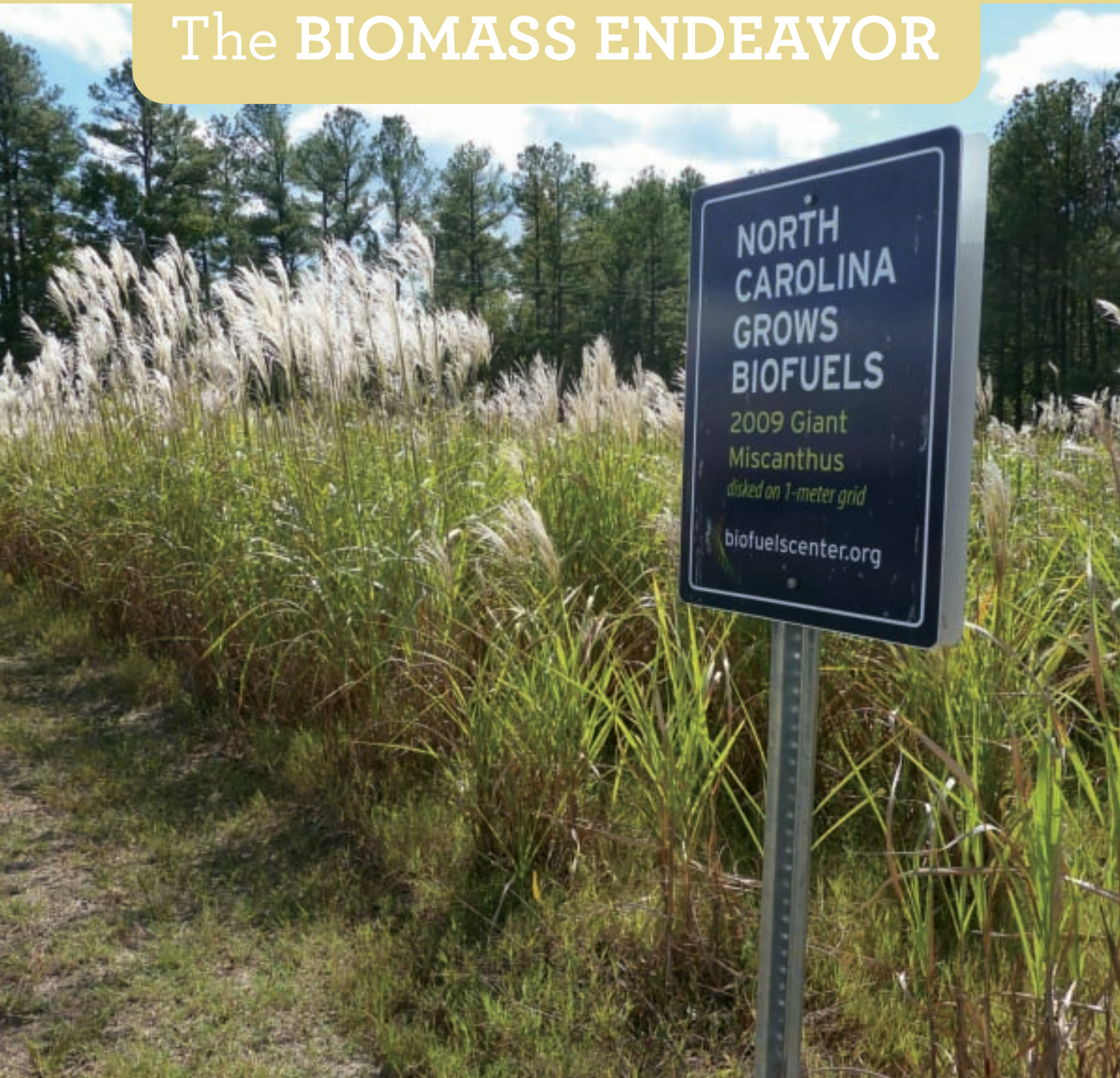


The BIOMASS ENDEAVOR



BIOFUELS CENTER OF NORTH CAROLINA



NORTH CAROLINA ASSOCIATION OF PROFESSIONAL LOGGERS



WEYERHAEUSER

North Carolina's energy future might be found in its forests and on its farms. WRITTEN BY Steve Wall

North Carolina is engaged in two significant initiatives that have the potential to transform how the state's energy needs for both electricity and transportation are met. One of the initiatives establishes new mandates for the generation of renewable electricity, and the other sets new goals for the production of liquid biofuels. Both of these initiatives will require substantial amounts of biomass.

Previous page: Biomass can include both grasses and debris from clear-cuts. Properly managed, efforts can benefit forest-dependent species such as the Southern toad, deer mouse (below) and tiger salamander (opposite page). Mechanical removal of woody debris in longleaf stands can help accomplish the same goals as prescribed fire (below).

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TODD PUSSEY



MASLOWSKI WILDLIFE PRODUCTIONS



Biomass is a catchall term that includes a wide range of sources, such as energy grasses, agricultural crop residues, forest resources and wood waste from construction and manufacturing. One of these categories, woody biomass, typically refers to small trees, tops and limbs and other forest residues. The use of woody biomass will be a significant component of North Carolina's new energy economy, and therefore the state initiatives will rely heavily on the state's farms and forestlands.

Although the future of this new energy economy is promising, questions about its impacts on North Carolina forests, farms and wildlife habitat are already being raised. Addressing these questions in a deliberative manner is a necessity. This necessity arises from two equal imperatives: our state's new quest for homegrown energy sources, and our state's longstanding commitment to protecting our natural resources.

A Regional Leader in Renewable Energy

North Carolina imports most of its energy needs in the form of petroleum, coal and natural gas. As a result, \$17 billion a year is being spent out of state for energy purposes. In 2007, state leaders set out to reduce the amount of money leaving the state for energy purchases and to make North Carolina more energy independent. North Carolina became the first state in the Southeast to pass a law mandating that a certain percentage of electricity produced in-state be generated from renewable resources. The law had several goals, including energy independence, stimulating economic investment and reducing greenhouse gas emissions. At the heart of this complex law is a long-term requirement that by the year 2021, 12.5 percent of the state's electricity generation must be met through renewable energy and energy efficiency measures.

Under the law, power companies have flexibility to choose the type of renewable energy resources (such as solar, wind and biomass) they can use to meet the mandate. However, when the legislation was being developed and debated at the General Assembly, many involved believed that the combustion of woody biomass would constitute the bulk of new renewable energy generation. Within the last year, filings with the N.C. Utilities Commission from Duke Energy and Progress Energy affirm the significant role woody biomass will likely have in North Carolina's renewable energy future.

At the same time that legislators passed a law to diversify sources of electricity generation, the state was also developing a goal to grow the renewable transportation fuels sector. In 2007, North Carolina's Strategic Plan for Biofuels Leadership established a goal that by 2017, 10 percent of the liquid fuels in North Carolina will come from biofuels grown and produced within the state. The General Assembly showed a strong commitment to this goal with the establishment of the Biofuels Center of North Carolina, which is located in the Granville County town of Oxford.

Landscape-Changing Initiatives

The earlier public concerns and policy debates—such as “food versus fuel”—that characterized the national biomass energy discussions in previous years are unlikely to raise the same concerns relative to North Carolina's efforts to develop biopower and biofuels. Given current land conditions and agricultural practices, the state is unlikely to see a conversion from land producing food crops to land producing fuel crops.

Instead, the discussion in North Carolina will likely focus on how the development of biomass energy markets will affect the state's forestlands. There is little doubt that both of the state energy initiatives, renewable power and biofuels, will require significant use of forest resources in years to come. The impact on the state's almost 18 million acres of forestlands could be significant.

Some may see an economic boon for landowners in the development of new markets for forestry, but others see potential harm in using the state's forests for energy production. A 2010 report from the North Carolina Environmental Management Commission (EMC), an agency charged with protecting the state's air and water resources, focused on the possible impacts to the state's forest resources from energy markets. The report found that “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.”

The report from the EMC raises concerns about adverse impacts to wildlife habitat and biodiversity, as well as conversion of natural forests to plantations. Though the EMC report was limited in scope to potential impacts in North Carolina, many organizations and agencies nationwide are undertaking similar evaluations. For example, in March 2010

a report from the National Wildlife Federation, an advocacy organization based in Washington, D.C., echoed many of the same natural resource concerns identified by the EMC.

The ever-growing number of reports outlining concerns and calling for guidelines and regulations governing biomass utilization for energy encapsulate one viewpoint. Another view posits that increased utilization of our forests and farms for energy will lead to greater health of the state's natural resources over time. Proponents of this latter view subscribe to the theory that energy generated from woody biomass has an appropriate place in the state's mix for both electricity and transportation. Dan Richter, professor of soils and forest ecology at Duke University, believes that the EMC report casts woody biomass as a second-class citizen in relation to other renewable resources such as solar and wind. Richter has written that “if properly sited and scaled to sustainably managed woodsheds, biomass energy facilities offer a host of very positive and recurring economic, societal and environmental benefits.”

Supporters of this vantage point also cite the potential new demand for forest resources and energy crops as a way to create new sources of income that will allow farmers and other landowners to remain on the land. The N.C. Department of Agriculture and Consumer Services reports that since 2002 the state has lost more than 600,000 acres of farmland. As the state's population continues to grow, this trend toward conversion of farm- and forestland to urban development is likely to continue. To farmers and landowners, the economic benefits of a new revenue source are welcome and may lead to increased farm- and forestland retention.

Mutual Gain for Energy and Wildlife

Increasingly, the use of forest resources for biomass power and biofuels is seen as having the potential for mutual gain in creating energy and for creating tangible benefits to natural resources, including wildlife habitat. Consequently, the debate about using forests and farms to procure woody biomass for energy is moving from one in which environmental interests and industry interests reflexively stake out opposite ends of the spectrum to one of searching for common ground on how best to proceed.

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North Carolina's Renewable Energy Law: Senate Bill 3, Session Law 2007-397

<http://www.ncleg.net/Sessions/2007/Bills/Senate/PDF/S3v6.pdf>

North Carolina's Strategic Plan for Biofuels Leadership

http://www.biofuelscenter.org/userfiles/File/NC_Strategic_Plan_for_Biofuels_Leadership.pdf

North Carolina Environmental Management Commission Biomass Report, March 2010

<http://www.ncleg.net/documentsites/committees/LCGCC/Meeting%20Documents/2009-2010%20Interim/March%2015,%202010/Handouts%20and%20Presentations/2010-0315%20EMC%20Biomass%20Report%20%20Draft.pdf>

National Wildlife Federation Report: "Growing a Green Energy Future," March 2010

<http://www.nwf.org/News-and-Magazines/Media-Center/Reports/Archive/2010/~//media/PDFs/Global%20Warming/Reports/Growing-a-green-energy-future.ashx>

North Carolina Agricultural Development and Farmland Preservation Trust Fund, 2009 Annual Report

<http://www.ncadfp.org/documents/CycleIIIADFPAnnualReport.pdf>

N.C. State University Forestry Extension Biomass Harvesting Guide

<http://www.ces.ncsu.edu/forestry/biomass/pubs/WB005.pdf>

Massachusetts Department of Energy Resources Biomass Report, June 2010:

http://www.mass.gov/Eoeea/docs/doer/renewables/biomass/Manomet_Biomass_Report_Full_LoRez.pdf

report concluded that "with careful attention to detail, biomass crops can be managed to maximize wildlife habitat." Julie Sibbing, one of the co-authors of the report, believes that the impact of harvesting biomass on wildlife habitat can run the full spectrum from "a totally negative outcome to a totally positive outcome," depending on the methods and practices implemented during a biomass harvest.

A revealing aspect of the National Wildlife Federation report is its premise that biomass energy and forest enhancement can go hand in hand. One example cited in the report notes that the harvesting of woody biomass for energy can complement North Carolina's ongoing efforts to restore the longleaf pine ecosystem throughout the Sandhills. Mechanical removal of woody biomass from longleaf stands where the understory is too thick for prescribed fire is just one example of this potential win-win situation. The connection between restoring longleaf pine and producing energy from our forests nicely symbolizes evolutionary changes in our state's silviculture sector.

The process of educating landowners on factors to consider during a biomass harvest is of growing importance. Efforts to meet this educational need are already under way. A biomass harvesting guide prepared and distributed by Forestry Extension staff at N.C. State University advises landowners and foresters conducting woody biomass harvests to retain critical wildlife habitat elements such as downed woody debris and to avoid or limit disruption of wildlife during breeding and nesting seasons.

Studies are also under way that will give policymakers a clearer picture of the impacts of biomass energy on our states' lands. Researchers from N.C. State University and the University of Georgia are working on a multiyear study to evaluate the impacts on wildlife from the harvesting of woody biomass. Some of the wildlife species that will be evaluated under the study include snakes, frogs, salamanders, mice and cotton rats. The

research is being conducted on privately owned forestlands, including sites owned by Weyerhaeuser, Plum Creek Timber and Georgia Pacific. "We have a great deal of data on the responses of wildlife to timber harvesting," said Bob Emory, Weyerhaeuser's Southern Timberlands Environmental Affairs manager. "People wonder whether a change in harvest techniques to recover more biomass will change the effects of our forest management on wildlife. This study will help us answer that question."

Dennis Hazel, an extension specialist and associate professor in the Department of Forestry and Environmental Resources at N.C. State, is one of the lead researchers on the study. Hazel believes that the study represents a significant collaboration between the private forestry industry and nonprofit conservation groups, both of which have had input into helping shape the study and both of which have a vested interest in ensuring stewardship over the lands as the biomass energy sector grows.

Uncertain Future

Despite the potential of mutual gain for in-state energy sources and for enhancements to forests and wildlife habitat, questions still remain about the long-term consequences of using farms and forests for energy. Public sentiment about the use of woody biomass for energy is mixed. A 2010 poll conducted by Elon University about North Carolinians' attitudes on environmental issues found that a majority of those surveyed oppose using forest resources to produce energy fuels. Such a divide in the public discourse over the use of forest resources accentuates the need for policies that will provide assurances to citizens and communities that state oversight of biomass energy facilities is being exercised.

North Carolina became a leader in the Southeast with its strong commitment to renewable energy and biofuels. As evidenced by the ongoing studies and increasing attention from state officials, actions are now under

way to ensure that North Carolina is also a pacesetter in addressing the complex scenario of energy production from forest- and farmlands and ensuring environmental sustainability of these same lands. This difficult balancing act is fraught with hazards and has stalled the growth of the bioenergy market in other states.

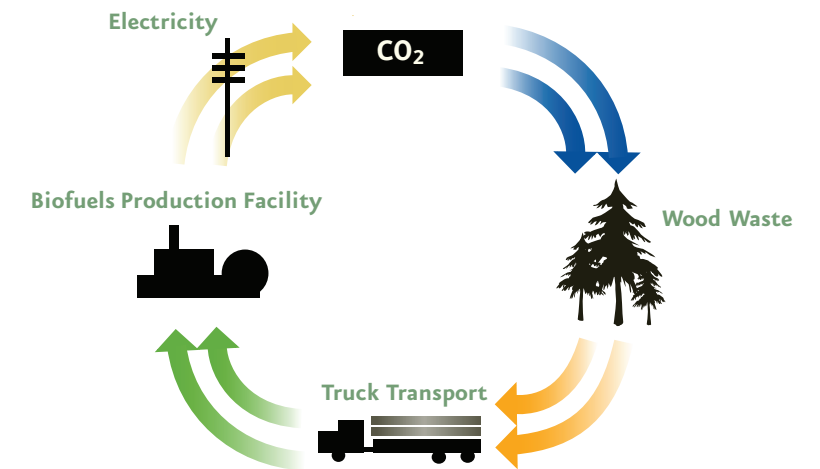
States around the country are wrestling with the challenging issues related to the use of biomass for energy. Massachusetts had been aggressively pursuing biomass power as a key component of its renewable energy plan. However, following the release of a report calling into question the greenhouse gas benefits of biomass power, Massachusetts officials made an abrupt about-face regarding biomass policy. Proposed biopower facilities in Florida and Michigan have faced stiff opposition causing cancellation of the projects.

Given these ongoing concerns, some states have developed voluntary biomass harvesting guidelines, and a few others have gone a step further and adopted sustainability requirements related to biomass harvesting. These requirements would mandate water, soil and wildlife protection. North Carolina leaders are looking at these models from around the country and striving to ensure that these complicated issues are addressed up front with the long-term vision of growing the biomass markets without any deleterious impacts on our state's landscape.

The development of both the biomass power and biofuels industries is at the center of North Carolina's emerging green economy. Thoughtful deliberation with an eye toward long-range policies that foster the growth of these industries in a sustainable manner is needed in the years to come. It is quite likely that the development of these policies will ultimately decide the fate of North Carolina's biomass endeavor. ♡

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ENERGY PRODUCTION FROM BIOMASS: A SUSTAINABLE CYCLE



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Despite the potential of mutual gain for in-state energy sources and for enhancements to forests and wildlife habitat, questions still remain about the long-term consequences of using farms and forests for energy.

Harvested forests regenerate relatively quickly into early successional habitat favorable to animals such as the scarlet kingsnake. Woody debris is chipped onsite and transported to a facility where it is used for energy generation or fuel production.