Report to the

Environmental Review Commission

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Report and Recommendations Concerning Forest Resource Impacts of the Woody Biomass Industry in North Carolina

March 2010

Submitted by the

North Carolina

Environmental Management Commission

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Executive Summary

Senate Bill 3 (session law 2007-397) created a renewable energy and energy efficiency portfolio standard for North Carolina. Among other things, the law requires North Carolina's three utility companies to meet 12.5% of their annual electricity output with renewable energy by 2021. The bill requires the utilities to meet specific benchmarks in earlier years beginning in 2010.

Senate Bill 3 also provides the Environmental Management Commission (EMC) with the authority to evaluate renewable energy technologies and establish environmental standards where existing regulatory programs are insufficiently protective.

Pursuant to this authority the EMC has been evaluating the potential impacts of biopower facilities that generate electricity through the process of burning woody biomass[1]. Biopower from woody biomass is typically generated one of two ways. First, a facility can directly burn wood to generate steam to drive a turbine. The second method, co-firing, involves using wood in place of a portion of the coal burned in conventional coal-fired power plants. Biopower facilities have a number of potential environmental impacts ranging from air quality emissions to increased pressure for more intensive harvesting on the state's forestlands.

The scope of this report is limited; it does not address all potential environmental, public health, and cultural concerns that arise from woody biomass combustion facilities. The report focuses on potential natural resource impacts that would likely arise from increased harvesting, changes in harvesting practices, and land use conversions to meet a growing demand for wood to serve the new state-created market for biopower. Additional recommendations may follow as more data becomes available concerning other potential impacts.

The EMC's evaluation of woody biomass facilities and their potential environmental and natural resource impacts was guided by a Technical Advisory Group (TAG). The TAG was comprised of representatives from the forest products industry, utility company representatives, state natural resource agency officials, environmental advocates and academics from North Carolina State University. The TAG reached general agreement that the creation of demand by the mandates of Senate Bill 3, particularly in combination with the demand for biomass from the biofuels goals, could have a significant impact on the market for woody biomass in the state.

At the same time it is important to understand that the degree and type of environmental impacts will be significantly affected by what is included within the categorization of eligible

[1] Woody biomass generally refers to the tops, limbs and other residuals that are left on the forest floor following a traditional harvest for timber. The usage of the term in this report, given the uncertainty of the North Carolina statutory definition of "biomass," may have a broader meaning.

woody biomass. It was generally acknowledged that due to the lack of data and insufficient experience with similar scenarios, it is difficult to project with a high degree of certainty that the types and degrees of environmental impacts that can be expected. Nevertheless, the EMC has concluded that, without proper protections, significant impacts are possible in the areas of land use (e.g. conversion of old growth forest to plantation), soil nutrient deterioration, water quality degradation, destruction of wildlife habitat, ecosystem disruption, air quality and ash deposition.

The EMC also identified key policy issues that will have a direct impact on the future growth of the woody biomass market; in some cases those issues were outside the EMC's statutory charge but were identified because of their significance to the development of this market as well as to the potential for environmental harm.

The work of the EMC revealed a number of uncertainties in this policy arena that need to be addressed. For example, under the current regulatory scheme there are differing interpretations of the definition of "biomass resources." In its most basic form, the policy decision at issue is whether the General Assembly, with the passage of Senate Bill 3, intended for the harvesting of whole trees solely for the purposes of electricity generation. If the definition of biomass is intended to encompass whole trees, as previously noted, the potential for landscape level impacts are increased.

Under the current regulatory scheme, the North Carolina Utilities Commission is determining on a case-by-case basis what constitutes eligible biomass and to date appears to be interpreting the definition of biomass resource broadly. However, the specific issue of whether burning whole trees harvested for electricity generation constitutes eligible biomass has not been considered by the Utilities Commission.

This process has led the EMC to identify several policy issues that are important to this emerging industry[2] and that need to be addressed prior to significant growth in the woody biomass sector to ensure protection of the state's natural resources. The findings and corresponding recommendations identified in this report are listed below:

[2] Two applications for new wood-burning biopower facilities have been filed with the North Carolina Utilities Commission. One in Hertford County and the other in Nash County.

Environmental and Natural Resource Impacts

- *Finding: The use of woody biomass for energy production has a broad range of potential impacts that, without adequate safeguards, could be harmful for the environment, public health and culture of the State.*

- **Recommendation: The EMC should continue to study and analyze the environmental ramifications of the broader utilization of woody biomass and should develop guidelines and regulations necessary to minimize harmful impacts on North Carolina's natural resources.**

Definition of Biomass

- *Finding: The differing interpretations of the statutory definition of "renewable energy resource" as applicable to "biomass" result in uncertainty and confusion as to the types of biomass resources eligible under the Renewable Energy Portfolio Standard, and could allow for an ad hoc application of a broad definition without adequate environmental safeguards.*

- **Recommendation: The General Assembly should clarify the definition of "renewable energy resource" in relation to woody biomass. A broad definition that allows the use of whole trees harvested for electricity generation should be adopted only in conjunction with sustainable management requirements. Such requirements should mandate that to be eligible for credit under the RPS mandates, woody biomass must be harvested in accordance with standards and practices that are protective of continuing forest productivity, ecosystem health, soil quality, water quality and biodiversity conservation.**

Sustainable Management

- *Findings: 1) There are currently no standards or guidelines that require the sustainable management of the utilization of woody biomass. Sustainability refers to continuing forest productivity as well as to ecosystem protection, water and air quality protection, and biodiversity protection. 2) The state created market for biopower will create pressure on the sustainable use of our forest resources, and therefore must be guided and monitored to avoid adverse impacts.*

- **Recommendations: 1) The General Assembly should require the adoption of forest management guidelines or adoption of third party sustainability standards by power generators and biofuel producers for these state created markets. Such guidelines will**

require that forest management plans adopted by the power and fuel generators will be protective of forest productivity, wildlife habitat, riparian buffers and other sensitive areas. Further, suppliers shall be required to certify that harvests were conducted in accordance with the requirements of the forest management plans. 2) The General Assembly should support ongoing studies related to the impacts from the harvest of forest residuals on wildlife habitat, water quality, soil conservation and forest health, as well as the quantity and value of the ecosystem services, and direct the development of harvest guidelines as appropriate.

Forest Productivity

- *Finding: Current funding sources for forestry and landowner incentive programs may be inadequate to encourage increased productivity of the state's forestlands needed to supply feedstocks for biopower and biofuels.*

- **Recommendations: 1) The General Assembly should enhance existing programs and explore new programs that promote increased forest productivity. 2) The General Assembly should explore new sources of revenue for such programs, such as extending the current forest product assessment to all wood harvested.**

Application to Biofuels

- *Finding: Under current law, any environmental standards or regulations adopted by the EMC for woody biomass utilization for biopower purposes would not apply to woody biomass utilization for the purposes of making biofuels. As a result, there is the potential for an unlevel playing field as these two emerging industries compete over limited feedstocks.*

- **Recommendation: The General Assembly should require that any rules or standards that are developed for woody biomass utilization for power generation are equally applicable to utilization for biofuels.**

Monitoring and Data Collection

- *Finding: Current data collection is inadequate to inform state policy makers and regulators of the impact of biomass harvesting. New technologies can facilitate better data collection without unreasonable expense to harvesters and power generators.*

- **Recommendation: The General Assembly should provide resources for data collection and monitoring efforts to better inform policy development related to woody biomass facilities.**

Ongoing Assessment

- *Finding: Oversight of the impacts of the woody biomass market is currently spread across a number of state entities and agencies, such as the Utilities Commission, the Environmental Management Commission, the Wildlife Resources Commission, the Division of Forest Resources and the Energy Policy Council.*

- **Recommendation: The General Assembly should direct the formation of an inter-agency task force charged with the oversight of the growth of the woody biomass market in North Carolina. The task force should be required to periodically provide updates to the appropriate legislative committees.**

North Carolina's woody biomass feedstocks are a valuable renewable resource and are critical to meeting the renewable energy goals in Senate Bill 3. The state has an opportunity to ensure that emerging biomass markets protect and enhance natural resources, provide increased revenue for landowners and provide jobs in rural communities. To capitalize on that opportunity, the state must provide clear and definitive policies that will allow the market to function without undue environmental impacts.

Background

Session law 2007-397, more commonly referred to as Senate Bill 3, created a renewable energy and energy efficiency portfolio standard for North Carolina. The purposes of the portfolio standard as outlined in the session law are to diversify energy resources, encourage private investment in renewable energy and improve air quality.

Outside of the legislatively required specific "set-asides" for solar energy, swine and poultry wastes, Senate Bill 3 provides the utilities with the flexibility to meet the renewable energy benchmarks without mandating a specific mix. A 2006 report prepared for the North Carolina Utilities Commission stated that biomass resources (wood and agricultural waste) would likely be the biggest contributor to renewable energy generation in North Carolina. Consequently, the development of the woody biomass market is critical to the success of the overall renewable energy market in North Carolina.

Included in Senate bill 3 was a provision directing the EMC to evaluate renewable energy technologies. The statutory language reads as follows:

> The Commission may establish a procedure for evaluating renewable energy technologies that are, or are proposed to be, employed as part of a renewable energy

facility, as defined in G.S. 62-133.7; establish standards to ensure that renewable energy technologies do not harm the environment, natural resources, cultural resources, or public health, safety or welfare of the State; and, to the extent that there is not an environmental regulatory program, establish an environmental regulatory program to establish these standards.

Following the passage of Senate Bill 3, the EMC established a Renewable Energy Committee (Committee) for the purposes of evaluating and identifying whether appropriate regulatory programs for renewable energy facilities are in place.

In late 2008 and early 2009 the Committee focused on developing a regulatory framework for a wind permitting program. This work culminated in the delivery of a report and recommendations for legislation to the General Assembly in March 2009.

Following its work on wind, the Committee turned its attention to the potential environmental impacts of woody biomass facilities. Since its inception the Committee has acknowledged that all renewable power generating sources, including solar, wind and woody biomass, will have some adverse environmental impacts. For example, solar farms may have land use impacts, while wind farms raise viewshed concerns and could potentially harm birds and bats, among other adverse impacts. Recognizing that some type of impacts are inherent with energy generation, the Committee's efforts have been guided both by recognition of the environmental benefits of the utilization of renewable energy resources and by the need to limit and manage any potential adverse environmental and natural resource impacts from these facilities.

It was within this context that the Committee undertook an evaluation of the potential environmental and natural resource impacts of biopower facilities fueled by woody biomass. The use of woody biomass for energy production has a broad range of potential environmental, health and cultural impacts. These include, without limitation: land use (land in forest and forest type) water quality; air quality; soil conservation; wildlife habitat; biodiversity; atmospheric carbon; scenic; and ash deposition.

The Committee's work assumed existing air regulations were sufficiently protective of air emissions, although air quality issues were discussed to a limited degree during the Committee's deliberations of woody biomass facilities. For example, the Committee was presented information related to the issue of whether the federal Clean Air Act rules regulating commercial and industrial solid waste incinerators (CISWI) apply to combustion units using untreated wood as fuel. Application of the incinerator rules to woody biomass combustion would require more stringent air quality controls and could limit use of woody biomass for

biopower purposes. DENR, in consultation with the NC Attorney General's Office, determined that woody debris harvested after completion of logging or land-clearing activity and transported or stored for use as a fuel is not a solid waste. Consequently, the combustion of this material would not require compliance with incinerator rules (*See Appendix I*).

Furthermore, just as the legislative committees heard reports from the Division of Air Quality during its deliberations on Senate Bill 3, the Committee heard the same reports on the emissions of wood fired plants. Counter to the stated goals of Senate Bill 3, those reports indicate that a wood burning facility will have higher emissions than a new state-of-the-art coal plant for some pollutants, including particulate matter and Nitrogen oxide. Although woody biomass is a renewable resource, combustion of woody biomass does generate greenhouse gas emissions, but to a lesser extent in comparison to a coal burning facility.

The majority of the Committee's review of woody biomass facilities focused on those sets of environmental impacts that would likely arise from increased harvesting, changes in harvesting practices and land use conversions to meet a growing demand for feedstocks given the new state created market for biopower.

Woody Biomass Technical Advisory Group

With the assistance of the North Carolina State University Solar Center the Committee convened a Woody Biomass Technical Advisory Group (TAG) to provide assistance to the Committee in the deliberation of these matters. The TAG consisted of representatives from the forest products industry, utility company representatives, state natural resource agency officials, environmental advocates and academics from North Carolina State University. (*For a full listing of TAG members see Appendix II*)

The TAG was charged with providing technical data as well as identifying policy matters for consideration by the Committee. During the course of four meetings held over several months the TAG heard presentations from the NC State School of Forestry, NC Division of Forest Resources, NC State Forestry Extension, and others. The TAG evaluated existing forestry regulations and potential economic changes to the woody biomass markets. The TAG also received information on laws and regulations from other state's governing the utilization of biomass (*See Appendix III, Memorandum on State Policy Options*). TAG members were invited to submit specific policy recommendations for the Committee's consideration (*A copy of submitted comments can be found in Appendix IV)*

Overview of the TAG Discussion Points

Below is a list of a few of the major discussion points identified during the TAG proceedings (it should be noted that the issues listed in no way reflect the views of all TAG members):

- The current definition of renewable energy resource in Senate Bill 3 provides for varying interpretations.
- The combined demand for power generation and biofuel production likely could not be met with wood waste or wood residuals alone.
- The new woody biomass market created by Senate Bill 3 has the potential to significantly increase demand for harvested wood, including increased harvesting specifically for woody biomass.
- Increased harvesting could lead to pressure to convert natural forests to plantations.
- Through more intensive forest management practices, and funding and education regarding the same, the existing average productivity of forests in this state could be increased in multiples.

Existing Forestry Regulations

The TAG reviewed the current regulatory framework for forestry operations. North Carolina has mandatory forest practice guidelines (FPGs) related to water quality which are defined by the Administrative Code (15A NCAC 01I .0100-.0209). All forestry activities must comply with the FPGs to remain exempt from the permitting and other requirements in the North Carolina Sedimentation and Pollution Control Act. Best Management Practices are the methods or practices that can be implemented to stay in compliance with the FPGs.

North Carolina has no requirement that a forest owner have a forest management or harvest plan, nor is there a requirement for pre-harvest or post-harvest notification or reporting. North Carolina does not have restrictions, except in limited circumstances, on harvesting from sensitive areas, such as old growth forests, riparian buffers or wetlands.

Policy Decisions

The EMC has identified below several major policy decisions that need to be addressed to ensure that the woody biomass market develops and does so in a sustainable manner for the long term benefit of the state.

Issue: Environmental and Natural Resource Impacts

As noted above the degree and type of environmental and natural resource impacts will be significantly affected by what is included within the categorization of eligible woody biomass. The areas of these impacts could include land use changes; water, air and soil quality; wildlife habitat; biodiversity; accumulation of atmospheric carbon; scenic changes; and ash deposition and disposal. While the burning of woody biomass to generate electricity has the advantage, like coal, of being usable for base load, its potential unfavorable environmental impacts are greater than other renewable resources such as wind and solar.

In particular the EMC evaluation has concluded that there will be increased harvesting, including more harvests specifically for biomass. Such harvests have some greater intensity of clearing than do harvests without a biomass component, with implications for water quality, soil conservation and wildlife habitat. There will also be pressure to convert natural forest to plantation. Conversion could include conversion not only to forest plantation but also to other forms of "energy crops."

Finding: The use of woody biomass for energy production has a broad range of potential impacts that, without adequate safeguards, could be harmful for the environment, public health and culture of the State.

Recommendation: The EMC should continue to study and analyze the environmental ramifications of the broader utilization of woody biomass and should develop guidelines and regulations necessary to minimize harmful impacts on North Carolina's natural resources.

Issue: Definition of Biomass

Senate Bill 3 defines, in part, "renewable energy resource" as a solar electric, solar thermal, wind, hydropower, geothermal, or ocean current or wave energy resource; **a biomass resource, including agricultural waste, animal waste, wood waste, spent pulping liquors, combustible residues, combustible liquids, combustible gases, energy crops, or landfill methane** (emphasis added).

As written the definition of renewable energy resource allows for a range of interpretations as to what the legislature intended to include as a biomass resource. The resolution of this issue is a critical policy decision when viewed in the context of recent data from N.C. State which illustrates that the amount of wood residuals or "wood waste" will likely be insufficient to meet both biopower and biofuels goals.

One view of this definition is that it is intended to encompass all woody biomass resources and is not restricted to wood waste. The acceptance of this interpretation in its most basic form would allow the use of any type of woody biomass resource to meet the mandates of Senate Bill 3, including the harvesting and burning of whole trees. The North Carolina Forestry Association supports this broad interpretation and submitted comments to the Committee stating such. In the TAG meetings representatives of the utility companies have also expressed their position that this is their favored interpretation and have questioned whether the Senate Bill 3 mandates can be met with a more restrictive definition (*See Appendix IV comments from Duke Energy Carolinas et al).*

Another view of the definition is that it is intended to be narrowly read and restricts biomass resources to wood waste. Supporters of this position contend that the listing of biomass sources in the definition is done for limiting purposes, rather than illustrative purposes. Comments were submitted to the Committee by the Southern Environmental Law Center in support of this interpretation. Furthermore, the current statute does not define wood waste. It is imperative from a policy perspective to include some further legislative guidance and clarification of the meaning of the phrase "wood waste."

The current regulatory framework in place would resolve these differing interpretations at the NC Utilities Commission. The Utilities Commission in its rulemaking for Senate Bill 3 chose not to further define the biomass resource, but rather stated it should be a case by case decision. The Commission concluded that "rather than potentially limit the definition of biomass on the basis of an incomplete record in this rulemaking proceeding, the Commission concludes that the statutory definition of "renewable energy resource" is sufficient."

A recent ruling by the Utilities Commission in a request for Declaratory Ruling by the Water and Sewer Authority of Cabarrus County found that biosolids (the organic material remaining after the treatment of domestic sewage) is a renewable energy resource for combustion purposes. The Utilities Commission in the order writes, "G.S. 62-133.8(a)(8) includes any biomass resource, listing several examples without limitation." The Commission's order indicates that it will interpret the definition of biomass resource very broadly.

The potential environmental impacts of this industry are very significantly affected by the resolution of this definitional issue. Therefore, to enhance the growth of this industry and to ensure strong environmental safeguards are in place, it is imperative that the state clearly and definitively establish what constitutes "eligible biomass" for purposes under Senate Bill 3.

Finding:

The differing interpretations of the statutory definition of "renewable energy resource" as applicable to "biomass" result in uncertainty concerning the types of biomass resources eligible under the Renewable Portfolio Standard, and could allow for an ad hoc application of a broad definition without adequate environmental safeguards.

Recommendation:

The General Assembly should clarify the definition of "renewable energy resource" in relation to woody biomass. A broad definition that allows the use of whole trees harvested for electricity generation should be adopted only in conjunction with sustainable management requirements. Such requirements should mandate that to be eligible for credit under the RPS mandates, woody biomass must be harvested in accordance with standards and practices that are protective of continuing forest productivity, ecosystem health, soil quality, water quality and biodiversity conservation.

Issue: Sustainable Management

Placing a sustainability requirement on power generators or landowners conducting biomass harvests is a policy already in place in other states. The suggestion for such a requirement is grounded on the recognition that the new market for woody biomass created by the legislative mandates could have far-reaching, but currently unforeseeable impacts. A sustainability requirement could take several forms. One form would require a power generator to develop its own forest management plan and certify that its suppliers of woody biomass are meeting the requirements of the plan. Such a plan could require management practices designed to conserve biological diversity and forest productivity and health, and potentially protect higher value forests and lands.

Some states have addressed the potential for increased harvesting or changes in harvesting practices through the development of harvesting guidelines specifically developed for the harvesting of woody biomass. In most cases these guidelines are voluntary and address such issues as wildlife and biodiversity, water quality and soil productivity.

Other policy actions, such as restricting harvesting of biomass from riparian buffers or a specific type of wetlands, would be another step for the legislature to take that could ensure increased biomass harvests do not lead to degradation of water quality. Furthermore, some states in an attempt to stop conversion of old growth forests to energy plantations have chosen to exclude any wood from an old growth forest as an eligible biomass for purposes of their state's Renewable Energy Portfolio Standard.

Findings:

There are currently no standards or guidelines that require the sustainable management of the utilization of woody biomass. Sustainability refers to continuing forest productivity as well as to ecosystem protection, water and air quality protection, and biodiversity protection.

The state created market for biopower will create pressure on the sustainable use of our forest resources, and therefore must be guided and monitored to avoid adverse impacts.

Recommendations:

The General Assembly should require the adoption of forest management guidelines or adoption of third party sustainability standards by power generators and biofuel producers for these state created markets. Such guidelines will require that forest management plans adopted by the power and fuel generators will be protective of forest productivity, wildlife habitat, riparian buffers and other sensitive areas. Further, suppliers shall be required to certify that harvests were conducted in accordance with the requirements of the forest management plans.

The General Assembly should support ongoing studies related to the impacts from the harvest of forest residuals on wildlife habitat, water quality, soil conservation and forest health, as well as the quantity and value of the ecosystem services, and direct the development of harvest guidelines as appropriate.

Issue: Forest Productivity

Due to the pending resource demands placed on the state's forests from the biopower and biofuels programs, there is a need to develop a statewide effort to increase the productivity of existing forests. The Committee identified the potential for increasing the productivity of our state's forestland through increased cost-share or other incentive programs with landowners.

One potential funding source for increasing incentive programs could include a more equitable forest product assessment. Under the current Forest Product Assessment Act, not all wood processed in North Carolina is being taxed in the same manner, including wood moving out of state or overseas. This disproportionately hurts in state processors and limits the revenue available for incentive programs.

Finding:

Current funding sources for forestry and landowner incentive programs may be inadequate to encourage increased productivity of the state's forestlands needed to supply feedstocks for biopower and biofuels.

Recommendations:

The General Assembly should enhance existing programs and explore new programs that promote increased forest productivity.

The General Assembly should explore new sources of revenue for such programs, such as extending the current forest product assessment to all wood harvested.

Issue: Application to Biofuels

North Carolina has a goal that by 2017 10% of the liquid fuels sold in the state will be locally grown and produced. The goal equates roughly to 600 million gallons of biofuels per year and could create a significant demand for woody biomass as a feedstock for development of biofuels. Impact from the use of woody biomass for power generation cannot be assessed without also considering impacts from the prospective demand for woody biomass conversion to biofuels. Thus, the North Carolina Biofuels Center has been an active and helpful participant in these policy discussions from the outset and has submitted written comments in support of a comprehensive approach to this issue.

The development of standards on woody biomass harvesting for biopower purposes, while ignoring harvesting for the biofuels sector would create an unlevel playing field. The biofuels

sector like the biopower program is being driven by a legislatively established program. As such, it would logically follow that each should be subject to the same types of restrictions, if any are developed. During Committee discussion and the TAG deliberations there was no opposition expressed to the idea that any standards applicable to woody biomass for biopower should also apply to biofuels.

One way of addressing this needed change would be to amend the current EMC authority from Senate bill 3 (N.C.G.S. 143B-282(a)(6)) and broaden that authority to the biofuels sector.

EMC Finding:

Under current law, any environmental standards or regulations adopted by the EMC for woody biomass utilization for biopower purposes would not apply to woody biomass utilization for the purposes of making biofuels. As a result, there is the potential for an unlevel playing field as these two emerging industries compete over limited feedstocks.

Recommendation:

The General Assembly should require that any rules or standards for woody biomass utilization for power generation are equally applicable to utilization for biofuels.

Issue: Monitoring and Data Collection

One of the consensus items of discussions during the TAG meets centered on the importance of capturing and analyzing data to help inform the policy-making process. The TAG received comments from DENR's Division of Natural Resource Planning and Conservation suggesting relevant data types be collected, including:

- Geographic information documenting the location of biomass harvests and the extent of the acreage that provided the biomass;
- Source of the biomass harvest and whether the biomass harvest was paired with harvesting for other purposes; and
- Post-harvest land use and whether a native forest is being converted to an energy crop.

The Division of Forest Resources also compiled a summary of the current data collection efforts underway at the state and federal level. Some of the information collection efforts already in place include the Forest Best Management Practice (BMP) Implementation Survey and the Forest Inventory and Analysis Program. The Forest BMP Implementation Survey could

potentially be expanded to gather additional biomass related information. The survey work requires dedicated salary funding.

In addition, research studies being conducted by the NCSU Forestry Extension and the NCSU Department of Forestry and Environmental Services have the potential to help illuminate the potential impacts a growing biopower market may have on our state's farm and forest lands. The first of these studies is intended to develop a statewide inventory of available woody biomass, while the second study is focused on the impacts on wildlife from woody biomass harvesting.

Finding:

Current data collection is inadequate to inform state policy makers and regulators of the impacts of biomass harvesting. New technologies can facilitate better data collection without unreasonable expense to harvesters and power generators.

Recommendation:

The General Assembly should provide resources for data collection and monitoring efforts to better inform policy development related to woody biomass facilities.

Issue: Ongoing Assessment

Another point of consensus during the Committee's work on this issue was the understanding that the woody biomass market is dynamic. External factors, such as possible federal climate change legislation and changes in the European energy market, only add to the uncertainty. Consequently, it is difficult to predict the likely growth of the woody biomass market and biopower facilities.

This uncertainty could be addressed through the creation of some state level entity charged with identifying possible policy issues that need resolution. The range of issues evaluated by this new "Woody Biomass Stakeholder Group" could include: development of siting criteria; changes in land use practices linked to biopower facilities, such as conversion of natural forests or crop lands to energy plantations; and impacts to water quality; wildlife and biodiversity.

A subcommittee of the Energy Policy Council or some other appropriate entity could convene an ongoing working group to cover these topics, which extend beyond environmental concerns. Such a group could be formed with representatives from the EMC, the Wildlife Resources Commission, the Utilities Commission and the investor-owned utilities. Coordination of these

organizations will be critical to the woody biomass market and formalizing a collaborative process among them adds to the chances for the growth of this market. This work group could provide annual reports to back to the legislature and identify key policy issues.

Finding:

Oversight of the impacts of the woody biomass market is currently spread across a number of state entities and agencies, such as the Utilities Commission, the Environmental Management Commission, the Wildlife Resources Commission, the Division of Forest Resources and the Energy Policy Council.

Recommendation:

The General Assembly should direct the formation of an inter-agency task force charged with the oversight of the growth of the woody biomass market in North Carolina. The task force should be required to periodically provide updates to the appropriate legislative committees.

Conclusion

North Carolina is in a strong position to be leader in renewable energy development. While the implementation of Senate Bill 3 remains in its early stages, it is critical that the state establish and develop clear and consistent policies to maintain this leadership status. The EMC's evaluation of the woody biomass industry in North Carolina has identified a number of pressing issues that must be addressed. The threshold issue that the implementing agencies and other stakeholders need clarification on is the definitional aspect of "biomass resource." Until the uncertainty is removed, the growth of the woody biomass market may be limited. However, should this clarification result in the unequivocal inclusion of whole trees harvested for power generation, due to the significant impacts from harvesting whole trees for energy generation, the authority of the EMC to develop appropriate regulations or guidelines should be reaffirmed.

This report also identifies a number of policy actions that could be taken by the General Assembly. Taken as a whole these findings are intended to promote the renewable energy market, and specifically the woody biomass sector as well as protect the environment, while at the same time establishing environmental and natural resource standards that will guide and manage growth in that sector. The woody biomass sector has the potential to become an important component of our state's energy production in the future. Properly managed the woody biomass facilities and the harvesting of the feedstocks necessary to fuel those facilities

have the potential to add jobs in rural communities and at the same time enhance the state's natural resources.

This report is intended to further the adoption of policies that will guide the growth of the woody biomass market in a manner consistent with the environmental protection mandate contained in Senate Bill 3.

This report was approved by the Renewable Energy Committee on March 10, 2010 and by the full Environmental Management Commission on March 11, 2010.

The members of the Environmental Management Commission's Renewable Energy Committee are:

Mr. J. Dickson Phillips, III	Committee Chairman
Mr. Thomas F. Cecich	
Mr. Stan Crowe	
Mr. John S. Curry	
Ms. Marion Deerhake	
Mr. Tom Ellis	
Dr. Charles Peterson	
Mr. Stephen T. Smith	EMC Chairman

APPENDIX I

Memo on Applicability of Federal Incinerator Rules

NCDENR
North Carolina Department of Environment and Natural Resources

Beverly Eaves Perdue, Governor

Dee Freeman, Secretary

August 31, 2009

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Re: Biomass Combustion in Utility Boilers

Caroline and George:

At Secretary Freeman's request, I am responding to your letter of August 18, 2009 asking for interpretive guidance on the applicability of federal Clear Air Act rules regulating commercial and industrial solid waste incinerators (CISWI) to combustion units using untreated wood and vegetative materials as fuel.

In June of 2007, the federal Court of Appeals for the District of Columbia Circuit struck down EPA rules that exempted a unit that combusted solid waste for purposes of thermal recovery from the CISWI rules. As a result of that ruling, any new unit that combusts solid waste must comply with the CISWI rules. The Clean Air Act references the definition of solid waste in the Solid Waste Disposal Act:

"...any garbage, refuse, sludge from a waste treatment plan, water supply treatment plant, or air pollution control facility and other discarded material including solid, liquid, semisolid or contained gaseous material resulting from industrial, commercial, mining and agricultural operations..."

Our staff and counsel representing the air quality and solid waste programs agree that woody debris and small timber that is harvested after completion of logging or land-clearing activity and transported or stored for use as a fuel is not a solid waste because the material has not been "discarded". The combustion of those fuels would not require compliance with the CISWI rules.

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(The same type of material would still constitute "solid waste" in circumstances where it has been discarded.)

We also recognize that there may be other types of clean, chemically unaltered wood and vegetative waste that could fall outside the definition of "solid waste". Making that determination, however, requires careful consideration of the nature of the material, its processing and handling. DENR has proposed to make determinations about application of the CISWI rules to other types of wood and vegetative waste, such as byproducts of manufacturing (including sawdust and wood chips), on a case by case basis. The Division of Air Quality will have the lead role in making those determinations, but will do so in consultation with the Division of Waste Management.

Staff in the Division of Air Quality and Division of Waste Management are still gathering information on torrified wood to get a better understanding of the product. We will provide additional guidance on use of torrified wood as soon as possible. I did not want to hold this response until we could fully address the question concerning torrified wood because of Duke Energy's immediate need for guidance on use of wood waste from land-clearing activities.

I hope this is helpful as a start. As you know, EPA has issued a notice of proposed rulemaking to clarify the application of CISWI at the federal level. Until a federal rule becomes final, DENR proposes to use this case-by-case approach unless a particular type of material clearly falls outside the definition of solid waste.

Sincerely,

Robin W. Smith
Assistant Secretary for Environment

Cc: Secretary Freeman
Keith Overcash
Dexter Matthews

APPENDIX II

Membership of Woody Biomass Technical Advisory Group

EMC Biomass Technical Advisory Group Members[1]

Name	Organization
Bob Abt	NC State University
Tracy Beer	Duke Energy
Grant Blume	Progress Energy
John Bonitz	Southern Alliance for Clean Energy
Steven Burke	NC Biofuels Center
Tom Cors	The Nature Conservancy
Garald Cottrell	Wellons Energy Solutions
Rosalie Day	NC Sustainable Energy Association
Doug Duncan	National Association of Professional Loggers
Robert Goodson	GreenCo Solutions Inc.
Rick Hamilton	NC State University
Dennis Hazel	NC State University
Chris Hopkins	NC State University
Will McDow	Environmental Defense Fund
Chris Moorman	NC State University
Barry New	NC Division of Forest Resources
Wib Owen	NC Division of Forest Resources
Linda Pearsall	NC Division of Natural Resources Planning and Conservation
Bob Slocum	NC Forestry Association
Stan Taylor	RST Engineering

[1] The Biomass Technical Advisory Group (TAG) was chaired by Environmental Management Commission member Dickson Phillips. The work of the TAG was made possible through the assistance of the NC State University Solar Center and specifically staff members, Alex Hobbs, Maureen Quinlan and Kim Tungate.

APPENDIX III

Memo on State Policy Options

Memorandum

To: Dickson Phillips

From: Steve Wall

Date: October 29, 2009

Re: Woody Biomass Policy Options

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Pursuant to Senate bill 3 (SB 3) the Environmental Management Commission is charged with evaluating renewable energy technologies and establishing standards to ensure that these technologies do not harm the environment, natural resources and cultural resources, or public health, safety or welfare of the State. In the last several months the EMC has focused its attention on the environmental impacts of utilizing woody biomass for energy. While there are air quality regulations currently in place that pertain to emissions from these biomass facilities, questions have been raised about the potential impacts to our state's forest and wildlife resources from woody biomass facilities. Consequently, the EMC must decide whether standards or regulatory actions should be put in place to limit any adverse impacts from the utilization of woody biomass for power generation.

What follows below are some potential options for consideration by the EMC based on actions in other states to address these same concerns. For some of the options it may require the EMC to recommend back to the legislature for statutory changes to SB 3.

No action with a five year review

This policy option would be based on the premise of taking no action other than a requirement that the EMC revisit this issue after more time has passed. This option would require a formal review by the EMC in five years. This assessment after a period of five years shall include updating the number of wood biomass burning facilities that are in operation, the portion of the SB3 requirements being achieved through woody biomass and a review of market prices of timber, pulpwood and wood residual. The assessment shall also note the extent to which the requirements of SB 3 have impacted the forest resources of the state, including conversions of forests to energy crops and identification of any potential "hot spots" or areas where biomass facilities have located in significant numbers.

The review shall also require the EMC to assess whether any regulatory or policy decisions are warranted based on the latest information. A requirement for a reassessment after a set time period would be consistent with prior EMC action, such as the mercury rules (15A NCAC 02D .2509) which require periodic reviews by the EMC.

Wood Waste definition

Senate bill 3 states that a renewable energy resource means a solar electric, solar thermal, wind, hydropower, geothermal, or ocean current or wave energy resource; **a biomass resource, including agricultural waste, animal waste, wood waste, spent pulping liquors, combustible residues, combustible liquids, combustible gases, energy crops or landfill methane** (emphasis added) ...." While varying interpretations can be made of this definition, one such interpretation takes the position that biomass resources are not limited to wood waste but rather include the entire universe of biomass. The N.C. Utilities Commission in its rulemaking for SB 3 chose not to further define the biomass resource but rather stated it should be a case by case decision. The Commission concluded that "rather than potentially limit the definition of "biomass" on the basis of an incomplete record in this rulemaking proceeding, the Commission concludes that the statutory definition of "renewable energy resource" is sufficient and that "biomass" should not be separately defined in RuleR8-67."

Other states have chosen to more directly define what types of biomass will be allowed under their renewable energy portfolio requirements. For example, Washington State excludes wood from old growth forests in its definition of biomass. Maryland and New Jersey are other examples of states that exclude old growth timber from eligible biomass resources. The definition of biomass and wood waste has also been subject to congressional action in past legislation and is once again under discussion in the pending climate change legislation.

At the very least, policy makers should be aware that the current definition of biomass in SB 3 can be interpreted in a manner that would not restrict its implementation to wood "waste" or residuals and could lead to the use of whole trees for power generation.

Caps on Woody Biomass Utilization

Limiting the amount of woody biomass combustion used to meet the RPS requirements is another option for consideration. This could be done by amending SB 3 to put a specific limit on the volume of biomass. For example, Virginia's statute establishing its voluntary RPS goal mandates that no more than 1.5 million tons of woody biomass may be used for RPS purposes. Enacting a limit could also be taken through a percentage limit. North Carolina chose to mandate specific set asides for solar, swine waste and poultry. It could take a similar approach of placing percentage limits on how much woody biomass could be relied upon to hit the SB 3 targets (For example: No more than 50% of the portfolio can be comprised of woody biomass).

Sustainability Requirements

Placing a sustainability requirement on power generators is an idea that has arisen in other states as large bioenergy facilities have been proposed. These types of projects have created concerns about the impacts of these facilities on the forest resources and on efforts to reduce greenhouse gas emissions. The basic structure of a sustainability requirement lies in requiring a power generator to certify that its suppliers of biomass have some type of forest management or sustainability plan in place. Massachusetts is currently in the process of developing a sustainability requirement. New York utilities regulations require that biomass facilities must have Forestry Management Plans. Suppliers of these facilities must be in compliance with the biomass facilities plans. The plans are required to contain management practices that conserve biological diversity, productive forest capacity and promote forest ecosystem health. The plans must be completed by a professional forester and are subject to state approval. The suppliers of the wood resource must then be in compliance with FMP and develop harvest plans for each parcel.

Harvesting Guidelines

A number of states have developed guidelines for the harvesting of woody biomass. In most cases these guidelines are voluntary and are intended to assist landowners with ensuring that the amount of removal does not cause any unintended consequences. Guidelines developed in other states cover such issues as wildlife and biodiversity, water quality and soil productivity. Minnesota, Wisconsin and several other states have developed biomass harvesting guidelines. These guidelines are summarized in a Forest Guild report (http://www.forestguild.org/publications/research/2009/biomass_guidelines.pdf).

The removal of dead wood and the corresponding reduction of dead wood on site is one of the key distinctions between harvesting practices for forestry operations. While North Carolina has existing best management practices for forestry activities, the BMPs are focused solely on water quality. Additional guidelines for the harvesting of biomass that has traditionally been left on site may prove useful.

APPENDIX IV

Comments Submitted by Technical Advisory Group Members

A. NC Forestry Association

B. NC Biofuels Center and Environmental Defense Fund

C. NC Division of Natural Resource Conservation and Planning

D. Southern Environmental Law Center

MEMORANDUM

To: EMC Renewable Energy Committee

From: Bob Slocum, Executive Vice President
NC Forestry Association

Subject: **RECOMMENDATIONS REGARDING RENEWABLE WOODY BIOMASS**

Date: November 12, 2009

A technical advisory group (TAG) established by the EMC's Renewable Energy Committee has been meeting to discuss policy options and recommendations regarding woody biomass. While the group has not reached any final conclusions or made any policy recommendations, members of the TAG were asked to provide comments to members of the Renewable Energy Committee prior to the November 18th meeting.

The following comments and recommendations are offered on behalf of the NC Forestry Association, a private non-profit conservation organization representing some 4,000 forest landowners, managers, wood suppliers and manufacturers of wood and paper products in North Carolina.

Definitions

Recommendation: The definition of renewable energy resource in Senate bill 3 must be clarified with regards to what a "biomass resource" means and includes. The NCFA recommends that it be made clear that a biomass resource includes all forms of wood and does not restrict the potential supply.

Discussion
In Senate bill 3, the bill that created NC's renewable power standard, the following definition was made of a "renewable energy resource:"
(8) 'Renewable energy resource' means a solar electric, solar thermal, wind, hydropower, geothermal, or ocean current or wave energy resource; a biomass resource, including agricultural waste, animal waste, wood waste, spent pulping liquors, combustible residues, combustible liquids, combustible gases, energy crops, or landfill methane; waste heat derived from a renewable energy resource and used to produce electricity or useful, measurable thermal energy at a retail electric customer's facility; or hydrogen derived from a renewable energy resource. 'Renewable energy resource' does not include peat, a fossil fuel, or nuclear energy resource.

Significant questions have surfaced over what "a biomass resource" means and/or includes. Some read the language [***including agricultural waste, animal waste, wood waste, spent pulping liquors, combustible residues, combustible liquids, combustible***

gases, energy crops, or landfill methane] to mean that only those items stated would be considered as a biomass resource. Under this interpretation, only wood waste (which is not defined) would be considered a "biomass resource" for the purpose of meeting the state's renewable power standard.

Others, including the NC Forestry Association, read this list as examples of a "biomass resource" and not an exclusive list of eligible materials. Under this view, all wood would be considered a biomass resource.

The NC Utilities Commission has stated that it will review this issue (what constitutes a biomass resource) on a "case by case" basis. This means that one facility might be allowed to use a broad range of wood resources while another could be restricted to using only "waste." We believe this alone is and will be a major deterrent to potential investors in biomass power. Thus, this definition must be clarified.

There is general agreement that if North Carolina is to meet the goals and mandates defined in Senate bill 3, wood will have to play a significant role in producing renewable power. Arbitrarily restricting the potential supply of woody biomass will make achievement of these goals and mandates almost impossible.

Other Policy Options

Recommendations: The NC Forestry Association recommends that no additional policy actions, beyond clarifying the above definition, be taken at this time and that the EMC revisit this issue at 5-year intervals.

Discussion

Despite much attention, fanfare and media coverage, the fact is that there has been no significant expansion of the use of wood for power generation in North Carolina. And most experts agree that it will take 3-5 years for any new facilities to come on line. While the major power utilities are exploring both co-firing at existing coal plants and building new biomass power capacity, no major expansions are expected in the near term.

Some have expressed concern over potential impacts to the existing forest products industry. We do not believe there will any significant adverse impact to this industry. The forest products industry in North Carolina is already the largest producer of renewable power in the state. This industry, like most manufacturing industries, is in a severe recession and a number of facilities have closed or are taking significant down time. For example, it was recently announced that the International Paper mill in Franklin, VA will be shut down. This was a major market for pulpwood in the northeastern part of North Carolina. The Domtar mill in Plymouth, NC is shutting down is last paper machine and converting to the production of fluff pulp. This means the mill will no longer use hardwood species in its production. Georgia Pacific has closed its mill in Ahoskie, NC and suspended operations at its Whiteville, NC mill for at least 6 months.

T&S Hardwoods in Sylva, NC closed its doors October 1st. This mill was the largest employer in Haywood County. Almost all other manufacturers are running at reduced levels.

The fact is that additional markets for wood are needed and we believe that biomass power, and eventually the production of liquid fuels, can provide new and much needed markets.

Some have expressed concern of potential impacts to our forests and suggested that new mandates, rules, or restrictions are needed. We disagree. "Biomass" is simply one of several forest products. And it is not new. We have been producing and using woody biomass for power generation for decades. We also believe that basic economics, certainly as they exist as this time, will mandate that biomass will be produced as part of an integrated harvesting operation, i.e. there will be very little harvesting solely for the production of biomass. We already have mandatory requirements for water quality protection that pertain to any land-disturbing activity for forestry. Almost all of our logging contractors are trained in best management practices and compliance rates for the mandatory performance standards for water quality exceed 90%.

Preliminary data from the new forest inventory and analysis work in North Carolina shows the following:

- Total forestland in North Carolina increased slightly;
- Forest growth per acre continues to increase;
- Our growth/drain ratio is positive for both hardwoods and softwoods (we are growing more than we are removing).
- Over half of NC's 18 million acres of forest land is in hardwood types and two-thirds of our timber volume is hardwood.

So the data does not indicate any problems in meeting demands for wood. What we do know is that the continued decline in markets will likely have an adverse impact on forest investments by private landowners that could lead to increased conversion of forestland to non-forest uses.

We do not believe that any additional mandates, requirements or restrictions are needed or are appropriate with regards to the production of woody biomass. We continue to support expanded landowner education and outreach regarding forestry and forest management options as well as the continued training of logging professionals in best management practices.

EDF ENVIRONMENTAL DEFENSE FUND
Finding the ways that work

Biofuels Center of North Carolina

Envisioning North Carolina's Biomass Future

A Framework for Thought and Action

December 30, 2009

I · Overview and Vision

North Carolina's biomass resources are abundant, diverse, and versatile. Carefully and sustainably managed, the resources can be increasingly valuable simultaneously to build the state's renewable energy economy, to enhance working lands, and to benefit the environment.

Emerging biomass markets offer significant potential to create and sustain new jobs and to reinvest in North Carolina a portion of the $30 billion currently spent outside the state to import coal, oil and natural gas. Key goals for North Carolina should be to keep those jobs in-state, particularly enhancing rural communities, and to produce more home-grown energy that reduces greenhouse gas emissions. The benefits derived from achieving these goals should be disseminated to the broadest representation of communities, landowners and industries across North Carolina.

North Carolina has an opportunity to ensure that emerging biomass markets are not only sustainable, but actually improve the environment while providing new income and jobs for local communities. Visionary thinking, decisive and timely leadership, and clear analytics will be required to realize this vision; standard and long-established methodologies and thinking will probably prove insufficient.

Achieving the best possible future requires assessing supply and demand, addressing new and possibly unforeseen issues, and developing effective policies. Toward that end, this document reflects thoughtful consensus from two significantly attentive organizations about future biomass usage, policies, and outcomes – offering both a vision and a framework for approaches and policies between now and that future.

Vision

The production and utilization of biomass resources must improve environment, communities and economy across North Carolina. Biomass resources will be defined and managed over time with effective policies and practices for ecologically and economically sustainable outcomes. Varied parties will work carefully together over coming months to achieve a shared vision.

II · Guidelines for Thought and Action

Core Principle

To be truly and responsibly sustainable, North Carolina's biomass future demands on-going commitment to a full suite of environmental, economic and societal imperatives.

Responsive Leadership

The state must make three foundational commitments to achieve outcomes that enhance North Carolina's economy, citizens, and environment.

- Leadership North Carolina will demonstrate leadership in developing biomass markets with dovetailed and balanced attention to sustainability, economic benefits, jobs, sector needs, public benefits, and the environment.

- Partnership Working together in coming years, varied parties in North Carolina will commit to such leadership and ensure it by behavior and activities from every vantage point.

- Responsive Expanding, emerging and unexpected factors – from climate impacts to altered landscapes and sector applications – will be necessarily and timely addressed by strategy and monitoring.

Policy Considerations

To ensure appropriate attention and future outcomes, North Carolina must:

- Meeting Demand Effectively and sustainably meet biomass demands from different sectors, including: existing industries, electric power generators, biofuels producers, and others at hand or to be shaped.

- Anticipating Needs Employ comprehensive analysis, estimation, feedback, and monitoring to anticipate both increasing and new biomass needs – yielding few surprises and solid foundations for sustainable biomass utilization.

- Policies and Strategies
  Adopt policies and strategies in a timely and decisive way to appropriately allot and benefit from biomass, as needs and questions are new, unfolding, and barely explored.

Craft and implement a portfolio of effective policies, regulations, and laws, no more or less than required for good stewardship, leadership, and outcomes.

Develop and maintain policies and incentives for biomass energy production as one strategy to reduce imported fossil fuel demands and associated greenhouse gas emissions.

- GOOD MANAGEMENT Ensure that biomass resources and land are exceptionally well managed by every measure of productivity, sustainability, and responsibility.

- MAXIMIZE BENEFITS Ensure that biomass markets maximize and spread economic and environmental benefits across the broadest representation of communities, landowners, and industries, and that costs are equitably allocated.

III · RECOMMENDATIONS FOR ACTION

Timely and decisive actions, combined with keen attention to emerging issues, are required to achieve the vision of a sustainable biomass industry that improves North Carolina's environment, communities and economy. All of the following recommendations are necessary steps that can and should be undertaken. The chronology and interrelationship of necessary actions over time will be determined by engaged partners.

- BIOMASS DEFINITION Define renewable biomass to include clean agricultural and forestry resources gained in accordance with sustainable biomass management guidelines.

- SUSTAINABLE MANAGEMENT Design and implement guidelines for sustainable management of biomass feedstocks as measured by water supply and quality, wildlife and biodiversity, soil quality and productivity, conservation of natural heritage sites and high-conservation value forests, improved forest management, and carbon balance.

- STATE ENERGY POLICIES Enable the fulfillment of North Carolina's renewable energy goals, including the REPS and the 10% biofuels strategy.

- COMPREHENSIVE PROJECTION Study and quantify the total amount of biomass needed to meet existing and future demand. The study should analyze biomass demand under conservative, probable and high yield and demand scenarios as well as the expected community or environmental tradeoffs associated with each demand scenario.

RECOMMENDATIONS FOR ACTION, contd.

- COMPREHENSIVE ANALYSIS Identify additional needs and fund critical biomass-related analysis at universities, state agencies and elsewhere to document and quantify biomass impacts and opportunities.

- LANDOWNER INCENTIVES Support existing and new agriculture and forestry cost-share and property tax programs (e.g., Forest Development Program, Present Use Value) to ensure sufficient biomass resources to meet growing demand.

- FACILITY INCENTIVES Support policies and fiscal incentives for modern and efficient biomass utilization facilities that reduce resource, energy, and water consumption, and that minimize water, air and greenhouse gas emissions.

- LOCATING FUTURE FACILITIES Develop effective mechanisms for appropriately scaling and locating new biomass utilization and collection facilities to minimize competition for limited resources and to minimize adverse community impacts.

- AIR AND WATER When developing new production processes and facilities, establish standards as needed to minimize adverse impacts to air and water.

- FORWARD LOOKING COMMITTEE Establish a *Consensus Committee for North Carolina's Biomass Future* to advance implementation of necessary actions and to resolve additional issues. This small and targeted group, representing appropriate and varied interests, will develop and submit a consensus approach for emerging and future needs, by the spring of 2011.

- LOOK-BACK ASSESSMENT Conduct a comprehensive review of biomass markets and policies within 3 to 5 years of implementation. The review should qualitatively and quantitatively assess impacts on: food, feed and fiber markets; jobs and local economies; fossil fuel and greenhouse gas reductions; water, wildlife and natural communities; air quality and human health; and local community well-being.

EDF ENVIRONMENTAL DEFENSE FUND
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DIVISION OF NATURAL RESOURCES
PLANNING & CONSERVATION

January 5, 2010

MEMORANDUM

TO: Dickson Phillips

CC: Steve Wall

FROM: Linda Pearsall

SUBJECT: Comments on Woody Biomass Policy Options

Thank you for the opportunity to provide comments on the October 29, 2009 Woody Biomass Options. I apologize that the comments are late, and hope you can still accept them. I also appreciate your willingness to accept comments from the diverse perspectives represented on the Technical Team. This is indeed a complex subject for which we have limited information to support informed decisions. Proceeding cautiously seems wise.

I have used the headings provided in your Oct. 29 document to organize my comments. If you would like the information provided in a different format, please let me know.

No action with a five year review
There is currently so much uncertainty about the potential ecological and market impacts resulting from SB 3. In addition to the data which you identify for consideration during a 5 year assessment, it would be extremely useful to have several specific types of data collected. These could include:

- **Geographic information** documenting the locations of biomass harvests. This information should be as specific as possible and could be at point of delivery to the purchaser of the biomass. In addition to the location, it will be useful to collect information on the extent of the acreage that provided the biomass.
- **Source of biomass harvest**- In order to assess the influence of a biomass harvests on current timber operations, it would also be useful to know if the biomass harvest results from a harvest strictly for biomass or if the harvest is paired with a harvest for roundwood or pulpwood, clearing for development or agriculture, a harvest following storm damage, or a thinning.
- **Post-harvest land use**. In order to assess the impact of harvests on the current and future extent of forests in North Carolina, it would be useful to know if the land is being returned to native forest or timber plantation, or if it is being converted to another land use such as development or establishment of an energy crop.

Wood Waste definition/Sustainability Requirements

In order to have a sustainable biomass resource, wood harvested from wetlands or from riparian buffers should be specifically excluded as part of the definition of a renewable resource. This will reinforce the current voluntary compliance of DFR Best Management Practices; protect most of the rare forest lands that are in private ownership; and result in protection of riparian buffers and wetlands that provide significant water quality protection.

Harvesting Guidelines

According to information presented to the committee, there is not a significant difference in the volume of dead wood left on sites that include a biomass harvest vs. sites that do not include a biomass harvest. Whether there is significant difference in the quality of the materials left on site from a wildlife habitat perspective was not addressed. As technology changes and the value of biomass increases, the amount of downed wood left on site could change significantly. I suggest that additional research into this issue is needed and that the issue should be examined more thoroughly in 5 years.

Thank you again for accepting the challenging task of leading this diverse group. If you have any questions or need additional information, please let me know.

LPP/lpp

SOUTHERN ENVIRONMENTAL LAW CENTER

Telephone 919-967-1450 | 200 WEST FRANKLIN STREET, SUITE 330 CHAPEL HILL, NC 27516-2559 | Facsimile 919-929-9421

January 12, 2010

Via Electronic Mail and U.S. Mail

J. Dickson Phillips III
Lewis Phillips Hinkle, PLLC
P.O. Drawer 4825
Chapel Hill, NC 27515

Re: **"Wood waste" as a renewable energy resource in Senate Bill 3**

Dear Mr. Phillips:

It is our understanding that a technical advisory group ("TAG") established by the Renewable Energy Committee of the Environmental Management Commission ("EMC") has been engaged in a discussion of policy options and recommendations regarding energy production from woody biomass, and that the Committee will be discussing woody biomass policy options at its next meeting. We offer the following comments for the Committee's consideration.

Senate Bill 3, which established North Carolina's renewable energy portfolio standard, authorizes the EMC to assess the potential environmental impacts of renewable energy resource use and to develop environmental standards through regulations if necessary to mitigate these impacts. It appears that there is some debate among members of the TAG regarding what forest or wood product related resources are included in the statute's definition of renewable energy resources. Because the scope of this definition will to a large extent determine the potential environmental impacts of compliance with the statute, we believe that it is important for the EMC to clarify the scope of this definition.

In Senate Bill 3, the legislature specifically defined the "renewable energy resources" that may be utilized to meet its requirements. The statute defines a "renewable energy resource" as, among other things, "***a biomass resource, including*** agricultural waste, animal waste, ***wood waste***, spent pulping liquors, combustible residues, combustible liquids, combustible gases, energy crops, or landfill methane. . . ." N.C. Gen. Stat. § 62-133.7(a)(8) (emphasis added). In reading a statute, we must look first to the plain language. "Including" must be given its plain meaning in this context. *Univ. of N.C. at Chapel Hill v. Feinstein*, 161 N.C. App. 700, 704, 590 S.E.2d 401, 403 (2003) ("A fundamental rule of statutory interpretation requires the plain meaning of the statute to control its applicability"). The *Merriam-Webster Dictionary* defines "include" as "to take in or comprise as a part of a whole or group." A statute that lists specific items or categories is read to exclude what the General Assembly did not enumerate. *Morrison v. Sears, Roebuck & Co.*, 319 N.C. 298, 303, 354 S.E.2d 495, 498 (1987) ("the General

Assembly's inclusion of specific terms or categories implies the exclusion of others."); *Evans v. Diaz*, 333 N.C. 774, 779-780, 430 S.E.2d 244, 246-47 (1993) (construing statute with "exhaustive" list to exclude categories not listed). Here, the General Assembly's use of "including" following "biomass resource" limits "biomass resource" to those specific resources in the exhaustive list. Potential biomass resources from forest or wood products are thus limited to "wood waste." If the legislature had intended the specific list of biomass resources to be illustrative instead of exhaustive, it would have used the frequent statutory phrase "including, but not limited to."

That the legislature intended renewable biomass resources derived from forest or wood products to be limited to "wood waste" is reinforced by the canon of statutory construction *nosictor a socilis*: the meaning of words may be enlarged or restrained by reference to the intent of the whole clause. In the list of biomass resources in the statute, "wood waste" is preceded and followed by "agricultural waste," "animal waste," "spent pulping liquors," and "combustible residues." N.C.G.S. § 62-133.7(a)(8). All these are byproducts of a primary industry or endeavor, consistent with the commonly understood meaning of "waste": "damaged, defective or superfluous material produced by a manufacturing process." *Merriam-Webster Dictionary*. It is noteworthy that the statute lists as "biomass resources" "energy crops" in addition to "agricultural waste." If the legislature had intended to include "forests" or "timber" or "wood products" as a renewable wood biomass resource, it would also have listed these more expansive terms instead of or in addition to "wood waste."

Since the statute limits renewable energy resources from forest or wood products to "wood waste," the EMC should develop an operative interpretation of the term "wood waste" to guide its assessment of the potential environmental impacts of this resource and its development of standards to mitigate those impacts. To be consistent with the statute, the definition must be limited to "waste" or "damaged, defective or superfluous materials" of the forest or wood product industry. In the forest industry, this could include slash from timber harvest and thinnings with no commercial pulp or timber value. In the wood products industry, this could include lumber and paper mill residues, furniture manufacturing residues, and other byproducts of primary wood products manufacturing. The definition must exclude harvesting of forests for the primary purpose of biomass feedstock, as this would not constitute "wood waste." We suggest the following definition of "wood waste" that is included as a renewable biomass resource in the statute:

> "Wood waste" that constitutes a renewable biomass energy resource means byproducts from timber management activities such as slash from harvesting or non-commercial thinning of timber stands; byproducts and residue from wood product industries such as sawdust, trimmings, and culled lumber; and finished wood products that would otherwise be discarded such as construction debris and used pallets.

Finally, we understand that there has been discussion among members of the TAG and others of a request to the legislature to clarify or expand the definition of "biomass resource." Regardless of the necessity or outcome of any such effort, it is clear that legislative action takes time. Meanwhile, renewable energy providers are likely poised to submit applications for

renewable energy facilities to the North Carolina Utilities Commission, which has stated its intent to determine on a case-by-case basis whether a resource used by a particular facility is a "renewable energy resource." Order Adopting Final Rules, Docket E-100, Sub 113 (Feb. 29, 2008). Because the scope of the definition of "wood waste" will impact the environmental consequences of renewable energy development, the EMC's establishment of an operative definition of wood waste would assist the Utilities Commission in its efforts to certify renewable energy facilities and help ensure that the environmental impacts of renewable energy development are properly taken into account.

Thank you for your consideration of these comments. If you have any questions or need additional information, please do not hesitate to contact either of us.

Sincerely,

Derb S. Carter, Jr.
Gudrun Thompson

cc (via email):
EMC Renewable Energy Committee
Steve Wall

GT/kbd

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February 1, 2010

J. Dickson Phillips, III
Lewis Phillips Hinkle, PLLC
P.O. Box 4825
Chapel Hill, NC 27515

Re: Letter from the Southern Environmental Law Center ("SELC") regarding the definition of "biomass resource" under Senate Bill 3 (Session Law 2007-397)("Senate Bill 3")

Dear Mr. Phillips:

We the undersigned want to respond to the letter from the SELC to you, dated January 12, 2010, wherein the SELC offered comments and recommendations regarding its interpretation of the language of Senate Bill 3 and the intent of the legislation with respect to the definition of "biomass resource." Please accept this letter as an informal response to those comments for consideration by the Renewable Energy Committee ("the Committee") of the North Carolina Environmental Management Commission ("EMC"). Simply put, the SELC's comments and recommendations should be disregarded due to the flawed legal reasoning that serves as the foundation for SELC's recommendations. SELC's interpretation of the language of Senate Bill 3 defining "biomass resource" is both inaccurate as to the actual connotation of the word "including" and contrary to accepted legal standards of statutory construction. Importantly, SELC's proposed interpretation would severely limit the ability of our utilities and potential investors in biomass power production to use biomass resources to comply with the renewable energy requirements of Senate Bill 3 and further increase compliance costs for our 1.8 million North Carolina customers.

First, SELC cites the Merriam-Webster Dictionary definition of the word "includes", and yet ignores that actual meaning of the definition. As cited by SELC on page 1, "includes" means "to take in or comprise as ***part*** of a whole or group." (emphasis supplied). SELC somehow interprets this definition as suggesting that words or items that follow the word "includes" are not ***part*** of the whole or group, but actually ***are the entirety*** of the whole or group, to the exclusion of any and all others. To "include" one thing does not implicitly "exclude" another due to the plain fact that "including" one or more items in the specified whole or group simply means that those specified items are ***part*** of that whole or group. Thus, based on a plain reading of the dictionary definition of "include", the addition of the clause, "but not limited to" following "including" is not only unnecessary, but also redundant. To suggest, as SELC does, that the addition of "but not limited to" after "including" is determinative as to legislative intent, is simply wrong. It is our understanding that the North Carolina General Assembly has not used the phrase "but not limited to" after "including" in drafting legislation for over twenty years for this very reason.

Further, based upon generally accepted norms of statutory construction, where a list is preceded by the word "includes," ***which is generally a term of enlargement*** rather than limitation, it indicates that matters ***other than those enumerated*** are covered. *See* Norman J. Singer, 2A *Sutherland on Statutory Construction* 231-232 (2000)(emphasis supplied). Moreover, according to *A Dictionary of Modern Legal Usage*, "including should not be used to introduce an exhaustive list, for it implies that the list is only partial." As illustrated by the citation to *Sutherland on Statutory Construction* above, "it is hornbook law that the use of the word "including" indicates that the specified list . . . that follows is illustrative, not exclusive." *Certified Color Mfg. Ass'n v. Mathews*, 543 F.2d 284, 296 (D.C.Cir. 1976). It is also compelling that ***in none of the cases cited and relied upon by SELC*** (to establish that the list of biomass resources listed in Senate Bill 3 are intended to be exhaustive and exclusive) are the lists covered by those statutes actually preceded by the words, "include" or "including". As such, *Morrison v. Sears, Roebuck & Co.*, 319 N.C. 298, 303 (1987) and *Evans v. Diaz*, 333 N.C. 774, 779-780 (1993) are easily distinguishable from the statutory clause in Senate Bill 3 due to the fact that there is no qualifying language at all, let along the word "including," that precedes the statutory language at issue in those cases.

Based on the above, the legal arguments underpinning SELC's position are inapposite and its comments as to how the EMC should read and interpret Senate Bill 3 should be ignored. Beyond the legal interpretation problems, SELC's arguments suggest a legislative intent behind Senate Bill 3 that is in direct opposition to our experience and understanding relating to the drafting and development of the law. Since the passage of Senate Bill 3, we have supported the expanded use of biomass as a key component of its North Carolina Renewable Energy and Energy Efficiency Portfolio Standards ("REPS") compliance portfolio. That compliance strategy has been based on an understanding that, consistent with the legislative intent of Senate Bill 3, "biomass resources" include a broad range of potential wood fuel inputs: such as biomass residuals, traditional forest products, and additional wood resources produced using advanced management techniques.

As a practical matter, the SELC's interpretation, if followed, would severely limit the ability of all electric power suppliers, to use woody biomass resources to comply with the goals and obligations under Senate Bill 3. In September 2009, officials from North Carolina State University presented a study entitled "Estimating Biomass Supply in the U.S. South" to the Biomass Technical Advisory Group to the EMC. The supply study assumed that logging residuals and roundwood trees of insufficient size or quality to meet the requirements of sawtimber (referred to as pulpwood), would be eligible to be used as biomass fuel. The supply study illustrated that even with increased collection of biomass residuals, these resources would represent only a portion of the biomass fuel resources necessary to meet the bioenergy demands of REPS[1] , and that the demand for woody biomass residuals, which SELC argues are the only wood products aside from energy crops that qualify as "biomass resources" under Senate Bill 3, will quickly exceed supply and availability in the marketplace. Forest2Market, a leading provider of market price and industry trend information for the forest, wood products and bioenergy industries, estimates that on average across the South (including the North Carolina

[1] The study assumed an aggressive escalation in the collection rate for in-woods biomass residuals, increasing from 10% for pine and 8% for hardwoods in 2012 to 66% for pine and 50% for hardwoods in 2025.

supply shed), approximately only 6% of all in-woods biomass residuals are currently recovered for utilization.

Residuals are certainly an important part of the fuel supply for woody biomass resources, but would be woefully inadequate to support the amount of biomass resources necessary to enable power suppliers to use biomass cost-effectively to meet its respective compliance obligations under REPS. Energy crops, including trees grown using advanced management techniques, are a potential biomass resource for the future, but they cannot be planted and harvested in quantities sufficient for the near term 2012 requirements. Thus, if the woody biomass fuel supply in North Carolina were restricted to residuals, the fuel supply for all woody biomass resources in the State would become dependent upon primary logging harvests and be subject to the fluctuations of a secondary, unregulated market. Due to the limitations on supply referenced above, the price of the available biomass fuel will inevitably increase with increasing demand. Further, the cost of woody biomass fuel is highly dependent upon transportation, so any additional restrictions upon fuel supply and sourcing areas will directly impact transportation costs. Taken together, the cost drivers will likely make woody biomass a much less attractive and cost-effective resource for REPS compliance purposes.

We thank the Committee and the EMC for its consideration of these comments in response to the SELC's letter.

Sincerely,

George T. Everett

Jim Eck
Vice President
Business and Development
Dominion North Carolina Power

George Everett
Director
Environmental and Legislative Affairs
Duke Energy Carolinas

Roy Jones
Senior Vice President
Planning and Marketing
ElectriCities

Robert Slocum, Jr.
Executive Vice President
North Carolina Forestry Association

A. Preston Howard, Jr.
President
Manufacturers and Chemical Industry
Council of North Carolina

Robert Schwentker, President
Senior Vice President and General Counsel
North Carolina Electric Membership
Corporation

Caroline Choi
Director
Energy and Policy Strategy
Progress Energy

APPENDIX V

SUMMARY OF EXISTING FORESTRY INVENTORIES & DATA COLLECTION

North Carolina
Department of Environment and
Natural Resources

Beverly Eaves Perdue, Governor
Dee Freeman, Secretary

North Carolina
Division of Forest Resources

Wib L. Owen, Director

February 18, 2010

To: Dickson Phillips, EMC

From: Wib L. Owen

Cf: David Knight, Steve Wall

Reference: Data Review Relevant to Biomass

As requested by the Environmental Management Commission's Technical Advisory Committee on using woody biomass for energy, the Division of Forest Resources has completed a review of current data collections and research underway that will be useful in monitoring an emerging woody biomass industry. Please accept the following as our response to your request.

North Carolina's climate, ownership patterns, forest productivity, and long history of timber production make it especially suitable for producing woody biomass. Reduced pulp and paper production capacity and large scale divestiture of forest industry lands to other owners in recent years also highlight North Carolina forests as significant potential sources of woody biomass for energy production.

Accompanying the potential to produce wood-based bio-energy from North Carolina forests are concerns and questions among some non-governmental organizations, existing forest products companies and public agencies about the long-term sustainability of our forest resources. Concerns and questions are specific to each entity, but taken together include a wide range of forest resource functions and values.

Some of these concerns and questions are:

- What is the definition of woody biomass?
- How much woody biomass is annually available for energy/fuel production?
- What will emerge from Congress and the White House as Federal Energy policy and how will this policy impact North Carolina economically, environmentally and with respect to our Renewable Energy Portfolio Standard?
- What impacts on North Carolina's forest resources will occur as a result of North Carolina's Renewable Energy Portfolio Standard, North Carolina Biofuels targets, European and other overseas markets, pellet fuel markets, and bio-energy markets in other states?
- Will dedicated wood energy/fuel crops emerge and have an environmental impact?
- What impact will a new biomass market have on traditional forest product markets?
- What local impacts will new woody biomass generating facilities have on traditional forest product markets, the sustainability of woody fuel and ecosystem (soil, water, air, wildlife, etc.) sustainability?
- What will be the landscape impacts of this new market?
- Will a biomass market result in the conversion of native stands of trees to plantations?
- Will forests be converted to agricultural land to produce energy fuel crops?
- Will agricultural land be converted to forest land to produce short rotation energy crops?

- What new forest management approaches will emerge as a result of the new market?
- How accessible will timber and biomass be from North Carolina's changing forest ownerships?
- What will be the true environmental effects of an industry that is yet to fully materialize?

We need to ensure that we are collecting data and conducting research that will address these concerns and provide answers to these questions. Division of Forest Resources staff completed an evaluation of data that is currently being collected within the Division of Forest Resources and research that is being conducted by NC State University. The attached Current Data and Research document presents the results of this work. The document outlines data that are currently being collected and research that is currently being conducted relevant to the biomass discussion. In addition, the document also identifies places where additional data fields could be added to help inform biomass decisions. And finally, the document identifies resource needs that should be addressed to ensure that data collection proceeds uninterrupted for years to come.

The Current Data and Research document shows that a wealth of data is being collected with an opportunity to collect additional data that should allow us to monitor our resources and inform future decisions about the sustainability of these natural resources.

Thoughts About How to Proceed

Some key decisions need to be made that will shape the future of wood-based bio-energy usage in North Carolina and the resulting market for forest products. These decisions center on views by two opposing groups. One group wants new regulations on forest products harvested for biomass and a narrow definition of which woody products can be used for bio-energy production versus the other group that feels current rules and regulations are sufficient to protect our natural resources and asks for a broad definition of biomass. In reality, the issues are more complex than the views presented above but these two opposing group views do capture the big picture that must be addressed. On one hand, new regulations and a narrow definition of woody biomass will result in a reduction of woody biomass used for bio-energy production and the inability of this resource to contribute substantially to meeting the goals and targets for renewable energy production established in NC Senate Bill 3. On the other hand, allowing the usage of biomass to develop with current regulations and a broad definition of biomass runs the risk of unsustainable management of our natural resources. A look at the facts about current practices and projections concerning the bio-energy industry will help in analyzing these views and making key decisions.

Though the potential for a significant wood-based bio-energy industry in North Carolina is real, it is yet to emerge in a significant way region-wide. Several areas in North Carolina have been operating bio-energy facilities under current regulations and definitions without resource sustainability problems. Numerous evaluations of the new industry agree that biomass markets and utilization will grow slowly during the next five years. This could be referred to as the development period. We also know that biomass will be harvested using current timber harvest techniques and equipment during this development period. The Division of Forest Resources inspects 3,000 to 4,000 timber harvesting operations annually. These inspections represent the vast majority of timber harvests that occur on private lands in North Carolina annually. These inspections and additional data collected by the Division of Forest Resources confirm that Forest Practice Guidelines (FPGs) and Best Management Practices (BMPs) related to water quality currently provide good protection of our soil and water during timber

harvesting operations. Therefore, during this development period, we are confident that soil and water sustainability will not be an issue.

North Carolina currently has a significant amount of wood waste and residual wood that is not being utilized by current forest industry and could easily be brought to market with existing technology. In addition, Forest Inventory and Analysis data for North Carolina indicate that we are growing more wood than we are harvesting with respect to our current forest product markets. NC State University reports that more than eight million tons of forest biomass are sustainably available annually in North Carolina without using wood grown for traditional forest products. This is enough material to produce 600MW-years of power annually. As a result, we can be confident that our forest resources will not be strained during this development period.

Sustainable management of our forestland ensures a continuous supply of wood, soil and water quality, air quality, good wildlife habitats and recreational opportunities. A broad definition of biomass is more acceptable to stakeholders if sustainable management is ensured. Down and dead wood is an important component of wildlife habitat. Research at NC State University shows that there is not a significant difference in the volume of dead and downed wood remaining on timber harvest sites that include a biomass harvest versus timber harvest sites that do not include a biomass harvest. While additional research is needed and underway for evaluating the effect of biomass harvests on wildlife, we can be confident that during the development period the amount of down and dead wood remaining on site is not an issue. Concerns have been raised over conversion of natural stands to plantations, loss of biodiversity and subsequent loss of wildlife habitat. Current available data are adequate for monitoring sustainability of wood supply, soil and water and biodiversity. We need to evaluate data needs for monitoring wildlife and implement data collection and research to ensure we can track sustainability on this front. Ensuring sustainable management by landowners will also address resource sustainability concerns. Certification programs to ensure sustainability by landowners, such as the Sustainable Forest Initiative and the Forest Stewardship Council, are used by some large landowners in North Carolina but are too expensive for the vast majority of private landowners. The American Forest Foundation's American Tree Farm System Certification (ATFS) offers an affordable alternative for private landowners. For ATFS certification, landowners need a Tree Farm or Forest Stewardship Management Plan. These comprehensive plans include recommendations to manage not only for timber and trees but also for soil and water, wildlife and recreation. Only a very small percentage of North Carolina private landowners have Tree Farm or Forest Stewardship Management Plans. Current funding and policy are not adequate to significantly increase the number of Tree Farm and Forest Stewardship Management Plans to address sustainability. Work should begin immediately to increase funding and change policy during the biomass development period so that sustainability can be addressed while allowing for maximum utilization of our forest resources.

In summary, we are confident that during the next five years and possibly more, while the bio-energy industry is developing, current data collection and research will capture information that is needed to monitor our forest resources and inform our decisions about these new markets and their relationship to resource sustainability. In addition, we are confident that current rules and regulations will protect these resources during this development period and until significant changes occur in harvest techniques, market demand or new dedicated energy wood crops. Above all, we must ensure that all decisions are grounded in science and based on sound scientific principles.

Thank your for your leadership on this issue.

CURRENT DATA AND RESEARCH RELEVANT TO BIOMASS DISCUSSIONS

Introduction

The information presented in this paper is a brief synopsis of forest resource data currently collected by various sources that may be of interest to the Biomass Technical Advisory Group (TAG) of the NC Environmental Management Commission. Where applicable, a discussion of potential options for collecting additional data or conducting further analysis is offered as well as resource needs to ensure data collection. Additionally, two current research studies under the leadership of faculty in the Department of Forestry and Environmental Resources at NC State University that are of direct interest to the TAG are briefly summarized. This summary was compiled by the NC Division of Forest Resources in January, 2010.

North Carolina Division of Forest Resources

A. *Forestry Best Management Practice (BMP) Implementation Survey ['BMP Survey']*

The BMP Survey is a detailed, site-specific evaluation to determine which forestry BMPs are being implemented on active logging jobs across the state. Due to the laborious work of these Surveys, they are conducted on cycles, allowing time to collect, analyze and report on the information collected during the field work. These surveys are distinct and completely separate from DFR's normal day-to-day water quality FPG site inspections.

The BMP Surveys conducted by the DFR follow a protocol that was jointly developed by the USDA-Forest Service and the Southern Group of State Foresters (SGSF), in an effort to standardize how each state in the southern region reports their respective BMP implementation -- the widespread adoption of this protocol and sharing of information between state forestry agencies is unprecedented in the U.S., with regards to the monitoring of BMP implementation. The protocol also includes guidance on how to determine the sample size (ie: how many logging jobs to evaluate), in a manner that provides a statistically-founded survey sample. More information about the SGSF Water Resources Committee: ***www.southernforests.org/water_committee.htm***. More information about the DFR's BMP Implementation Surveys: ***http://dfr.nc.gov/water_quality/water_quality.htm***

How Data are Available

Current: MS-Access database (with entries transcribed from paper forms.)

Future: MS-Access database (with entries made from hand-held electronic devices.)

Frequency of Data Capture

Periodic Cycles every 3 to 5 years. Next Cycle ("Round 3") to begin in 2010.

Current Status

Round 1: Surveys taken on 565 sites from 2000 to 2003. Report is available from DFR.

Round 2: Surveys taken on 212 sites from 2006 to 2008. Data is being compiled for analysis, quality control, and reporting. Expect report to be completed in mid-2010.

Round 3: Targeting mid- to late-2010 to begin Round 3 with all-electronic data capture.

Biomass-Related Information Currently Available from BMP Surveys

- Latitude/Longitude GPS point
- Estimated Harvest Size
- Type of Landowner
- Dominant Land Feature of the Site (wetland, flatwoods, mountains,... etc.)
- Forest Management Prior to Harvest (intensive or passive)
- Timber Harvest Method (clearcut, thinning, select-cut, salvage,... etc.)
- Primary Tree Species Harvested
- Pre-harvest Plan Performed
- Technical Assistance Provided for the Harvest
- Logger Training Program Participant
- Average Width of SMZ (this parameter was not collected during the 2000-2003 Survey)
- Specific Information About SMZ Conditions (refer to excerpt of Survey form)

Additional Biomass-Related Information That Could Be Collected on Future Surveys

- Landowner Name: Allows ability to cross-reference with other DFR databases.
- Type of Logging Equipment: Is a chipper/grinder being used? If 'yes', is it combined with conventional logging equipment, or being used as a stand-alone operation?
- By-Product Utilization: If chips are being produced on-site, what are they being produced for?
- Area of SMZ: How much of the tract is contained within a SMZ?
- SMZ Timber Harvest: Is timber being harvested from the SMZ? If 'yes', we will need a metric to evaluate and report on: perhaps a % of total SMZ; or Basal Area retained in SMZ after harvest.
- SMZ Biomass Harvest: Is material harvested from the SMZ being used for biomass? (this would be a subjective response based on logger's input and evaluator's observations.)

BMP Survey Topics

The topics that are evaluated in the North Carolina Forestry BMP Surveys include:

- General Information; Site Information; Forestry Operations
- Riparian Buffer Rule Applicability/Compliance
- Streamside Management Zones-SMZ
- Stream Temperature
- Debris Entering Stream
- Waste Entering Streams, Waterbodies or Groundwater

- Forest Access Roads
- Skid Trails
- Stream Crossings
- Access Road Entrances
- Rehabilitation of Project Site
- FPG Compliance

Subjective Threat/Risk to Water Quality

In addition to evaluating whether or not a specific BMP is implemented, there is an opportunity to identify whether or not a threat or risk to water quality is observed. As cited in the 2000-2003 Survey Report (page 5):

> *"Conditions that posed a threat or risk to water quality prior to the tract naturally healing over time recorded a 'Yes' response. The surveyors considered the following six factors before making a 'Yes' response:*
>
> 1. *Sediment was delivered to stream/waterbody;*
> 2. *Sediment was likely to be delivered to stream/waterbody during a rainfall event (<=1" over 24 hours);*
> 3. *Sediment was delivered to stream/waterbody via wind gusts;*
> 4. *Adverse stream/waterbody temperatures were a result of harvest;*
> 5. *Logging debris and/or other logging byproducts were left in stream/waterbody;*
> 6. *Chemical or petroleum products had a high potential to reach stream/waterbody."*

Structure of BMP Surveys

During each BMP Survey cycle, the DFR's central office staff specifically trained select DFR personnel across the state to conduct these surveys, in an effort to keep the pool of evaluators relatively small and promote consistency among the survey results.

The BMP Surveys essentially follow along with the voluntary recommendations outlined in the forestry BMP manual, with the evaluator choosing a "yes" or "no" response to indicate whether or not each BMP was observed as being implemented on the logging job. A portion of the 2006-2008 BMP Survey form is provided as an example of the Survey structure and layout. The section excerpted here is for evaluating the activities that were conducted within the SMZs on the tract:

BMP: **Streamside Management Zone (SMZ) Conditions**	BMP PROPERLY IMPLEMENTED AND MAINTAINED			THREATS OR RISKS TO WATER QUALITY	
	Yes	*No*	*N/A*	Yes	No
Overall SMZ Width was adequate to provide effective sediment protection to waterbodies.	☐	☐	☐	☐	☐
SMZ uniformly maintained along intermittent & perennial streams / waterbodies. (i.e. without large gaps)	☐	☐	☐	☐	☐
Roads or trails minimized in SMZ.	☐	☐	☐	☐	☐
Trees were felled away from stream channel.	☐	☐	☐	☐	☐
Skidders and other equipment use was minimized in SMZ.	☐	☐	☐	☐	☐
Forest floor / ground cover is adequately maintained - no more than 20% bare ground for perennial streams; 40% for intermittent streams.	☐	☐	☐	☐	☐
No visible sediment from operations traveling through the SMZ and entering the stream.	☐	☐	☐	☐	☐
Machinery kept out of SMZ in areas where ephemeral streams intersect intermittent / perennial waters.	☐	☐	☐	☐	☐
Logging decks and/or sawmill sites located outside of SMZ.	☐	☐	☐	☐	☐
When no other feasible option exists, logging decks and/or sawmill sites in SMZ ≥ 10 feet from stream/waterbody.	☐	☐	☐	☐	☐
Total Responses for Streamside Management Zone (SMZ) Conditions					

DFR Resource Needs

- $135,000 per year: Salary funding is time-limited, via grant funds through Spring 2011, for the DFR personnel (2 FTE's) that manage this Survey and other BMP projects. Dedicated salary funding is needed to support these 2 FTE's to assure continuity of surveys and BMP program delivery.
- $ 35,000: The purchase of electronic hand-held devices and corresponding software to initiate paperless BMP Survey field data collection and storage has not yet occurred.
- $ 4,000: Upon completion of the '06-'08 report, we wish to publish a limited number of copies.
- BMP Surveys will remain labor intensive, in spite of the planned efficiencies that DFR will implement in future Rounds of survey, including the use of hand-held data collection devices. Extensive travel across the state and per-diem is required. If a more rigorous sampling size or frequency of BMP surveys is desired, then additional DFR personnel, or a re-assignment of existing DFR personnel, would be required to maintain the desired intensity level of survey and reporting.

B. *Forest Management Accomplishment Records and Reports (4220 database)*

County rangers assigned the responsibility of carrying out forest management activities, and foresters working in counties where county rangers are not assigned the responsibility of carrying out management activities are required to keep records of, and report forest management accomplishments. Forest management accomplishment records and reports are required in order to provide continuity of projects, summaries of accomplishments, and evaluation of the program.

Accomplishments consist of **192 forestry-related activities** that are grouped into 12 categories.

Forest Management Accomplishment Categories	
• Management Plans • Site Preparation • Establishment • Forest Protection • Forest Practice Guidelines • Stand Improvement	• Harvesting • Other Resources • Urban Forestry • Best Management Practices • Referral to Consultant • Water Quality

Every accomplishment is linked to a landowner and tract of land. Landowner data includes basic demographic information including name and contact information, ownership information (Private, Public, Forest Industry, Other), private ownership information (Male, Female, Joint), and race (American Indian, Asian, Black, Hispanic, White). Tract information includes acreage, latitude and longitude, and identifies what river basin the tract is located within. Other accomplishment data includes cost share program data, species data, riparian acreage, and Southern Pine Beetle information.

Data Analysis and Collection Opportunities

Create linkages between the 4220 database and other DFR information such as the BMP Survey database and the FPG Inspections database in order to better correlate and understand the impact of DFR forestry management services on FPG compliance and other measures of sustainability.

C. *DFR Water Quality and Forest Management Information (FPG Inspections) and Biomass Harvesting*

Water Quality Foresters, County and District Division of Forest Resources personnel conduct inspections of timber harvesting operations, reforestation operations and miscellaneous activities annually. These inspections represent 3000 – 5000 visits to forestry sites each year. The following table represents data that are collected during water quality inspections and as a result of forest management exams. The "SOURCE" category indicates the hardcopy forms or electronic databases that are used to record this information. As you will notice only 3 types of information is recorded in all 7 of these sources. These are landowner name, latitude/longitude, and county. While we do often record information that can be

useful in answering some of the questions that have arisen concerning biomass harvesting, it is not found in one source and in fact is often located among several hardcopy forms that are in turn filed in separate landowner files.

INFORMATION COLLECTED	SOURCE (SEE FOOTNOTES)	COMMENT
Landowner Name	1,2,3,4,5,6,7	
Landowner Address	1,2,3,4,6	
Landowner Phone #	1,2,3,6	Sometimes obtained and recorded.
Latitude / Longitude	1,2,3,4,5,6,7	Lat/Long information is the standard for DFR. GIS shapefiles are only gathered consistently for Stewardship lands and significant fire polygons.
County	1,2,3,4,5,6,7	
DFR District	1,2,4,7	
River Basin	1,2,6,7	
Estimated Acreage	1,3,4,5,6,7	
Parties involved with Harvest	1,2,7	Level of details can vary from tract to tract.
Active or Inactive Harvest	1,6,7	
FPG Compliance / Non-compliance	1,3,6,7	#7 is used for FPG non-compliance tracts only.
If non-compliance, which FPG standard not met	1,7	There are nine FPG standards.
Date FPG Compliance Complaint Received, Person Receiving Information, Source of Information, Situation Description, Type of Operation	1,6,7	If the site inspection originated from a complaint, this information is recorded. For #6, no details are logged, only that there was a complaint. For #7, only complaint date and source of complaint are logged.
If FPG non-compliance, date brought back into temporary or permanent compliance	2,7	
Riparian Buffer Rule Non-Compliance	1,3,6	
Referral for Enforcement Action Due to Continued FPG non-compliance	2,7	Referrals may be made to NC Division of Land Resources, NC Department of Agriculture, NC Division of Water Quality, or NC Division of Forest Resources, Law Enforcement
Estimated Days Since Harvest was Closed Out	1,3,6,7	
Person performing the exam	1,2,3,5,6	
Date of exam	1,2,3,5,7	
Recommended Activities	1,2,3,6	

Stand Description, Age & Growth Rate, Diameter Range, Hgt of Dominants, Site Index, Basal Area Range, Volume Range, Stand Quality, Midstory/Understory Description, Reproduction, Site Description	3	Details vary with type of exam being performed.
Tree Planting Accomplishments	5,6	
Species of tree planted	5,6	
Type of Cost-Share Applicant	4	Options are: Individual, Joint Owner, Corporation, Association
Cost-Share Practices Needed	4,6	
Actual Cost-Share Work Performed	4,5,6	For #5, site preparation work is recorded only when applicable.
Confirmed Acreage of Cost-Share Work Performed	4	

#1 Hardcopy - 4808-1, Site Evaluation / Compliance Notification

#2 Hardcopy - 4808-2, Site Re-Inspection / Compliance Notification. Only used after an FPG violation has been documented.

#3 Hardcopy - 4203-1A, NCDFR Field Data Sheet

#4 Hardcopy - 4910-1 & 4500-20, State Cost-Share Project Records

#5 Hardcopy - 4204-2, Tree Planting Quality Control Inspection

#6 4220 Database - NCDFR Forest Management and Urban Forestry Accomplishment Reporting and Planning Program

#7 4808 Database - NCDFR Forest Practices Guidelines Violation Tracking Program

There are additional pieces of information that personnel could potentially gather during the course of traditional work events that would help to inform biomass discussions.

Data Analysis and Collection Opportunities

DFR has developed a new Data Management Section that will have a charge of evaluating all of our current databases and analyzing data. Making sure these databases are compatible with interchangeable data and also compatible with our GIS is a priority. Data collection techniques, procedures and equipment will also be evaluated to ensure that all personnel and activities are operating as efficiently and effectively as possible.

DFR Resource Needs

2 FTE's to support a Data Management Branch head and Fire Environment data specialist.

Data logging equipment to facilitate collection and transfer of data.

USDA Forest Service

A. Southern Pulpwood Production Survey and Report

An annual report that presents the findings of a 100-percent canvass of pulpmills that draw roundwood or wood residues from the 13 Southern States. Annual reports date back to 1953.

Data collected in the survey include:

- Company information (address, telephone numbers, email and web site information, contacts, location).
- Roundwood and chips from roundwood received by State/County and foreign sources.
- Plant byproducts received by origin (State).
- Use of bark (by percentage) for various purposes (*fiber products, charcoal or chemical wood, industrial fuel, mulch, miscellaneous uses including livestock bedding and mulch, other uses, not used*).
- Quantity of bark sold
- Quantity of in-woods chips used as boiler fuel

Report findings for North Carolina include:

- Total roundwood pulpwood production (softwood and hardwood)
- Total residue pulpwood production (softwood and roundwood)
- Roundwood pulpwood production by County (softwood and hardwood)
- Roundwood pulpwood movement between States (softwood and hardwood)
- North Carolina pulpmills by process and capacity

USDA Forest Service/North Carolina Division of Forest Resources

A. Forest Inventory and Analysis Program

The McSweeney-McNary Forest Research Act was passed in 1928 creating the first Forest Inventory and Analysis program conducted by the USDA Forest Service. The Forest and Rangeland Renewable Resources Research Act of 1978 replaced earlier legislation and this to was amended by the Agriculture Research, Extension, and Education Reform Act of 1998 (Farm Bill). Collection of forest inventory data in NC began in the 1930s when the first permanent forest inventory plots were established. The USDA Forest Service historically established and re-measured forest inventory plots in North Carolina on an approximate ten (10) year cycle. Known as the Forest Inventory Analysis (FIA) program, this periodic survey was a sort of forest "census" documenting and determining the status, trends, volume, availability, species, health, etc. of the many types of forests in North Carolina. The 1998 Farm Bill identified that our natural resources were changing at a faster pace than in the past and that the survey should be collected annually on a 5-7 year cycle. Field work for the first seven periodic surveys of NC were completed in 1938, 1956, 1964, 1974, 1985, 1990 and 2002. Field work for the eight survey (annual) was completed in 2008.

Types of Data collected:

Land Attributes	**Tree Attributes**
Condition Status	Tree Species
Reserved Status	Tree Status
Owner Group	Tree Class
Forest Type	Crown Class
Stand Size Class	Tree Grade
Regeneration Status	Tree Diameter
Tree Density	Tree Height
Owner Class	Standing Dead
Stand Age	Damages
Disturbance Type and Year	
Treatment Type and Year	
Physiographic Class	
Site Class	
Presence of Water/Snow	

Report findings for North Carolina include:

- Historical Statistical reports from the USDA Forest Service.
  - Temporal changes in land use/forested acres.
  - Changes in Forest type/stand age/and species composition over time.
  - Many other comparisons of land and tree attributes.
- Interactive online data mining tool Forest Inventory Data Online (FIDO) (http://fiatools.fs.fed.us/fido/index.html) allows users to compare the above attributes from surveys completed in 1984, 1990, 2002, and 2007.
  - Land use trends, Acreage, Product Volumes, and Biomass can be calculated for each survey and can be quantified
  - Biomass volumes for forest land or timberland can be calculated for all live aboveground, merchantable, top and limb, sapling, stump, and below ground volumes along with standing dead and down woody material materials.
- EVALIDATOR (http://fiatools.fs.fed.us/Evalidator401/tmattribute.jsp) is an online tool by USDA Forest Service that allows you to populate tables with the above attributes and calculates sampling errors.
- The USDA Forest Service, Southern Research Station can also field specific request that are not readily available online.

B. Timber Product Output Survey and Report

This report contains the findings of a biennial canvass of all primary wood-using plants in North Carolina, and presents changes in product output and residue use. It complements the Forest Inventory and Analysis (FIA) inventory of volume and removals from the State's timberland. The survey is conducted to determine **the amount and source of wood receipts** and **annual timber product drain, by county**, and to determine **interstate and cross-regional movement of industrial roundwood**. Timber product output reports date back to 1964.

Only primary wood-using mills are surveyed. Primary mills are those that process roundwood in log or bolt form or as chipped roundwood. Examples of industrial roundwood products are saw logs, pulpwood, veneer logs, poles, and logs used for composite board products. Mills producing products from residues generated at primary and secondary processors were not canvassed. Trees chipped in the woods were included in the estimate of timber drain only if they were delivered to a primary domestic manufacturer.

Data collected in the survey include:

- Company information (address, telephone numbers, email and web site information, contacts, location, type plant, products, mill status).
- Total quantity and type of raw material received
- Volume of product produced from logs received

- Receipts of logs on a percentage basis, by species group and origin (County level for NC, State level for out-of-state).
- Type of equipment in use at facility (including wood fired boilers)
- Disposal of mill residues by residue classification (*bark, coarse residues, fine residues*) and end use (*fiber products, particle board, charcoal or chemical wood, small dimension products, industrial fuel, mulch, miscellaneous, not used*).

Report findings include:

- Output of Industrial Timber Products (sawlogs, pulpwood, veneer logs, composite panels, other industrial products).
- Plant byproducts
- Total roundwood output (Source, ownership, species)
- Regional trends (mountain, Piedmont, Coastal Plain)
- TPO table maker website link

C. *NC Harvest and Utilization Study (2002)*

Report presents the findings from a harvest and utilization study conducted during the seventh inventory of North Carolina's forest resources completed in 2002. The study's main goal was to provide an estimate of softwood and hardwood volume used, and of volume left in the woods as logging residue. Survey crews sampled and measured trees harvested in a variety of logging operations, and analysts calculated wood volume and percent of utilization. Harvest volume data and factors for growing-stock and nongrowing-stock logging residues were described and interpreted.

Data collected include:

- Location (State, Survey Unit, County, Location)
- Stand origin (planted or natural)
- Tree Measurements (Species, Source, Diameter at breast height (DBH), Tree class, Product, bole and section lengths, cull, outside bark diameters)
- Types of logging equipment being used

Report findings include:

- Average DBH by product
- Average bole length by product
- Average residual stump height
- Average diameter (outside bark) at the end of utilization
- Disposition of harvest volume (utilized or not utilized) for softwoods and hardwood
- Source of non-utilized volume (growing stock or nongrowing stock) for softwoods and hardwoods
- Disposition of growing-stock volume (utilized or not utilized) for softwoods and hardwoods

NC Department of Revenue

A. *NC Primary Forest Product Assessment Act and the NC Forest Development Program*

The Forest Development Act of 1977 provided for the establishment of a Forest Development Program (FDP) to:

- Provide financial assistance to eligible landowners to increase the productivity of privately owned forests of the State through the application of forest renewal practices.
- Insure that forest operations in the State are conducted in a manner designed to protect the soil, air, and water resources, including but not limited to streams, lakes and estuaries through actions of landowners on lands for which assistance is sought.
- Implement a program of voluntary landowner participation through the use of a forest development fund.

The forest development fund consists of assessments on primary forest products collected under Article 12 of Chapter 113A of the General Statutes (**Primary Forest Product Assessment Act**), General Fund appropriations, and gifts and grants made to the fund.

The assessment shall be levied against the processor of the primary forest product and shall be remitted to the Secretary, Department of Revenue on a quarterly basis. Primary forest products include those products of the tree after it is severed from the stump and cut to its first roundwood product for further conversion. These products include whole trees for chipping, whole tree logs, sawlogs, pulpwood, veneer bolts, posts, poles, and pilings.

Data submitted to the North Carolina Department of Revenue by primary processors includes company contact information and information on the quantity of primary forest products processed by product categories.

Under the Primary Forest Product Assessment Act, the production reports of the various processors shall be used only for assessment purposes and production information will not be made a part of the public record on an individual processor basis. Information available to the NC Division of Forest Resources is limited to a quarterly report of aggregate statewide total quantities of primary forest products severed by product category.

<u>Data Analysis and Collection Opportunities</u>

The Forestry Council, an 18 member advisory council appointed by the Governor, President Pro Tempore of the Senate and Speaker of the House, is evaluating the FDP and will make recommendations to DENR on how to address Biomass issues related to this program.

Research Studies

A. Sustainable Woody Biomass Resources for North Carolina

Lead Organization: NCSU Forestry Extension

Principal Partners:

NCSU Cooperative Wood Products Extension, NCSU Department of Wood and Paper Science, NC Solar Center, Southern Forest Resource Assessment Consortium, NC Division of Forest Resources, Brooks Forest Products Center VPI & SU, NC Department of Commerce, Biofuels Center of North Carolina

Justification:

To develop sustainable woody-biomass based industries in North Carolina, a focused more formalized effort is needed to develop and maintain a reliable accounting of resource availability and use. Having readily available answers to these questions and engaged partners such as the Biofuels Center of North Carolina, Cooperative Extension Forestry at NC State University, and the NC Department of Commerce, the NC Solar Center, and the NC Division of Forest Resources will position North Carolina as a state where biobased energy can be sustainably produced and projects will have long-term viability and success.

Energy independence, increasing costs of finite fossil fuels, climate change, and the need for economic development factors are driving the U.S. and North Carolina towards renewable energy, chief among them rural economic viability. In response, the state and Federal government have developed programs, incentives, and legislative requirements to promote technologies such as biofuels and power production. Other state and Federal action will continue to develop. The Biofuels Center of North Carolina mission is to develop a statewide biofuels industry to reduce the state's dependence on imported liquid fuels. In 2007, the General Assembly passed the Renewable Energy Portfolio Standard to promote renewable-generated electricity production, most of which will be based on woody biomass.

Although woody biomass is an abundant resource in North Carolina and the region, there is existing demand within the paper industry and forest products industry. Development and recruitment of sustainable woody biomass and biofuels requires answers to the following data projections from a state perspective and for specific proposed projects:

- Projected sustainable resource stocks statewide, by economic region and for a specific project
- Cost estimates for delivered feedstock (energy value, green and dry weights)
- Existing and projected use
- Long-term trends for supply, use, or cost

Objectives:

1. Develop and maintain a statewide data base of available woody biomas including, but not limited to:

    - Logging and land clearing residues,
    - Pulpwood
    - Financially non-productive (highgraded) woodlands
    - Secondary mill residues
    - Urban yard and storm waste
    - Clean industrial and retail wood waste
    - Agricultural residues
    - Purpose grown biofuel and biomass feedstocks

2. Develop and maintain a statewide database of existing and officially announced users of woody biomass including non-energy uses that utilize the same resource.

3. Integrate appropriate data layers and analytical tools to allow localized scenario-based analyses of impacts of possible projects.

4. Develop the capability with graphical interface of forecasting trends in resource availability and use and feedstock costs.

B. Developing Research-based Biomass Harvesting Guidelines to Improve Sustainability of Harvesting Woody Biomass for Renewable Energy

Lead Organization: NCSU Department of Forestry & Environmental Services

Project Summary/Abstract:

We propose an Integrated, Standard Project that addresses Priority 1 for the Managed Ecosystems Program with a focus on understanding, delivery, and implementation of sustainable woody biomass harvesting in agroecosystems. As the U.S. moves toward renewable-based energy, there will be enormous pressure to produce energy with woody biomass from forests. Forests provide a variety of ecosystem services; however, intensified resource extraction from forests may impact the balance of services. Biomass Harvesting Guidelines (BHGs) may be used to protect, maintain, and enhance biodiversity, wildlife habitat, and site productivity during biomass harvesting. However, research is needed to guide development and evaluate the efficacy of BHGs, especially related to wildlife habitat.

We will monitor the environmental response (e.g., wildlife populations and degree of soil erosion) at a replicated set of woody biomass harvesting treatments to develop better information that can be used to modify existing BHGs or guide the development of new BHGs. We also will engage biomass harvest operators and other stakeholders via interviews and surveys and perform an economic analysis to ensure that recommended BHGs are operationally feasible. Based on research results, we will integrate recommended BHGs into forest certification system standards that will ensure environmental protection during harvests. We will employ an array of novel extension methodologies, including eXtension, webinars, existing forest-based bioenergy websites, and regional workshops, to transfer technology related to the project. We also will use novel techniques, including a new online course, to engage undergraduate and graduate students in issues related to woody biomass harvesting.