses, soft and hard bottoms, and shell bottoms), produce the finfish, shrimp, crabs, oysters, and other economically important species sought by fishermen, as well as the forage base that supports them. The division implements the commission's rules and department initiatives. In 2010, the Shellfish Sanitation and Recreational Water Quality programs were incorporated into the DMF. With the addition of those two programs, the DMF changed its mission statement to reflect the changes: "*The Division of Marine Fisheries is dedicated to ensuring sustainable marine and estuarine fisheries and habitats for the benefit and health of the people of North Carolina.*" Division staff members drafted the CHPP, and they will staff many of the groups working on implementation actions. Staff members in DMF's district offices will also use CHPP information to review potential impacts of coastal development projects.

#### **Environmental Management Commission and Division of Water Quality**

The Environmental Management Commission (EMC) is responsible for adopting rules for the protection, preservation and enhancement of the state's air and water resources. The commission oversees and adopts rules for several divisions of DENR, including the divisions of Air Quality, Water Resources, and Water Quality. The goal of the Division of Water Quality (DWQ) is to maintain or restore and improve the

aquatic environment and to ensure compliance with state and federal water quality standards. In coordination with the CRC and MFC and their respective staffs, the Environmental Management Commission (EMC) and DWQ have developed specific actions to implement the CHPP recommendations.

### **Coastal Resources Commission and Division of Coastal Management**

The Coastal Resources Commission (CRC) establishes policies for North Carolina's Coastal Management Program and adopts implementing rules for both the N.C. Coastal Area Management Act (CAMA) and the N.C. Dredge and Fill Law. The commission designates areas of environmental concern, adopts rules and policies for coastal development within those areas, and certifies local land-use plans. The Division of Coastal Management (DCM) serves as staff to the CRC and works to protect, conserve and manage North Carolina's coastal resources through an integrated program of planning, permitting, education and research. With jurisdictional authority at the interface of many of the habitats identified in the CHPP, the CRC and DCM take actions to complement those of the MFC/DMF and EMC/DWQ.

### **Wildlife Resources Commission**

The Wildlife Resources Commission (WRC) and its agency became full members of the CHPP Steering Committee and the CHPP process in the fall of 2008. The WRC has as its mission "To manage, restore, develop, cultivate, conserve, protect, and regulate wildlife resources and their habitats for the citizens of the state of North Carolina." The Wildlife Resources Commission and its staff, as it directly relates to the CHPP, manage the state's freshwater fisheries through fisheries research, fisheries management, hatchery operation and habitat conservation, administer and coordinate educational programs designed to facilitate conservation of the state's wildlife and other interrelated natural resources and the environment people share with them.



## **Attachment 3. Updates to the Two-Year CHPP Implementation Plan**

### **Division of Marine Fisheries**

*Goal 1: Improve effectiveness of existing rules and programs protecting coastal fish habitats*

<b>Rec</b>	<b>Action</b>	<b>Update</b>
1.2	Develop a data system for monitoring data and mapping the closure of shellfishing waters to enhance the sharing of information among departmental divisions.	No action - Shellfish closure maps are complete and available on the DMF website, and our shellfish classifications GIS data is available on NC One map, but the IBEAM database system has been at a standstill for many years due to a lack of programmers and time at the department level.
1.3	Promote habitat conservation by creating informational materials highlighting life history, habitat use, and threats of focal species at festivals; 2) set up fish habitat displays, such as a marsh tank, for longer events; 3) seek funding for additional displays.	DMF staff regularly attend festivals and outreach events to educate the public on DMF activities including habitat conservation, the oyster shell recycling program, and the life history, habitat use, and threats to important fishery species. DMF also received additional funding through CRFL grant to reprint DMF's popular "recreational angler's guide," which is used to educate the public on the most commonly caught species highlighting their habitat use and life cycles.
1.3	Incorporate CHPP materials into current DMF outreach activities ('This Week at the Fisheries' articles, Fish Eye News, Zoo FileZ).	<p>DMF included CHPP informational briefs and sustainability tips in issues of its 'This Week at the Fisheries' email publication. DMF also had numerous news releases related to habitat conservation and awareness.</p> <p>DMF's Fish Eye News, a web-based publication, featured articles addressing CHPP implementation, obstacles to anadromous fish spawning migrations, endocrine disrupting chemicals, and beach water quality (see <a href="http://portal.ncdenr.org/web/mf/fish-eye-news-0811">http://portal.ncdenr.org/web/mf/fish-eye-news-0811</a>).</p> <p>Protection of coastal habitat from pollutants and marine</p>

		<p>debris were featured in an ethical angling episode of ZooFileZ, which is a video series produced by the North Carolina Zoo. Also provided a list of “Things you can do to help fish habitat” for the public on our website. Links to both topics can be found on DMF’s website at: <a href="http://portal.ncdenr.org/web/mf/education/ethical-angling">http://portal.ncdenr.org/web/mf/education/ethical-angling</a>.</p> <p>The DMF habitat section hosted Operation Medicine Drop events in both Morehead City and Wilmington, and supported another event in Manteo to educate the public on proper disposal methods of unwanted medications to keep endocrine disrupting chemicals out of our waterways. Totals: Wilmington had 77 participants bring 33,908 pills/oz; Morehead City had 25 participants bring 15,513 pills/oz; Manteo had 18 participants bring 11,924 pills/oz for a combined total of 120 participants bringing in 61,345 pills/oz.</p> <p>DMF staff gave presentations on Strategic Habitat Areas and accomplishments and future plans of the CHPP at APNEP’s “State of the Sounds” symposium. DMF also presented a poster on the role of Primary Nursery Areas in protecting tidal creeks at the “Tidal Creek Summit” produced by N.C. and S.C. Sea Grant.</p>
1.3	Encourage Coastal Recreational Fishing License (CRFL) projects related to habitat education.	<p>In 2011, an educational display was funded through CRFL at the Harkers Island Waterfowl Museum, and the DMF Oyster Shell Recycling program received money for educational outreach.</p> <p>In 2012, DMF modified the grant criteria to encourage the funding of projects that increase awareness of living shoreline stabilization techniques (i.e., marsh sills) and provide financial incentives for the construction of such structures.</p>
1.4	Continue to review development issues and address	No action.

	environmental issues as they relate to the Coastal Area Management Act (CAMA) Land Use Planning Program.	
1.6	Participate in state and federal efforts to control invasive aquatic species and educate staff and partner agencies.	DMF staff serves on the N.C. Aquatic Weed Control Council and is working with other agencies (DWR, WRC) to find funding for developing a statewide Aquatic Nuisance Species Plan.

*Goal 2: Identify, designate and protect strategic habitat areas*

<b>Rec</b>	<b>Action</b>	<b>Update</b>
2.1a	Facilitate mapping of deep (>15 ft) estuarine bottoms, starting with lower Neuse River.	Mapping of benthic habitat in deep estuarine bottom has occurred in current oyster sanctuary locations and proposed oyster sanctuary locations. The mapping of natural benthic habitat in the lower Neuse River and Pamlico Sound is planned for late summer and fall 2012.
2.1b	Conduct cooperative DMF/NOAA research on methods for evaluating status and trends in SAV distribution and condition.	DMF supported CRFL funding for an NOAA/ECU/NCSU/APNEP SAV project. The product is expected to be a recommendation on how best to monitor SAV in North Carolina. The final report is due in fall 2012.
2.1b	Continue mapping of all shallow estuarine bottom and bottom types.	The DMF bottom mapping program has mapped and sampled: Newport River, Harlowe Creek, Back Sound, Harbor areas on the Eastern side of Harkers Island, Davis Bay and other areas on the Western side of North River in Carteret County; the Lower Lockwood Folly intercostal waterway in Brunswick County. There remains approximately 9,000 acres to be mapped in both Hyde and Brunswick counties. Within the next year, the DMF Mapping Program plans to remap some areas in Carteret, the lower New River, the back barrier areas near Oak Island, and areas near Bluff Point in Hyde County.
2.1b	Investigate SAV and shell bottom monitoring methods for trend assessments.	No action.
2.2	Complete Strategic Habitat Area (SHA) evaluation for Region 2.	Region 2 SHAs were approved by the Marine Fisheries Commission. The Strategic Habitat Area designations were

		completed in partnership with a N.C. Sea Grant/DMF shared Marine Fisheries Management Fellow. Final report is posted on the DMF website.
2.2	Conduct ground truthing of Region 1 SHA nominations.	Three out of 20 SHA nominations in region 1 were ground truthed in July 2011. In those areas, the information used as inputs in the SHA analysis was fairly accurate upon direct observation.
2.2	Conduct ground truthing of Region 2 SHA nominations.	DMF has initiated the development of a plan for ground truthing these areas.
2.2	Conduct SHA evaluation for Region 3.	DMF is currently in the process of compiling and modifying GIS data for input into the MARXAN computer program. The region 3 SHA nominations are expected to be complete in mid 2013.
2.2	Integrate resulting criteria and information from SHA committee into DENR divisions' guidelines, policies, and rulemaking.	No action.
2.2	Study the feasibility and benefits of developing an SAV Restoration Program.	No action.
2.2	Work with DENR to include SHA priorities within EEP local watershed plans and DENR conservation planning tool.	No action.

*Goal 3: Enhance habitat and protect it from physical impacts*

<b>Rec</b>	<b>Action</b>	<b>Update</b>
3.1a	Continue expanding the oyster sanctuary program.	<ul style="list-style-type: none"> <li>- The Oyster Sanctuary Program lost \$1.5 million of state funding in 2011, but was able to make up for much of that with the grants listed below.</li> <li>- Oyster Sanctuary development is continuing at Gibbs Shoal using reef ball and rip rap provided through CRFL funding.</li> <li>- In the Little Creek Oyster Sanctuary (Lower Neuse River), the U.S. Army Corps of Engineers (USACE) funded a project to compare reef ball, rip rap, reef pyramid,</li> </ul>

		and concrete block material in the creation of oyster sanctuaries. The project is in the final stages of permitting. CRFL money funded one fishing reef/oyster sanctuary in each of the northern, central, and southern regions of the coast. The siting criteria included access from existing boat ramps and considered recreational fish species and oyster recruitment.
3.1a	Cooperate with university researchers on oyster larvae distribution and movement investigations.	No action.
3.1a	Enhance oyster shell recycling program. Discourage use of shell material for landscaping or other uses besides shellfish cultch.	Received CRFL funds to create two informational brochures and an educational video describing the process of building oyster reefs and how shell recycling helps oyster populations (to be completed by December 2012).
3.1a	Work with university researchers to monitor fish/invertebrate use of oyster sanctuaries and effect of oysters on local water quality.	No action.
3.1b	Make protection and restoration of critical fisheries habitats a priority part of the One North Carolina Naturally initiative, through incorporation of DMF data on habitat and SHAs.	No action.
3.1b	Obtain funding to restore designated streams and associated wetlands designated as anadromous fish spawning areas in the Albemarle Sound area as implementation steps for the River Herring Fishery Management Plan.	DMF submitted a proposal for a National Fish and Wildlife Foundation grant to replace culvert obstructions in the Chowan River Basin with a “fish friendly” culvert. However, the funding was denied. This process brought to DMF’s attention three major issues: 1) the high cost of replacing a single culvert (~\$300,000), 2) it is not clear what constitutes a “fish-friendly” culvert design, and 3) which culverts are priority for replacement. DMF formed an internal workgroup to address these issues. In addition, DMF initiated a discussion among multiple agencies that renewed interest in developing better stream-crossing guidelines with regard to fish passage.
3.1b	Support efforts to restore SAV.	DMF participates in the interagency SAV partnership, and one of the main goals of the group is to enhance restoration efforts.

3.2	Work with DWR to minimize conflicts between Aquatic Weed Control practices and protection of SAV habitat.	DMF has worked with WRC and DWR regarding stocking reservoirs with triploid grass carp for <i>Hydrilla</i> control. DMF is working toward requiring gates near the spillways to reduce the risk of escapement.
3.3	Evaluate through the fisheries management plan process the need for further restrictions of bottom-disturbing gear.	As part of the shrimp FMP process, DMF updated GIS datasets of no-trawl areas and included areas that are temporarily closed through proclamations to get accurate acreage estimates of areas closed to trawling throughout the year.
3.5b	Continue to study the feasibility and benefits of dam and barrier removal in general and for mitigation.	DMF participates in the NOAA Cape Fear River Watershed study to assess and develop an action plan to enhance conditions for anadromous fish. DMF also participates in the American Rivers Aquatic Connectivity Team, which is looking at feasible obstructions to remove.
3.4	Encourage alternatives to vertical shoreline stabilization methods.	DMF will work with DCM on a living shoreline implementation team to further encourage living shorelines (see DCM action 3.4 for details).
3.5b	Survey previously identified Albemarle Sound river herring spawning areas to estimate current condition and spawning function, and identify stream obstructions on river herring spawning streams.	In an effort to select stream obstructions that would be a priority for removal or replacement, DMF staff used GIS to compare river herring spawning data (1970's to present) to examine temporal and spatial trends. This analysis was overlaid with the culvert locations from a variety of sources including NCDOT and a recent survey of culverts by DMF staff in the Chowan River Basin. This information was then compared to a report produced by the Environmental Defense Fund that estimated the number of acres opened by removal or replacement of existing obstructions. As a result, three culverts were identified as potential priorities for replacement in the Pembroke and Queen Anne's Creek sub-watersheds.

*Goal 4: Enhance and protect water quality*

Rec	Action	Update
4.1c	Seek funding to initiate research on impacts of endocrine-	No action.

	disrupting chemicals to blue crabs and oysters.	
4.1c	Work with the DCAS to develop and implement a drug disposal program for pharmaceuticals.	The DEA is looking into creating a federal drug disposal program.
4.5b	DMF will seek grant funding to reduce stormwater runoff from the DMF Headquarters' property through use of stormwater infiltration, rain gardens, and shoreline marsh plantings.	DMF received two grants (from the Clean Water Management Trust Fund (CWMTF) and APNEP) and have completed the grant requirements for each. The CWMTF grant was for developing a comprehensive plan to reduce stormwater runoff at the DMF headquarters property. The APNEP grant was for a rain garden, stormwater re-route, and marsh plantings. DMF plans to seek additional funding to complete other suggestions in the plan such as the installation of cisterns.
4.6c	Form workgroup to determine water quality standards necessary to support SAV habitat.	No action.

## **Division of Coastal Management**

*Goal 1: Improve effectiveness of existing rules and programs protecting coastal fish habitats*

<b>Rec</b>	<b>Action</b>	<b>Update</b>
1.3	DCM will incorporate CHPP into their research and education efforts.	<p>Research: See also recommendations 2.1 b and c, 3.1c, 3.4, and 3.8 below.</p> <ul style="list-style-type: none"><li>• The NOAA NERRS Graduate Research Fellowship at the NCNERR funded the following project that began in 2011. The project examines the roles shoreline hardening and climate change have on fiddler crabs and their ability to engineer marsh ecosystems. The project will assess how this ecosystem engineering role changes based on the presence/absence of shoreline stabilization and changing water levels.</li></ul> <p>Education</p> <ul style="list-style-type: none"><li>• The reserve implemented an education and outreach campaign focusing on estuaries and sea level rise in the Albemarle-Pamlico system funded by the Albemarle-Pamlico National Estuary Program (APNEP). Activities included a social media "Did You Know?" series on estuaries and sea level rise (on DENR's Facebook &amp; Twitter accounts), a Coastal Exploration teacher workshop in Corolla in August 2011 that incorporated two new curricula on estuaries developed as part of this campaign, an estuarine shoreline stabilization workshop in Nags Head in September 2011 that emphasized the importance of fringing marsh habitats and explained alternatives to vertical control structures, and three public field experiences (estuary exploration in Kitty Hawk Bay, Kitty Hawk Woods kayak trip, and a guided Currituck Banks Boardwalk trip).</li></ul>



		<ul style="list-style-type: none"> <li>• Estuarine Shoreline Stabilization workshops were held April 24 in Beaufort and May 2, 2012 in Wilmington. The workshops emphasized the importance of fringing marsh habitats and explained alternatives to vertical control structures. The same workshop was hosted in Nags Head in September 2011 as part of the aforementioned education and outreach campaign funded by APNEP. The “Weighing Your Options: How to Protect Your Property from Shoreline Erosion” booklet was distributed at the workshops.</li> <li>• A realtor workshop on Estuarine Shoreline Stabilization is being developed and will be approved for four continuing education credits by the N.C. Real Estate Commission. It will be offered in 2013.</li> <li>• A fourth “Getting to Know Wetlands” workshop (with an emphasis on coastal wetland plant identification and delineation) will be offered in Beaufort in May 2013. This workshop was also offered in May 2011.</li> <li>• The CHPP habitats are addressed during Reserve K-12 student field trips, teacher/educator workshops, summer public field trips, and summer camps. Discussions include why these habitats are important to coastal North Carolina and how they benefit plants and animals.</li> </ul>
1.3	Distribute brochures and posters about fish, fish habitat, and fishing to be available for general distribution by DENR staff.	No action.
1.3	Provide information to focus students in K-12 understanding the biodiversity of lakes, streams, and estuaries.	An activity booklet titled “Our Living Estuaries” was produced in 2011 through funding from a Cooperative Institute for Coastal and Estuarine Environmental Technology (CICEET) grant. CHPP habitats are included in the booklet. Students read about each habitat and then

		try to match which animals and plants can be found in each.
1.4	Continue to review development issues and address environmental issues as they relate to the CAMA Land Use Planning Program.	No action.
1.5	Begin analysis of DCM's estuarine shoreline mapping project.	DCM has completed mapping of the estuarine shoreline resulting in a digital representation of the shoreline by type, modifications, and an inventory of structures. The division will be contracting with East Carolina University to assist in further analysis of the project data to identify regional development trends along the shoreline and to better understand the distribution of coastal structures and natural resources.

*Goal 2: Identify, designate and protect strategic habitat areas*

<b>Rec</b>	<b>Action</b>	<b>Update</b>
2.1b	The National Estuarine Research Reserve (NERR) will initiate emergent wetland vegetation monitoring of sentinel sites.	Emergent marsh monitoring was initiated in three of the four NCNERR components. The data record includes more than five years at the Rachel Carson component through a partnership with NOAA, and was initiated in 2011 for the Masonboro and Zeke's Islands components. Sediment elevation tables (SETs) and groundwater wells were installed at the Masonboro and Zeke's Islands components to complement similar infrastructure already in place at the Rachel Carson component. The goal of the monitoring efforts is to track the health of the marsh plant community through time and evaluate any impacts to the marsh systems due to changing water levels. The monitoring for this project is ongoing and new elements (e.g., additional SETs, groundwater wells, elevation readings) will be added as resources allow. The final report for the initial year of this project for the three components was submitted to NOAA in December 2011. Initial findings indicate that the marsh community at Zeke's Island is unique compared

		<p>to that at Rachel Carson and Masonboro Island. The plants occur at a greater density at Zeke's Island and potentially grow taller and thinner than at the other two sites. These results will be re-examined as future data is obtained.</p> <p>The emergent marsh monitoring, sediment elevation tables, and groundwater and water column monitoring are observational elements of the NERRS sentinel sites program. Two of the four NCNERR components are considered to be operational sentinel sites.</p> <p>The NCNERR received funding from the NOAA Restoration Center from 2008-2011 to examine <i>Spartina</i> marsh ecosystems and compare restored marshes to natural ones. This work was part of a five year? NERR partnership to identify the best metrics to monitor to determine restoration success. The final report for this project was submitted to the NOAA Restoration Center in November 2011. For the North Carolina marshes examined, above ground biomass, soil organic content, and species richness were identified as the critical metrics to monitor.</p>
2.1c	Conduct research on the nursery role of SAV, oysters, and wetlands (through NERR in conjunction with UNC-IMS).	This CRFL-funded UNC-IMS led project is conducted in conjunction with the reserve program. The project will be complete in June 2012. Progress reports are available through DMF.
2.1c	Conduct research to manage intertidal oyster reefs in a changing climate (through NERR in conjunction with UNC-IMS).	The joint reserve-N.C. Sea Grant coastal research fellowship funded a UNC-IMS graduate student examining the impact of algae on intertidal oyster reefs at the Rachel Carson Reserve in 2011. This same student used the coastal research fellowship to gather seed data to secure a NOAA NERRS Graduate Research Fellowship at the NCNERR to continue the work.

*Goal 3: Enhance habitat and protect it from physical impacts*

<b>Rec</b>	<b>Action</b>	<b>Update</b>
3.1c	Conduct research to determine if clams can enhance eel grass growth.	This was a UNC-IMS project that was conducted in Middle Marsh at the Rachel Carson Reserve. The project is complete and results indicate that clams did enhance the resident eelgrass production.
3.1c	Support efforts to restore SAV.	Coastal Reserve and Coastal Program staff members serve on the SAV partnership committee. In addition, DCM has completed mapping of the estuarine shoreline including inventory of structures such as docks and piers. Data can be used in analysis of the cumulative shading impacts of these structures on SAV.
3.2	DCM will serve as a clearinghouse for beach nourishment monitoring data and distribute reports to review agencies.	No action.
3.2	Develop minimum criteria for monitoring beach nourishment projects.	No action.
3.4	Use shoreline mapping to develop methodology to determine estuarine shoreline recession rates.	DCM has completed mapping of the estuarine shoreline resulting in a digital representation of the shoreline by type, modifications and an inventory of structures. The division will be contracting with East Carolina University to assist in further analysis of the project data to identify regional development trends along the shoreline and to better understand the distribution of coastal structures and natural resources.
3.4	Encourage alternatives to vertical shoreline stabilization methods through permit requirements and fees (including but not limited to refining rule 15A NCAC 07H .2700 GP for Marsh Sills).	DCM and DMF have initiated a broader department-level effort to address estuarine shoreline stabilization that may advance the use of marsh sills and other alternative stabilization structures. Through a Living Shorelines Implementation Team, DCM and DMF will: <ul style="list-style-type: none"> <li>• Reduce the number of conditions associated with the Marsh Sill General Permit.</li> <li>• Develop a comprehensive education and training effort on the benefits of alternative shoreline stabilization approaches.</li> <li>• Investigate financial incentives and cost reductions</li> </ul>

		<p>for individuals seeking to utilize alternative stabilization approaches.</p> <ul style="list-style-type: none"> <li>• Support continued staff advocacy through enhanced information, training, and outreach materials on the benefits of alternative shoreline stabilization approaches.</li> <li>• Develop a pre- and post-hurricane study project that would 1) develop baseline information about constructed marsh sill projects, and 2) establish a methodology that would allow for an analysis of how well these structures functioned and/or survived during a hurricane.</li> <li>• Continue to map, monitor and research coastal shoreline stabilization in North Carolina.</li> </ul> <p>See also Estuarine Shoreline Stabilization workshops in Recommendation 1.3.</p> <p>The marsh sill assessment project final report was issued in 2011.</p> <p>An alternative shoreline stabilization demonstration site was installed on the Carrot Island portion of the Rachel Carson Reserve in June 2012. The demonstration project is part of the reserve's ongoing "Sustainable Estuarine Shoreline Stabilization: Research, Education and Public Policy in North Carolina" project funded by CICEET. The demonstration project is a loose oyster shell sill design with <i>Spartina alterniflora</i> plantings.</p>
3.4	Use NOAA grant to delineate estuarine shorelines; apply methods to CAMA counties.	<p>DCM management has established a detailed shoreline, for non-regulatory purpose, that can serve as a basis for analyzing policy language that has been adopted by the Coastal Resource Commission within North Carolina's estuarine and ocean system areas of environmental concern. State resource agencies face challenges and inefficiencies directly attributed to current digital mapping</p>

		products. DCM designed a methodology and rules for digitizing a complete estuarine shoreline and all structures that exist along the shoreline. The shoreline delineation methodology was designed to address issues DCM and other stakeholders face when managing the estuarine shoreline. Digitizing was completed in June of 2012. A total of 12,581 miles of shoreline was digitized. Of that total, 602 miles of shoreline was modified with an erosion control structure such as a bulkhead. Also, 26,648 bridges, piers and docks were recorded. Those structures covered 826.3 acres.
3.7	Develop an interagency policy for marina siting to minimize impacts to ecologically important shallow habitats such as Primary Nursery Areas (PNA), Anadromous Fish Spawning Areas (AFSA), and SAV.	No action.
3.8	Develop CRC Sea Level Rise Policy.	The CRC continues development of a sea-level rise policy focusing on identifying specific needs for additional research, monitoring and education, and planning assistance. The commission is expected to send the draft policy to public hearing at its August 2012 meeting.
3.8	Teach the value and function of estuarine habitats, how these habitats may be affected by sea level rise, and alternative methods (other than bulkheads) of estuarine shoreline stabilization.	<p>See Estuarine Shoreline Stabilization workshops in Recommendation 1.3.</p> <p>A booklet entitled "Weighing Your Options" was produced in 2011 to help property owners understand shoreline stabilization options available to them, how they work, and the cost/benefits of each option through funding from a CICEET grant. This grant also funded research that examined the impact of bulkheads on fringing saltmarsh. The project will be complete in August 2012. Initial results indicate that small, narrow pieces of marsh are still capable of providing many of the ecosystem services that a wide marsh can, but most of these services are lost when no marsh is present.</p>

		Results from the marsh monitoring projects (2.1b Recommendation above) will be translated into student and teacher activities in the coming year.
3.8	Develop a sea level rise education strategy including messages and audiences with the Coastal Training Program (CTP) and other DCM staff using the information gathered from the DCM's Sea Level Rise Perception Survey, APNEP's Climate Ready Estuary Program, and existing sea level rise educational materials available through the NERRs and other programs.	<p>This strategy is in draft form and will be refined in the next year. As part of this refinement, a climate change research symposium and a workshop for educators/trainers on sea level rise messaging strategies will be held in the upcoming year.</p> <p>A market analysis of publicly-funded outreach professionals was conducted to assess sea level rise education and outreach activities, which will be used for future coordination on sea level rise messaging and outreach.</p>

*Goal 4: Enhance and protect water quality*

<b>Rec</b>	<b>Action</b>	<b>Update</b>
4.1c	Incorporate power washing best management practices (BMPs) into the Clean Marina Manual.	DCM worked with DWQ to incorporate power washing BMPs into the update of the Clean Marina BMP Manual and has included additional power washing guidance based on that input.
4.5a	Enhance DCM education efforts such as the N.C. NERR Septic Systems Workshops.	The reserve will host a series of stormwater/low impact development workshops in 2013 that incorporate the North Carolina Watershed game that was developed by N.C. Coastal Federation, N.C. Sea Grant and the reserve.
4.5a	Implement Pivers Island stormwater BMP project.	Construction is scheduled for February 2013.
4.5e	Incorporate areas of high aquatic habitat value in addition to high terrestrial habitat value into the N.C. Coastal and Estuarine Land Conservation Program (CELCP).	No action.
4.5f	Develop a clean boater initiative.	DCM has developed the North Carolina Clean Boater program as an important part of the North Carolina Clean Marina program. Both programs protect coastal resources through the use of best management and operation

		practices. To become a North Carolina Clean Boater, boaters read “A Boaters’ Guide to Protecting North Carolina’s Coastal Resources”, commit to clean boating by signing the pledge card located in the Clean Boater brochure, mail a pledge card to the North Carolina Clean Boater Program office, and receive a North Carolina Clean Boater sticker to display on their vessel.
4.7	Improve wastewater/stormwater management at coastal marinas.	No action.
4.7	Inventory docks and piers in the 20 coastal counties.	DCM has completed mapping of the estuarine shoreline resulting in a digital representation of the shoreline by type, modifications and an inventory of structures.
4.7	N.C. Clean Marina Program and Clean Vessel Act activities will emphasize the threats to fish habitat and benefits of BMPs.	No action.
4.7	Seek dedicated funding to staff DCM's Clean Marina Program and effectively implement BMPs as a non-regulatory way to improve water quality in and around marinas and docks.	DCM has incorporated funds for Clean Marina Coordinator in the division’s 2012-2013 NOAA cooperative agreement.



## **Division of Water Quality**

*Goal 1: Improve effectiveness of existing rules and programs protecting coastal fish habitats*

<b>Rec</b>	<b>Action</b>	<b>Update</b>
1.3	Conduct outreach to educate citizens about DWQ's Neuse and Tar-Pamlico riparian buffer rules and 401 Water Quality Certification program.	New coastal buffer rule changes effective July 1, 2011 affect construction of single family residences on existing lots (lots of two acres in size or less that were platted and recorded in the appropriate county's register of deeds prior to Aug 1, 2000). The rule applies to the following counties in the Neuse and Tar-Pamlico river basins: Beaufort, Hyde, Carteret, Craven, Dare, Onslow, Pamlico and Washington. It allows development that would have been prevented by previous Neuse and Tar-Pamlico Buffer rules. Development should still be back from the high water level a minimum of 30 feet, the maximum feasible distance back designed to minimize encroachment into the protected riparian buffer. New stormwater generated by the development must be treated and diffuse flow still maintained through the buffer. No septic tank or drain field may encroach on the buffer.
1.3	Provide information to focus students in K-12 understanding the biodiversity of lakes, streams, and estuaries.	A mobile car washes fact sheet has been prepared.
1.3	Implement workshops for engineers and consultants on stormwater, buffer, and 401 Water Quality Certifications.	Outreach and educational efforts for engineers, developers, local jurisdictions and the general public on stormwater rules and techniques are continuing. In addition, a rewrite of the permeable pavement chapter of the BMP manual was released. This clarifies levels of credit for such pavement and provides guidance on proper design standards.
1.4	Continue to review development issues and address environmental issues as they relate to the CAMA Land Use Planning Program.	There is a strong promotional effort underway this year towards encouraging green infrastructure and low-impact development techniques in new development and

		retrofitting existing development.
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*Goal 2: Identify, designate and protect strategic habitat areas*

Rec	Action	Update
2.2	Study the feasibility and benefits of developing an SAV Restoration Program.	No action.

*Goal 3: Enhance habitat and protect it from physical impacts*

Rec	Action	Update
3.1c	Support efforts to restore SAV.	No action.
3.5b	Continue to study the feasibility and benefits of dam and barrier removal in general and for mitigation.	No action.

*Goal 4: Enhance and protect water quality*

Rec	Action	Update
4.1a	Work with the Department of Agriculture and Consumer Services to develop and implement a drug disposal program for pharmaceuticals.	No action.
4.1c	Incorporate power washing BMPs into the Clean Marina Manual.	Power washing BMPs have been incorporated into the Clean Marina Manual as of June 2011.
4.4	Provide Phase II stormwater educational & technical assistance to local governments through the DENR Runoff Pollution Campaign and through partnerships with the Division of Community Assistance and UNC's School of Government.	DWQ is continuing to issue and re-issue Phase II stormwater permits to coastal and non-coastal local jurisdictions and military bases. DWQ is working closely with them to help them design and develop programs to better control stormwater and also develop strategies to address existing impaired waters.
4.6b	Work towards developing a model framework to begin to evaluate the impact of the new coastal stormwater rules on the level of non-point source runoff pollutant concentrations.	Jordan and Falls Lake rules implementation continues with Jordan Lake local government new development programs due to begin in August 2012. In addition, a new NPDES NCG24 composting permit was released, requiring

		composting operations to be permitted and control and treat their runoff. This permit has man wastewater provisions as well.
4.6c	Form workgroup to determine water quality standards necessary to support SAV habitat.	No action.
4.7	Improve wastewater/stormwater management at coastal marinas.	Improving wastewater/stormwater management at coastal marinas has been an ongoing activity for much of 2011 and 2012.
4.8a	Support early implementation of environmentally superior alternatives to waste lagoon and spray field systems. Encourage commissions to express support for early implementation.	No action.

## **Wildlife Resources Commission**

*Goal 1: Improve effectiveness of existing rules and programs protecting coastal fish habitats*

<b>Rec</b>	<b>Action</b>	<b>Update</b>
1.3	Promote habitat conservation through the Wildlife Action Plan (Green Toolbox) and Educational Centers.	Agency review of Wildlife Action Plan (WAP) – Habitat vulnerability sections for upcoming WAP revision.
1.3	Encourage CRFL projects related to habitat education.	WRC regularly participates in the CRFL grant committee.
1.4	Continue to review development issues and address environmental issues as they relate to the CAMA Land Use Planning Program.	WRC reviews Land Use Plans when circulated for review by DCM.
1.6	Participate in state and federal efforts to control invasive aquatic species and educate staff and partner agencies.	WRC staff participated in US Department of Agriculture (USDA) multi-agency discussion on <i>Hydrilla</i> in the Albemarle Sound (March 5, 2012).

*Goal 2: Identify, designate and protect strategic habitat areas*

<b>Rec</b>	<b>Action</b>	<b>Update</b>
2.2	Conduct SHA evaluation and designation process for Pamlico Sound and tributaries (Region 2).	Completed – WRC staff participated as an advisory committee member in the SHA region 2 nomination process.
2.2	Conduct SHA evaluation and designation process for White Oak basin (Region 3).	No action – WRC staff will be part of the advisory committee for region 3 when the committee starts its work.
2.2	Integrate resulting criteria and information from SHA committee into DENR divisions' guidelines, policies, and rulemaking.	No action.
2.2	Study the feasibility and benefits of developing an SAV Restoration Program.	WRC participates in the multi-agency SAV committee and Restoration sub-committee.

*Goal 3: Enhance habitat and protect it from physical impacts*

<b>Rec</b>	<b>Action</b>	<b>Update</b>
3.1b	Obtain funding to restore streams and associated wetlands designated as anadromous fish spawning areas in the Albemarle Sound area as implementation steps for the River Herring Fishery Management Plan.	No action.
3.1b	Continue to study the feasibility and benefits of dam and barrier removal in general and for mitigation.	Conducting study on the effects of small dams on fish and mussels in the Chowan, Neuse, Roanoke and Tar river basins.
3.1b	Survey previously identified Albemarle Sound river herring spawning areas to estimate current condition and spawning function, and identify stream obstructions on river herring spawning streams.	WRC staff selected two creeks in the Albemarle Sound region known for an historic herring run to sample weekly with boat electrofishing. A draft report of the results is currently in review.

*Goal 4: Enhance and protect water quality*

<b>Rec</b>	<b>Action</b>	<b>Update</b>
4.1c	Work with N.C. State University to develop a GIS-based map of potential sources of endocrine disrupting chemicals statewide.	<p>WRC is funding a study on endocrine disrupting chemicals and intersex fish in North Carolina waters including the Roanoke River. Funding info:</p> <p>Aday, D. D., S. W. Kullman, W. G. Cope, T. J. Kwak, J. A. Rice, and J. M. Law. A Comprehensive Examination of Endocrine Disrupting Compounds and Intersex Fish in North Carolina Water Bodies. 2011–2016. NC Wildlife Resources Commission. \$493,258.</p>

## **DENR**

### *Goal 1: Improve effectiveness of existing rules and programs protecting coastal fish habitats*

<b>Rec</b>	<b>Action</b>	<b>Update</b>
1.3	Develop and distribute brochures and posters about fish, fish habitat, and fishing to be made available for general distribution by DENR staff.	Distribution of the “ <i>Home Is Where the Habitat Is...</i> ” posters and brochure continue at meetings and speaking engagements.
1.3	The department, through the Office of Environmental Education and Public Affairs will coordinate with the North Carolina Zoo, aquariums, N.C. Museum of Natural Sciences, Division of Parks and Recreation, educational state forests and environmental education centers to integrate the relevant components of the CHPP into exhibits and programs.	“ <i>Home Is Where the Habitat Is...</i> ” posters and brochures continue to be available and distributed to the aquariums, EE Centers and through Partnership for the Sounds. Educators and guides reference these documents and the CHPP in their presentations.

### *Goal 2: Identify, designate and protect strategic habitat areas*

<b>Rec</b>	<b>Action</b>	<b>Update</b>
2.1a	Complete and disseminate photo-interpretation of 2007-08 coast-wide SAV imagery.	This action item is complete. The SAV imagery is available through APNEP and NOAA and is available on the APNEP website.

### *Goal 3: Enhance habitat and protect it from physical impacts*

<b>Rec</b>	<b>Action</b>	<b>Update</b>
3.1b	DENR review of state agency requests to the Natural Heritage Trust Fund will place a priority on those proposals that would further protect and restore critical fisheries habitats.	Incorporated into the NHTF application process.
3.1b	Make protection and restoration of critical fisheries habitats	No action

	a priority of the One North Carolina Naturally initiative, such as developing conservation plans for the 20 coastal counties that identify potential conservation focus areas.	
3.1b	The department will assist coastal local governments in identifying navigation and stream restoration projects of particular importance to fish and fisheries with grants from the state and local projects program of the N.C. Division of Water Resources.	Work underway jointly between APNEP and Virginia's Department of Conservation and Recreation (DCR) looking at the shared waters of the Meherrin River and the Chowan River in North Carolina as part of the Virginia Healthy Waters Initiative.
3.6	Provide support for ongoing marine spatial planning efforts while working with the Bureau of Ocean and Energy Management (BOEM) task force.	Support is ongoing through various agencies participating on the task force.

*Goal 4: Enhance and protect water quality*

<b>Rec</b>	<b>Action</b>	<b>Update</b>
4.4	Provide Phase II stormwater educational and technical assistance to local governments through the DENR Runoff Pollution Campaign and through partnerships with the Division of Community Assistance and the UNC School of Government.	No action
4.4	Pursue funding for the Community Conservation Assistance Program (CCAP) with emphasis on CHPP stormwater priorities in coastal counties.	For fiscal 2012, about \$212,000 funds were allocated to local soil and water conservation districts for BMP implementation. A \$125,000 grant was received from the Environmental Enhancement Grants program in 2011 for BMP implementation in the Cape Fear, Neuse, Tar-Pamlico, and White Oak river systems. The DSWC will continue to pursue grant funds to supplement the state allocation.
4.8a	Support early implementation of environmentally superior alternatives to waste lagoon and spray field systems. Encourage commissions to express their support for early implementation.	There has been no action in the coastal counties this past year. However, an anaerobic digester was completed in Yadkin County. The system captures the methane and can produce enough electricity to run the system and part of the farm itself. Individuals are exploring the possibility of replicating a similar system in the coastal counties in the future.

## Other Agencies

*Goal 1: Improve effectiveness of existing rules and programs protecting coastal fish habitats*

Rec	Agency	Action	Update
1.1	NCFS	Evaluate use of forestry BMPs at logging sites.	During 2011, the N.C. Forest Service (NCFS) recorded more than 880 instances in eastern North Carolina in which the agency assisted with BMP use, identified BMPs that were being used, or made recommendations for using BMPs. Collectively, these activities encompassed almost 54,500 acres in eastern North Carolina. Work continued to develop a comprehensive, new data collection and analysis program for conducting detailed BMP site survey evaluations. Initial in-woods beta testing was conducted. BMP surveys will begin in the summer of 2012 across the state.
1.2	APNEP	The department, through the APNEP, will develop a comprehensive monitoring plan for the estuarine system.	Development of a monitoring strategy for the Albemarle-Pamlico ecosystem is underway, designed to align with APNEP's 2012 CCMP.
1.3	APNEP	Conduct outreach to educate citizens about DWQ's Neuse and Tar-Pamlico riparian buffer rules and 401 Water Quality Certification program.	No action.
1.3	DPR, APNEP, DSWC	Provide information to focus students in K-12 understanding the biodiversity of lakes, streams, and estuaries.	Annual N.C. Association of Soil and Water Conservation Districts education contest was held and included posters, essays, speeches, computer designed posters and slideshows. The 2011-12 contest theme was "Wetlands are Wonderful." Local SWCDs have done outreach to schools in their counties regarding this topic. Also, the Envirothon program contains an "aquatic ecology" study area. Teams of high school and middle school students study resource materials related to this topic in preparation for local, state and national competitions. The Coastal Envirothon was



			held March 20, 2012. The N.C. Envirothon was held April 20-21, 2012. APNEP and APNEP-funded programs for educators this year have included its annual teacher institute, Shad in the Classroom curriculum, a bookmark contest, and the Estuary Essentials summer program for libraries.
1.3	NCFS	Enhance forestry BMP compliance with education videos, outreach projects and guide books.	The results of the most recent BMP implementation monitoring survey study were presented across the region at various forestry meetings and conferences. The NCFS portable logging bridgemats were used on five sites in the region in calendar year 2011. The bridgemats establish and protect stream or ditch crossings on logging sites.
1.3	WRRI	Implement workshops for engineers and consultants on stormwater, buffer and 401 Water Quality Certifications.	Six workshops were held from 2009-2011. One is scheduled for the fall of 2012. To date, 27.25 PDH credits have been awarded to engineers and landscape architects.
1.4	NC Sea Grant	Continue to review "Inner Coast Study" development issues and address environmental issues.	A draft report providing technical information on such issues as estuarine shoreline stabilization, water availability, monitoring and enforcement, and sanitary sewer outflows is anticipated to be released by the end of the summer of 2012. The final report is planned for release at the end of 2012.
1.4	FS	The NCFS will revise its memorandum of agreement (MOA) documents with the N.C. Division of Land Resources (DLR) and the DWQ to ensure compliance monitoring and enforcement policies are consistently practiced in a timely and seamless manner. These MOAs primarily address interdivisional communication on the nine forestry performance standards known as the Forest Practice Guidelines Related to Water Quality (FPGs) and the Riparian Buffer Rules applicable to the state's river basins.	The NCFS executed a new Memorandum of Understanding (MOU) with DLR regarding the inspection, monitoring, education and enforcement of the Forest Practices Guidelines. The two agencies are working to develop an indicator list that can be referenced when agency personnel are determining if a land-disturbing activity is for forestry purposes or non-forestry purposes.
1.5	FS	Develop threshold criteria for determining when a non-compliant forestry operation directly contributes	No action

		to a degradation or loss of in-stream aquatic habitat sufficient to warrant restoration or remediation of the affected water resource.	
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*Goal 2: Identify, designate and protect strategic habitat areas*

<b>Rec</b>	<b>Agency</b>	<b>Action</b>	<b>Update</b>
2.1a	APNEP	Complete and disseminate photo-interpretation of 2007-08 coast-wide SAV imagery.	Completed – map and GIS data are available at <a href="http://portal.ncdenr.org/web/apnep/resources/maps">http://portal.ncdenr.org/web/apnep/resources/maps</a> .
2.1a	APNEP	Conduct cooperative DMF/NOAA research on methods for evaluating status and trends in SAV distribution and condition.	This work is ongoing through continuing support from the SAV Partnership.
2.2	EEP	Study the feasibility and benefits of developing an SAV Restoration Program.	The EEP developed and proposed a comprehensive research questions framework to systematically identify and prioritize North Carolina's SAV restoration research needs. The table is intended to be used by the Restoration Subcommittee to propose a short and long-term research plan that may inform an SAV restoration strategy for the state. The EEP continues to participate in the SAV Partnership and the SAV Restoration Subcommittee.
2.2	EEP	Work with DENR to include SHA priorities within EEP local watershed plans and DENR conservation planning tool.	The SHA priorities are now a standard data layer incorporated into EEP River Basin Restoration Priorities plans for applicable coastal regions. The inclusion of SHAs in the RBRP prioritizations elevates the scores for full-delivery projects sought for mitigation by EEP in target areas.

*Goal 3: Enhance habitat and protect it from physical impacts*

<b>Rec</b>	<b>Agency</b>	<b>Action</b>	<b>Update</b>
3.1b	DSWC	DSWC encourages local Soil and Water Conservation Districts (SWCDs) to include Strategic Habitat Areas and other CHPP priorities in local priority ranking	DSWC is working with DMF to obtain SHA Region 1 and Region 2 maps in a format usable for local soil and water conservation districts when ranking cost

		system for the Agriculture Cost Share Program and the Community Conservation Assistance Program.	share projects. When maps for other regions are complete, they will be shared with local offices.
3.1b	DSWC	Include Strategic Habitat Areas as a priority area for Conservation Resource Enhancement Program (CREP).	DSWC working with DMF to obtain the SHA data layers so this may be incorporated in the CREP priority areas.
3.1b	DWR	The department will assist coastal local governments in identifying navigation and stream restoration projects of particular importance to both fish and fisheries with grants from the state and local projects program of the Division of Water Resources.	Work underway jointly between APNEP and Virginia's Department of Conservation and Recreation (DCR) looking at the shared waters of the Meherrin River and the Chowan River in North Carolina as part of the Virginia Healthy Waters Initiative.
3.1b	NCFS	The NCFS will work with other DENR agencies to start pre-construction water quality and water quantity monitoring of 'The Canal,' which is a tributary of the Little River that flows through the N.C. Forest Service's Claridge Nursery in Wayne County. The tributary will be a future N.C. Department of Transportation mitigation project.	The NCFS continues to work with partners at North Carolina State University (NCSU) to develop a long term monitoring study proposal that can be used to solicit and obtain necessary funds for more in depth monitoring.
3.1b	EEP	EEP will work with the U.S. Army Corps of Engineers, the N.C. Department of Transportation, and the Interagency Review Team (IRT) on innovative mitigation projects and an appropriate crediting system. Such projects may include the protection and restoration of SAV and oyster beds (or other degraded fish habitats), and the removal of certain dams and other aquatic organism barriers.	During this fiscal year, EEP has been collaborating with NCDOT to assess the potential for barrier and dam removal, specifically on a test-case basis in the Chowan River Basin. EEP presented barrier removal scenarios to the IRT and is discussing crediting strategies with members during the most recent and the upcoming bimonthly meetings.
3.1b	APNEP, EEP	Obtain funding to restore designated streams and associated wetlands designated as anadromous fish spawning areas in the Albemarle Sound area as implementation steps for the River Herring Fishery Management Plan.	The EEP is using the RHFMP and the prioritization document River Herring Habitats (NC Environmental Defense 2010) as a basis for field assessments of obstruction removal sites in the Chowan on a test case basis. Restoration projects pursued by EEP in the Chowan will be focused in areas that promote improved fisheries habitats in addition to traditional mitigation measures. The EEP is issuing (scheduled for May 2012) a full-delivery request-for-proposals

			(FDRFP) in the Chowan for a six-acre wetland restoration project; added weight in the proposal scoring methodology will be given to projects that demonstrate anadromous fisheries habitat improvement.
3.5b	EEP, ACE	Continue to study the feasibility and benefits of dam and barrier removal in general and for mitigation.	Development of a dam removal modeling strategy for the Wake-Johnston Collaborative Local Watershed Plan (WJCLWP) is continuing. A new regional watershed plan in the upper Neuse is under development and expands the WJCLWP area by approximately 2.5 times. The plan will include modeling and feasibility assessment for aquatic organism passage projects, with a focus on dam removals and anadromous fish passage/nursery habitat improvement.
3.5b	EEP, ACE, DWR	The department, WRR, and EEP will pursue dam removal projects where appropriate.	The EEP continues to actively participate in the N.C. Aquatic Connectivity Team initiative (formerly the NC Dam Removal Task Force). The EEP is working with American Rivers to modify and implement the obstruction removal prioritization tool developed by an intern from the Duke University School of the Environment.
3.1c	APNEP, EEP	Support efforts to restore SAV.	APNEP continues to provide substantial staff support for the SAV partnership, providing expertise in areas of science, communication and education.

*Goal 4: Enhance and protect water quality*

<b>Rec</b>	<b>Agency</b>	<b>Action</b>	<b>Update</b>
4.4	DSWC	Pursue funding for the Community Conservation Assistance Program with emphasis on CHPP stormwater priorities in coastal counties.	For fiscal 2012, about \$212,000 funds were allocated to local soil and water conservation districts for BMP implementation. A \$125,000 grant received from the Environmental Enhancement Grants program in 2011 for BMP implementation in the Cape Fear, Neuse, Tar-Pamlico, and White Oak river systems. The

			DSWC will continue to pursue grant funds to supplement the state allocation.
4.5a	Duke, NOAA	Implement Pivers Island stormwater BMP project.	Construction is scheduled for February 2013.
4.5a	NCFS	Minimize water quality impacts during timber harvesting.	The NCFS has organized an internal work group to address potential issues related to timber harvesting in bottomland/muck/swamp systems, regarding how to minimize water quality impacts during these operations and promote successful tree regeneration. This effort could involve participation by NCSU to evaluate harvested sites, determine the extent of these systems, and develop possible management recommendations and technical guidance on how best to manage, harvest and regenerate these types of wetland forests in North Carolina.
4.5b	NCFS	The NCFS will begin long-term water quality and water quantity monitoring of Beddingfield Creek during 2007 in anticipation of implementing a 3,000+ acre watershed restoration effort in the Neuse River Basin.	This project has been de-prioritized due to other more pressing projects. Occasional visual inspections of the Beddingfield Creek drainage area are made upon Clemmons Educational State Forest with photo documentation made as needed.
4.8a	DSWC	Support early implementation of environmentally superior alternatives through the Lagoon Conversion Program.	There has been no action in the coastal counties this past year. However, an Anaerobic Digester was completed in Yadkin County. The system captures the methane and able to produce enough electricity to run the system and part of the farm itself. Individuals are exploring the possibility of replicating a similar system in the coastal counties in the future.
4.8b	DSWC	Continue implementing the Swine Buyout Program; plan to close one (possibly two) conservation easements in fiscal 2012.	Funding is available to fund one more project for the Swine Buyout Program. The project is in Craven County and the division is awaiting an appraisal before moving forward.

## **APPENDIX 1. GLOSSARY OF ACRONYMS**

USACE	U.S. Army Corps of Engineers
APNEP	Albemarle-Pamlico National Estuary Program
CHPP	Coastal Habitat Protection Plan
CSC	CHPP Steering Committee
DCM	Division of Coastal Management
DENR	Department of Environment and Natural Resources
NCFS	N.C. Forest Service
DMF	Division of Marine Fisheries
DSWC	Division of Soil and Water Conservation
DWQ	Division of Water Quality
DWR	Division of Water Resources
EEP	Ecosystem Enhancement Program
NERR	National Estuarine Research Reserve
NOAA	National Oceanic and Atmospheric Administration
SAV	Submerged Aquatic Vegetation
WRRI	Water Resources Research Institute

## **APPENDIX 2. CHPP GOALS AND RECOMMENDATIONS (DEATON ET AL. 2010)**

### ***GOAL 1. IMPROVE EFFECTIVENESS OF EXISTING RULES AND PROGRAMS PROTECTING COASTAL FISH HABITATS***

1. Continue to enhance enforcement of, and compliance with, Coastal Resources Commission (CRC), Environmental Management Commission (EMC), Marine Fisheries Commission (MFC), and Wildlife Resources Commission (WRC) rules and permit conditions.
2. Coordinate and enhance water quality, physical habitat, and fisheries resource monitoring (including data management) from headwaters to the nearshore ocean.
3. Enhance and expand educational outreach on the value of fish habitat, threats from land-use and human activities, climate change, and reasons for management measures.
4. Coordinate rulemaking and data collection for enforcement among regulatory commissions and agencies.
5. Develop and enhance assessment and management tools for addressing cumulative impacts.
6. Enhance control of invasive species with existing programs.

### ***GOAL 2. IDENTIFY, DESIGNATE, AND PROTECT STRATEGIC HABITAT AREAS***

1. Support Strategic Habitat Area assessments by:
  - a. Coordinating, completing, and maintaining baseline habitat mapping (including seagrass, shell bottom, shoreline, and other bottom types) using the most appropriate technology.
  - b. Selective monitoring of the status of those habitats, and
  - c. Assessing fish-habitat linkages and effects of land use and human activities on those habitats
2. Identify, designate, and protect Strategic Habitat Areas.

### ***GOAL 3. ENHANCE HABITAT AND PROTECT IT FROM PHYSICAL IMPACTS***

1. Expand habitat restoration in accordance with ecosystem restoration plans, including:
  - a. Creation of subtidal oyster reef no-take sanctuaries.
  - b. Re-establishment of riparian wetlands and stream hydrology.
  - c. Restoration of SAV habitat and shallow soft bottom nurseries.
  - d. Developing compensatory mitigation process to restore lost fish habitat functions.
2. Sustain healthy barrier island systems by maintaining and enhancing ecologically sound policies for ocean and inlet shorelines and implement a comprehensive beach and inlet management plan that provides ecologically based guidelines to protect fish habitat and address socio-economic concerns.
3. Protect habitat from fishing gear effects through improved enforcement, establishment of protective buffers around habitats, modified rules, and further restriction of fishing gears, where necessary.
4. Protect estuarine and public trust shorelines and shallow water habitats by revising shoreline stabilization rules to include consideration of erosion rates and prefer alternatives to vertical shoreline stabilization measures that maintain shallow nursery habitat.
5. Protect and enhance habitat for migratory fishes by:
  - a. Incorporating the water quality and quantity needs of fish in water use planning and rule making.
  - b. Eliminating or modifying obstructions to fish movements, such as dams and culverts, to improve fish passage.
6. Ensure that energy development and infrastructure is designed and sited in a manner that minimizes negative impacts to fish habitat, avoids new obstructions to fish passage, and where possible provides positive impacts.
7. Protect important fish habitat functions from damage associated with activities such as dredging and filling.

8. Develop coordinated policies including management adaptations and guidelines to increase resiliency of fish habitat to climate change and sea level rise.

#### ***GOAL 4. ENHANCE AND PROTECT WATER QUALITY***

1. Reduce point source pollution discharge by:
  - a. Increasing inspections of discharge treatment facilities, collection infrastructure, and disposal sites.
  - b. Providing incentives for upgrading all types of discharge treatment systems.
  - c. Develop standards and treatment facilities that minimize the threat of endocrine disrupting chemicals on aquatic life.
2. Adopt or modify rules or statutes to prohibit ocean wastewater discharges.
3. Prevent additional shellfish and swimming closures through targeted water quality restoration and prohibit new or expanded stormwater outfalls to coastal beaches and to coastal shellfishing waters (EMC surface water classifications SA and SB) except during times of emergency (as defined by the Division of Water Quality's Stormwater Flooding Relief Discharge Policy) when public safety and health are threatened, and continue to phase-out existing outfalls by implementing alternative stormwater management strategies.
4. Enhance coordination with, and financial/technical support for, local government actions to better manage stormwater and wastewater.
5. Improve strategies throughout the river basins to reduce non-point pollution and minimize cumulative losses of fish habitats through voluntary actions, assistance, and incentives, including:
  - a. Improved methods to reduce pollution from construction sites, agriculture, and forestry.
  - b. Increased on-site infiltration of stormwater.
  - c. Documentation and monitoring of small but cumulative impacts to fish habitats from approved, un-mitigated activities.
  - d. Encouraging and providing incentives for low impact development.
  - e. Increased inspections of onsite wastewater treatment facilities.
  - f. Increased water re-use and recycling.
6. Improve strategies throughout the river basins to reduce non-point pollution and minimize cumulative losses of fish habitats through rule making, including:
  - a. Increased use of effective vegetated buffers.
  - b. Implementing and assessing coastal stormwater rules and modify if justified.
  - c. Modified water quality standards that are adequate to support SAV habitat.
7. Maintain adequate water quality conducive to the support of present and future aquaculture.
8. Reduce non-point source pollution from large-scale animal operations by the following actions:
  - a. Support early implementation of environmentally superior alternatives to the current lagoon and spray field systems as identified under the Smithfield Agreement and continue the moratorium on new/expanded swine operations until alternative waste treatment technology is implemented.
  - b. Seek additional funding to phase-out large-scale animal operations in sensitive areas and relocate operations from sensitive areas, where necessary.
  - c. Use improved siting criteria to protect fish habitat.