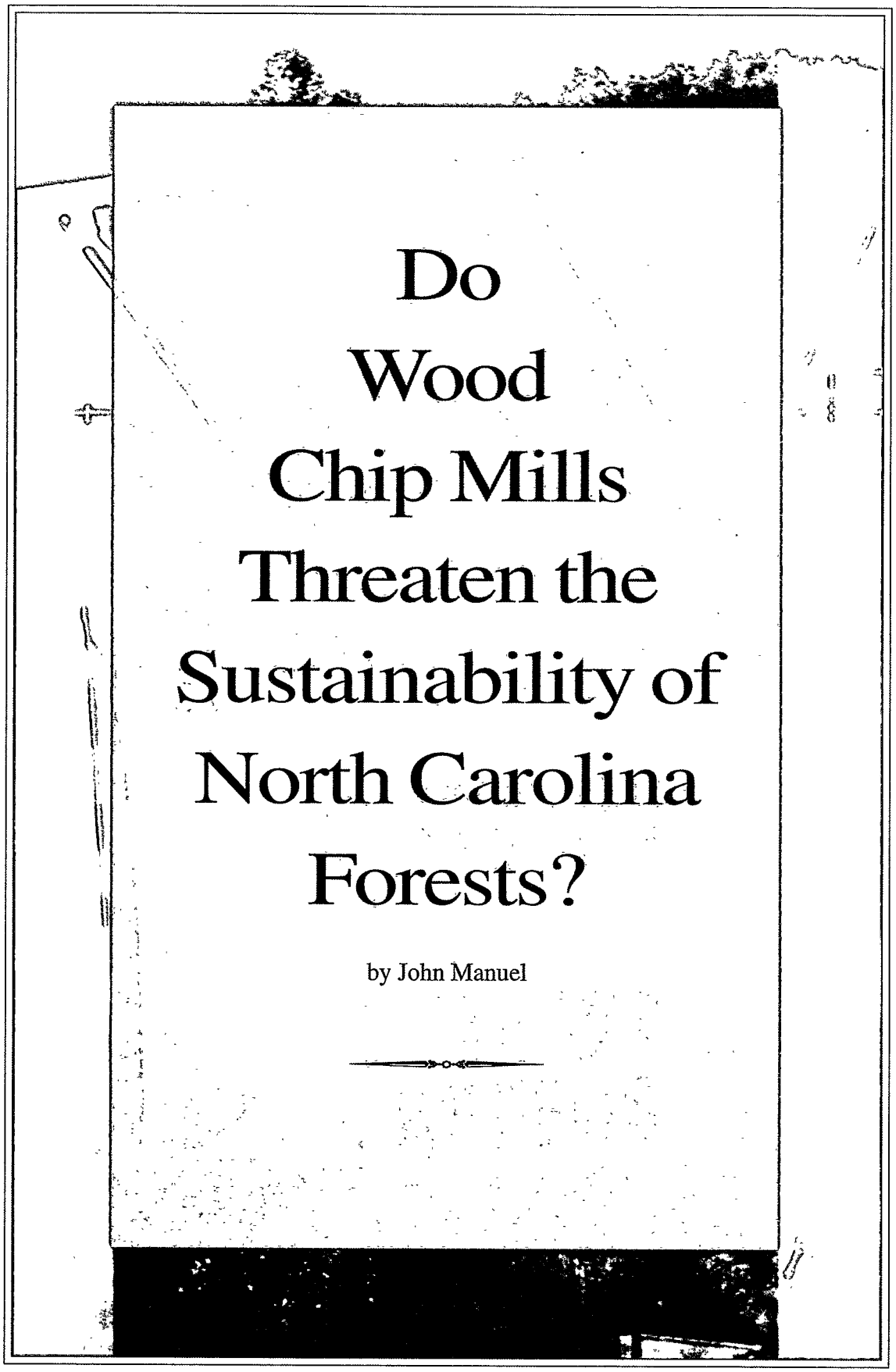

Do Wood Chip Mills Threaten the Sustainability of North Carolina Forests?

by John Manuel

Photo courtesy of the Forest City Daily Courier

Summary

Chip mills that process whole logs into tiny chunks of wood for forest products have been described as everything from one of the 10 greatest threats to the state's environment to merely a necessary step in the preparation of pulp, paper, and other forest products. But which is closer to the truth?

No one would deny that chip mills are proliferating in North Carolina and the Southeast. A number of trends are contributing to this proliferation. First, while chip mills have been a part of the forest products industry since the turn of the century, structural changes in the forest products industry and the need to become more efficient have driven the development of stand-alone facilities. Second, the woodbasket of the nation is no longer the Northwest but the South, where more timber is in private hands and there is less stringent regulation. The South had long been the leader in the pulp and paper segment of the industry, whereas lumber had been central to forestry operations in the Northwest.

As worldwide demand for wood products grows and as the timber companies continue to concentrate in the South, increased levels of harvest are anticipated. So how can the state satisfy public concerns to preserve forests without unduly limiting the rights of private citizens and businesses or restricting the supply of timber needed to sustain the forest products industry?

As many as 18 chip mills currently operate in North Carolina, each with an average annual capacity of 250,000 tons and capable of processing up to 2,600 acres of trees per year. That's up from only two chip mills in 1980. The opening of a chip mill can certainly increase the market value of timber in a local area, and that may well lead to an increase in logging in that area.

But chip mill capacity does not dictate how much wood is chipped in the state. Rather, the vagaries of the marketplace have more influence on how much wood the mills process. Natural disasters like Hurricane Fran, which felled trees across eastern North Carolina, also can have a great impact, as can economic cycles. The state has some 700,000 individual forestland owners with varying interests and motivations. How these private owners manage their tracts is the principal issue of concern. Foresters indicate that few tracts of land are purchased solely to feed chip mills.

Beyond the fact that chip mills promote clear-cutting, proponents and opponents of chip mills find little upon which to agree. Opponents generally make the following points: clear-cutting promoted by chip mills detracts from scenic beauty; succession forests that grow up after clear-cuts may contribute to declines in both the number of species and diversity of flora and fauna; clear-cutting can increase sedimentation in nearby streams and rivers; and chip mills create increased traffic by logging trucks, often on rural roads that are ill-suited to handle the extra load. In addition, there are general economic concerns around the sustainability of an industry based on extraction of natural resources.

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Proponents, on the other hand, argue that: the sheer number of forest owners in North Carolina—some 700,000, all with different motivations and interests in owning woodlands—provides a check against widespread clear-cuts; some game species, such as deer and grouse, seem to thrive on the browse that grows up after a clear-cut; that rivers and streams can be protected from sedimentation bearing runoff with proper site management; and that selective cutting actually damages a site more than clear-cutting because heavy logging equipment must traverse the site a greater number of times. In addition, proponents say chip mills themselves do little damage to the environment, emitting little air pollution and using little water in the chipping process.

A bottom line question is whether the hardwood pulpwood harvest in a given area of the state increases as chip mill capacity expands. This question cuts to the heart of the sustainable forestry debate. If trees are harvested faster than they can regenerate, ultimately, the forest resource is depleted. Here again, the numbers are mixed. In the Piedmont, chip mill capacity increased by 149 percent between 1989 and 1997, while hardwood pulpwood harvest increased by 170 percent. In the mountains, however, hardwood pulpwood harvest actually decreased by 52 percent from 1994–97, while chip mill capacity increased by 66 percent. Harvest rates have varied in the east, showing no clear link to the rising number of chip mills. It's important to note, however, that other factors might account for increased hardwood pulpwood harvest—such as land clearing for development.

Chip mills convert trees into the raw material for a broad array of consumer products such as paper and paper products, particle board, and siding for houses. Consumers consider many of these products necessities. Presumably, these products would be less broadly available or would cost more without chip mills.

But if wood chips produced by chipping whole logs play a vital role in the marketplace, trees also have a clear non-market or indirect value. They contribute handsomely to the scenic beauty of the state. Lawmakers may have blundered in the 1997 General Assembly when they expanded a tax credit for North Carolina ports customers to include wood chips. The credit is intended to encourage exports and may encourage more chipping of wood than otherwise would be the case.

In 1996, Governor Jim Hunt instructed the N.C. Department of Environment and Natural Resources (DENR) to conduct a study of the economic and environmental implications of wood chip production in North Carolina. DENR later contracted with the Southern Center for Sustainable Forests (a consortium of forestry experts at Duke and North Carolina State universities), but the department remains responsible for the study. The Southern Center for Sustainable Forestry is scheduled to report to DENR and, by extension, to the governor, in March 2000.

Clearly, the economic and environmental consequences of chip mills must be closely monitored and the advantages of the tax credit weighed against any threat to the state's forest resources. Chip mills have a voracious appetite that, combined with a state tax credit designed to encourage new business at the state ports, could create over-consumption and threaten sustainability of the state's forestlands for short-term profit. In the long term, that would benefit no one.

Bob Jordan, owner of Jordan Lumber Company in Mount Gilead, N.C., and former legislator and lieutenant governor (1985–89), is not used to being considered an enemy of the environment. "I worked with Bill Holman [former environmental lobbyist and now Assistant Secretary for Environmental Protection at DENR] on the phosphate ban—it wouldn't have passed without me," Jordan says of the 1983 bill that banned the sale of phosphate detergent in the Neuse River watershed. "I helped get the votes together to create the North Carolina Natural Heritage Trust Fund. You can't say I'm not a friend of the environment."

But that is exactly how Jordan was portrayed at a public hearing in Rutherford County in August 1995 over his proposal to build a mill that would cut logs into wood chips. Citizens living in the vicinity of the mill were convinced that it would spur widespread cutting of the surrounding forests, that the timbering would muddy the streams, and that the roads would be clogged with logging trucks. They demanded that the Rutherford County Commissioners deny Jordan a permit to build the mill, and they generally provided an icy reception for the self-described environmental champion.

"It was the only time I've ever had to be escorted out of a meeting by bodyguards," Jordan says. "It was a real shock."

Jordan was not the only public figure to be confronted with fear and anger over the construction of chip mills in North Carolina. By the summer of 1996, citizens opposed to Jordan's mill had formed an official group—Concerned Citizens of Rutherford County—and their ranks had swelled to several hundred. Unable to convince the commissioners to stop the mill, the group descended on Raleigh and petitioned the North Carolina Department of Environment and Natural Resources (DENR) to deny the mill a stormwater permit. That too failed, so they petitioned unsuccessfully to have Governor Jim Hunt put a moratorium on chip mills.

In the fall of 1997, another proposed chip mill came to light, this one in Stokes County, to be owned and operated by Godfrey Lumber Company. This proposal spurred another wave of citizen protest, and the formation of a second grassroots opposition group—the Hickory Alliance. Editorials for and against chip mills began sprouting up in papers across the state, and citizens demanded government action. A stormwater discharge permit for the mill is yet to be approved, and the issue is under litigation.

What are chip mills and why have they spawned such concern? Mechanical chipping of roundwood (trees cut off the stump) has been part and parcel of pulp and paper mill operations in this state since the early 1900s. Chipping is an integral stage in breaking wood fiber down into a form that can be more easily converted into pulp, which is used for paper and paper products. Until recently, most chip mills were located adjacent to the large pulp and paper mills and, thus, were largely out-of-sight and out-of-mind for most of the state's population.

However, structural changes in the marketplace and the need to become more efficient have in recent years driven the industry toward satellite operations—defined by the N.C. Division of Forest Resources as either stand-alone facilities or those located at a solid wood processing facility such as a sawmill or a pallet mill. The typical satellite chip mill employs a crane that unloads trees from logging trucks and places them into a chute. The chute feeds a rotating drum that strips the trees of their bark. The trees continue on a conveyer belt into a chipper, where sharp blades turn each tree into slices and then into chips. The chips then move on the conveyer belt and out of the mill ready for transport. Chip mills are known for their speed and efficiency. With an average annual capacity of more than 250,000 tons, each of the chip mills in North Carolina is capable of processing 1,000 to 2,600 acres of trees each year (assuming 15 cords per acre taken in a thinning operation, with all timber going to the chip mill).[1]

Transportation of wood chips to pulp mills is less costly and more efficient than transporting whole logs because the chips consist of 100 percent usable fiber, according to Bob Slocum, executive vice president of the N.C. Forestry Association. Whole logs include waste in the form of tree bark. It's also safer to transport wood chips once processed, says Slocum, since the chips are transported on the highways in enclosed vans rather than in open logging trucks and thus represent a more stable load. Finally, many pulp and paper mills have changed their procurement policies to purchase more chips from outside suppliers and store fewer whole logs on site. This reduces cost to the mill and frees up needed space on the mill site.

Combined with the growing variety of products that can be made from wood chips, this is increasing the popularity of chips in the global marketplace. In 1960, wood chips accounted for less

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Wood chips being transported by rail through Raleigh, N.C.

than 10 percent of the wood fiber trade. By 1990, they accounted for 54 percent of the market, replacing whole logs in market dominance.[2] In addition to pulp and paper, wood chips are now used to create particle board and medium-density fiber board used in siding, among others. Both hardwoods and softwoods can be used to create this material, and trees can be virtually any shape and size. Thus, trees that were formerly considered unmarketable and left on site now have a commercial value.

Another trend supporting the proliferation of chip mills in North Carolina has been the movement of the forest products industry from the Pacific Northwest to the South. Changes in federal policy toward harvesting in the national forests have greatly reduced the supply of timber available for harvest in the Pacific Northwest. Meanwhile, the South has experienced a remarkable increase of forested acres due to the decline of agriculture and the regrowth of forests heavily timbered around the turn of the century. The South has more private timberland than any other region of the nation and better growing conditions than the Pacific Northwest. In fact, Southern forests are more productive than any other region.

And, to date, the South has fewer environmental restrictions than the Northwest. North Carolina, for example, requires no permits for harvesting of timber on private land, no notification of government agencies, and has no required standards for road building, stream protection, methods of harvest, or reforestation, although Forest Practice Guidelines in North Carolina address road building and stream protection. By contrast, the state of Washington requires permits for most types of timber harvest[3] and forest road building.[4] It prescribes riparian management zones up to 300 feet wide around streams and lakes within which specific ratios, sizes, and numbers of trees must be left uncut. It requires a certain number of trees and downed logs to be left on site as wildlife habitat, and in order to comply with the federal Endangered Species Act, it prescribes specific distances around spotted owl and marbled murrelet nesting sites within which heavy equipment may not operate. It also requires reforestation of most sites not being converted to other land uses.

"We are now considering even more restrictive rules, because salmonoids [salmon and steelhead] have been declared endangered throughout

the state," says Judith Holter, rules coordinator for the Washington Forest Practices Board. "These would include additional environmental review of all permits, road maintenance and abandonment plans, and wider riparian zones."

All of these factors have spawned an increase in timber harvest in the South. Pulp harvest in North Carolina has increased from approximately 3 million cords in the early 1980s to 4.8 million cords in 1997.[5] Corresponding to this trend has been an increase in the number of chip mills. David Brown of the N.C. Division of Forest Resources says there are currently 18 satellite chip mills operating in North Carolina that use an average of 224,000 tons a year, according to a 1997 survey.[6] (See Table 1, p. 72, for a list of North Carolina satellite chip mills and their locations.) This is compared to two chip mills in 1980 with a capacity of 336,000 tons. Of the current mills, four are located in the mountains, four in the coastal plain, and 10 in the Piedmont. As to whether increased chip mill capacity has led to increased timber harvest in these areas of the state, the numbers are mixed. (See Table 2, p. 73.) And it's important to note that other factors, such as intense development, can contribute to changes in timber harvest levels. Brown says there is now a market for pulpwood in nearly every county in the state because of an increase in the number of satellite chip mills and other manufacturers that use low-quality roundwood.

Rightly or wrongly, chip mills are seen by some people as driving increased timber harvests in the region, just as slaughter houses have been associated with a proliferation of hog farms. And many people feel there should be greater state regulation of chip mills and private forest management practices. Virtually every environmental group in North Carolina lists regulation of chip mills as one of its priorities. The Rutherford County mill has since been built, while the Stokes County mill is not yet complete and is still under litigation. Environmentalists and community groups say the policy of approving mills without any public input or consideration of wider environmental impacts must change.

Environmental Concerns With Chip Mills

Unlike traditional pulp and paper mills, which emit foul-smelling odors into the air and produce vast amounts of liquid waste, chip mills themselves are relatively benign in terms of their environmental impacts. Chip mills do not use any water other than what may be needed to keep dust down or to keep log piles moist. They do not discharge

I hope that I have proven that the days [of our virgin forests] are numbered, that the hour glass is inverted. As surely as the grains of sand will seek the lower level, so certainly is the day coming when these forests, now the wonder and admiration of the world, the Nation's last reserve stock of timber, will be but a memory of the past; when the reverberating sound of the wielded axe and the roar of logging engines will cease to waken the once sylvan solitudes; when the smokestacks of a thousand mills, their days of usefulness past, their machinery gone to ruin, their thousands of busy laborers forced to other fields, will stand desolately forlorn, grim monuments of a past commercial era and a perpetual testimony to the heedless disregard for nature's treasures on the part of her servants.

—FRANK H. LAMB
WASHINGTON STATE FOREST COMMISSION, 1909
AS QUOTED IN ROBERT PYLE'S *WINTERGREEN*

Table 1. Satellite Chip Mills in North Carolina

Mill type 1: stand-alone facility used to chip roundwood for sale to other wood processors

Mill type 2: located at a solid wood processing facility such as a sawmill or pallet mill; commonly installed to chip low-quality saw logs for sale of chips to other wood processors but may also be used to process pulpwood for resale to chip buyers.

Mill Name, Location	Mill Type	County	Start-up Year
Anson Wood Products, Wadesboro	1	Anson	1970
B&B Chip Mills, Inc., New Hill	1	Wake	1990
Bristol Industries, Inc., Morganton	1	Burke	1985
Broad River Forest Products, Inc., Union Mills	1	Rutherford	1998
Bunn Hardwoods, Inc., Bunn	2	Franklin	1996
Cotton Creek Chip Co., Star	1	Moore	1991
Edwards Wood Products, Marshville	2	Union	1978
Edwards Wood Products, Laurinburg	2	Scotland	1990
Godfrey Lumber Co., Statesville	2	Iredell	1988
H&M Wood Products, Mars Hill	2	Madison	1991
International Paper Co., Snow Hill	1	Greene	1990
International Paper Co., Norlina	1	Warren	1995
North Carolina Chip Co.	1	Wilson	1990
Parton Lumber Co.	2	Rutherford	1985
Shaver Wood Products Inc., Cleveland	2	Rowan	1981
St. Laurent Forest Products, Elizabeth City	1	Pasquotank	1986
Suncrest Land and Timber, Waynesville	2	Haywood	1985
Valwood, Cherokee	1	Cherokee	1986

Source: Data prepared by James Gregory, Department of Forestry, N.C. State University, Raleigh, N.C., August 11, 1998. Compiled with the assistance of David Brown, utilization forester, N.C. Division of Forest Resources, and Bradley Bennett, N.C. Division of Water Quality, Water Quality Section.

any air pollutants other than exhaust fumes from vehicles and diesel generators that may be used on site. Noise, however, has been an issue to people living in close proximity to chip mills, particularly if a mill is not enclosed.

Only one federal Environmental Impact Statement ever has been required for a chip mill project—that involving three proposed chip mills on the Tennessee River with barge terminals directly on a navigable river. Requiring an Environmental Impact Statement is a judgment call based on what courts have decided in the past constitutes a "major federal action," according to Brooke Lamson, district counsel for the Wilmington office of the U.S. Army Corps of Engineers. In the Tennessee River case, an Environmental Impact Statement was required because navigable rivers are under federal jurisdiction.

The only environmental permit routinely required of mills in North Carolina is a general stormwater discharge permit, which deals with water runoff and erosion from the mill site. Rather than the mills themselves, off-site activities such as clear-cutting and increased truck traffic are of most concern to the public.

Increased truck traffic in the vicinity of the mill is one of the most immediately noticeable impacts of a chip mill. Although logging trucks on the state's highways are nothing new, dozens of logging trucks per day are likely to make deliveries to a large chip mill. Given the location of chip mills in rural areas, these trucks often travel winding two-lane roads that may not have been designed to handle the weight and width of such vehicles. This can and has prompted complaints from local citizens.

"The most glaring impact of the [Rutherford] chip mill has been the increase in truck traffic," says Lynne Faltraco, president of the Concerned Citizens of Rutherford County. "My son was run off the road by a logging truck, and we've heard from local citizens about a lot of other incidents. I complained to the mill owner, but he said he didn't own the trucks, so it wasn't his business to tell them how to drive."

While truck traffic is of concern to local resi-

Table 2. Number of N.C. Chip Mills and Level of Timber Harvest by Region, 1989–97

Region	Number of Chip Mills	Level of Timber Harvest
Mountains	4	Decreased*
Piedmont	10	Increased**
East	4	Varied***

* Between 1989 and 1997, chip mill capacity increased in the Piedmont by 149 percent, while hardwood pulpwood harvest increased by 170 percent, from 247,328 cords in 1989 to 669,102 cords in 1997. A cord equals about 2.8 tons of hardwood pulpwood.

** Between 1994 and 1997, chip mill capacity increased in the mountains by 66 percent, but hardwood pulpwood harvest decreased by 52 percent, from 307,158 cords in 1994 to 148,586 cords in 1997.

*** Between 1994 and 1997, chip mill capacity remained unchanged in the East. However, hardwood pulpwood harvest declined 11 percent from 1994 to 1995 (from 1,312,764 cords to 1,166,079), declined 25 percent from 1995 to 1996 (from 1,166,079 cords to 877,357 cords), and increased 33 percent from 1996 to 1997 (from 877,357 cords to 1,164,724 cords).

Source: Unpublished summary of annual series of reports on Southern Pulpwood Production issued by the Forest Service, U.S. Department of Agriculture. Prepared by Rex Schaberg, Southern Center for Sustainable Forests, for the advisory committee of the North Carolina Wood Chip Study, January 26, 1999, pp. 14–22.

"Tree cutting has not 'devastated the environment' in the Northwest. It is true that the national forests have reduced harvests, and this has created some hardships on many of the communities, but harvesting is continuing on private lands and some of the areas are increasing their production."

—BOB JORDAN, FORMER LIEUTENANT GOVERNOR AND OWNER OF JORDAN LUMBER COMPANY

dents, a more widespread fear is of increased timber harvest within the sourcing (timber supply) area of the chip mills—a radius of about 50 to 75 miles. Tree cutting is an emotional issue for many Americans, and the immediate visual impacts of some timber harvests—a denuded landscape, rutted soils, bent and broken saplings—can indeed be shocking. Environmentalists have expressed concern that the multiplication of chip mills in North Carolina will lead to over-cutting of woodlands, with trees being cut faster than they are being replaced.

"Adding up chip mill capacity year-to-year reveals a geometric progression in tree cutting that is not sustainable," says Lou Zeller of the Blue Ridge Environmental Defense League. "The example of the Pacific Northwest where tree cutting has devastated the environment and, ironically, caused a bust in the lumber business is what we seek to avoid."

But Jordan, the owner of Jordan Lumber Company and a chip mill operator since 1957, disagrees with Zeller's assessment of the forestry situation in the Northwest. "Tree cutting has not 'devastated the environment' in the Northwest," says Jordan. "It is true that the national forests have reduced harvests, and this has created some hardships on many of the communities, but harvesting is continuing on private lands and some of the areas are increasing their production."

While the construction of a chip mill may result in an increase in timber cutting within the area of the mill, the connection between actual harvest levels and chip mill capacity over time is less than exact. According to data presented by the Southern Center for Sustainable Forests, harvest levels of hardwood used for pulp and paper—called pulpwood—have increased dramatically in the Piedmont as chip mill capacity has grown. (See Table 2, p. 73.) Between 1989 and 1997, chip mill capacity increased in the Piedmont by 149 percent, while hardwood pulpwood harvest increased by 170 percent. Between 1994 and 1997, chip mill capacity increased by 66 percent in the mountains, but hardwood pulpwood harvest actually decreased by 52 percent. In the coastal plain, harvest levels have ranged up and down over the last two decades, not showing any clear correlation with chip mill capacity.[7]

Bob Beason, a retired industrial forester, says regional timber harvests rarely correlate directly to chip mill capacity. "Vagaries of timber availability and demand, clearing of land for uses other than planned timber harvest, and natural disturbances such as Hurricane Fran can all affect harvest rates in any given year, independent of chip mill capacity," Beason says.

Jordan says the construction of a chip mill doesn't necessarily mean there are more acres being harvested than in the past. Rather, he says, the chip mill often is replacing a multiplicity of smaller, less efficient operations that existed in the area. "There used to be 30–40 pulpwood yards in Moore and Montgomery counties; now there are only four," Jordan says. "Because of technical advances like the chip mill that enable us to use more of the wood that is harvested, the amount of acreage that is being cut is probably less than in the past."

Jordan says tracts of timber are not bought for chip mill harvest, but that chip mills consume previously unmarketable materials left in a timber cut. However, Jordan says the demand for fiber for pulp has stabilized in recent years while the demand for by-products produced at lumber yards has increased. These trends have caused chip mills to lose markets and reduce production.

Environmentalists, academicians, and forest industry experts alike agree that an important indicator regarding sustainability of forests is the rate of tree removal versus the rate of growth. An analysis of such trends by Scott Burleson and Frederick Cubbage of the North Carolina State University Department of Forestry indicates that while the overall growth rate of trees exceeds re-

John Mannel

A clear-cut in progress in Moore County.

movals in North Carolina, the trend lines point toward a convergence sometime in the next decade.[8] In 1990, volume of trees removed exceeded growth in 11 counties versus only five in 1983.[9] However, researchers cannot say to what degree this is the result of planned timber harvest versus conversion of land for development and other uses.

Indeed, conversion of land to other uses is of greater concern to some forestry officials than rate of tree removal versus growth. "The overall timber growth/drain ratio is only one factor to be considered in sustainability," says Bob Slocum of the North Carolina Forestry Association. "In fact, this ratio has varied over time. A deficit ratio is usually just a signal that we need to look more closely at what is happening in the forest. A far more important factor is what happens to the land after harvest. Does it stay in forest use or is it converted to another use? If the land stays in forest use, it will grow new trees. If it doesn't, then the timber productivity is lost,

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—BOB SLOCUM,

EXECUTIVE VICE PRESIDENT OF THE NORTH CAROLINA FORESTRY ASSOCIATION

and that is a more serious concern."

David Brown of the N.C. Division of Forest Resources says the only state policy that directly applies to sustainability of forests is the Forest Development Program, which provides qualifying landowners with up to 40 percent cost sharing for replanting seedlings after a timber harvest. In order to qualify, landowners must comply with Forest Practice Guidelines during harvest. The recommended Best Management Practices (BMPs) help them do this. Two-thirds of the funding for this program comes from the forest industry by way of a tax on wood consumption. (For a thorough discussion of the North Carolina Forest Development Program, see Howard Muse and Bill Finger, "Small Woodlot Management—a New Challenge for Smokey," *North Carolina Insight,* Vol. 6, No. 1 (June 1983), pp. 32–36.)

"We're seeing massive clear-cutting throughout the Southeast, along with many examples of soil erosion and muddied streams. Something has got to change."

—DANNA SMITH,
EXECUTIVE DIRECTOR OF THE
DOGWOOD ALLIANCE

Along with concerns about unsustainable timber harvests, critics are deeply concerned that chip mills will promote clear-cutting of land where selective cutting predominated before. Clear-cutting, critics say, increases the potential for soil erosion, robs the soil of nutrients needed for plant regeneration, and changes both the species composition and the diversity of flora and fauna. "We're seeing massive clear-cutting throughout the Southeast, along with many examples of soil erosion and muddied streams," says Danna Smith, executive director of the Dogwood Alliance. "Something has got to change."

Faltraco of Concerned Citizens of Rutherford County believes more should be done to inform landowners of options for managing forests other than clear-cutting. "I think that it is important to provide landowners with options on what is available to help them make decisions that that can enhance their forestlands and can benefit the landowner and his family without feeling that they are getting pressure from the timber industry, procurement foresters, or state programs to exercise only one option—that being to clear-cut," says Faltraco. "Some of these options could include information on tax deferment programs, evaluations of forestland plans, selective cutting, rotational cycles, landscape planning/aesthetics, wildlife habitats, economic considerations, logging contracts/operations, recreation, conservation easements, living trusts, and land donations."

There is no question that clear-cutting is the favored harvest method for supplying wood chips. However, clear-cuts are the predominant method of harvesting timber with or without a chip mill. And there is no consensus on whether clear-cutting does more or less damage to the environment than selective cutting. "Research conducted by the U.S. Forest Service at Bent Creek Experimental Forest near Asheville demonstrates that successful regeneration of quality hardwoods usually requires a clear-cut," says Slocum of the North Carolina Forestry Association. "Also, simple economics often turn a selective harvest into a high-grade harvest where all the best trees are taken and only the sick, lame, or infirm are left on site. This adversely impacts timber quality over time and leads to the genetic deterioration of the stand. This can and does have a serious impact on timber productivity."

And many professional foresters argue that clear-cutting *decreases* the potential for soil erosion over selective cutting, because it reduces the number of times heavy equipment needs to be brought on site.

"Selective cutting requires traversing the same tract of woods multiple times in comparison to clear-cutting, because of trees that are left in the way of logging machinery," says Richard C. Ellis, board chairman of the N.C. Society of Consulting Foresters. "Likewise, selective cutting will actually cause an increase in the acres traversed, because less than the total material is removed from the land."

Daniel Richter, professor of forest soils and ecology at Duke University's Nicholas School of the Environment, says that roads on harvest sites are probably the prime contributor to soil erosion in forests. "The road network of a forest usually occupies a small area of the whole forest, yet it is the road network that is likely to be the source of most soil erosion," he says. "Whether we're talking about clear-cutting or selective cutting, we clearly need to do a better job of managing the impacts of roads in this state."

Richter says there also is cause for concern

about how successive planting and harvest of trees on the same plot of land affects the supply of nutrients over time. He directs one of the world's longest studies of soil sustainability at the Calhoun Environmental Forest in South Carolina. "There is no doubt that as an increasing fraction of the biomass is harvested, there is an increasing removal of nutrients from the site," Richter says. "Nutrient supply controls productivity of many forests in the Southeast, which are generally supported by soil with low native fertility. We need to improve how we manage soils to benefit soil fertility, plant growth, water quality, and biological diversity."

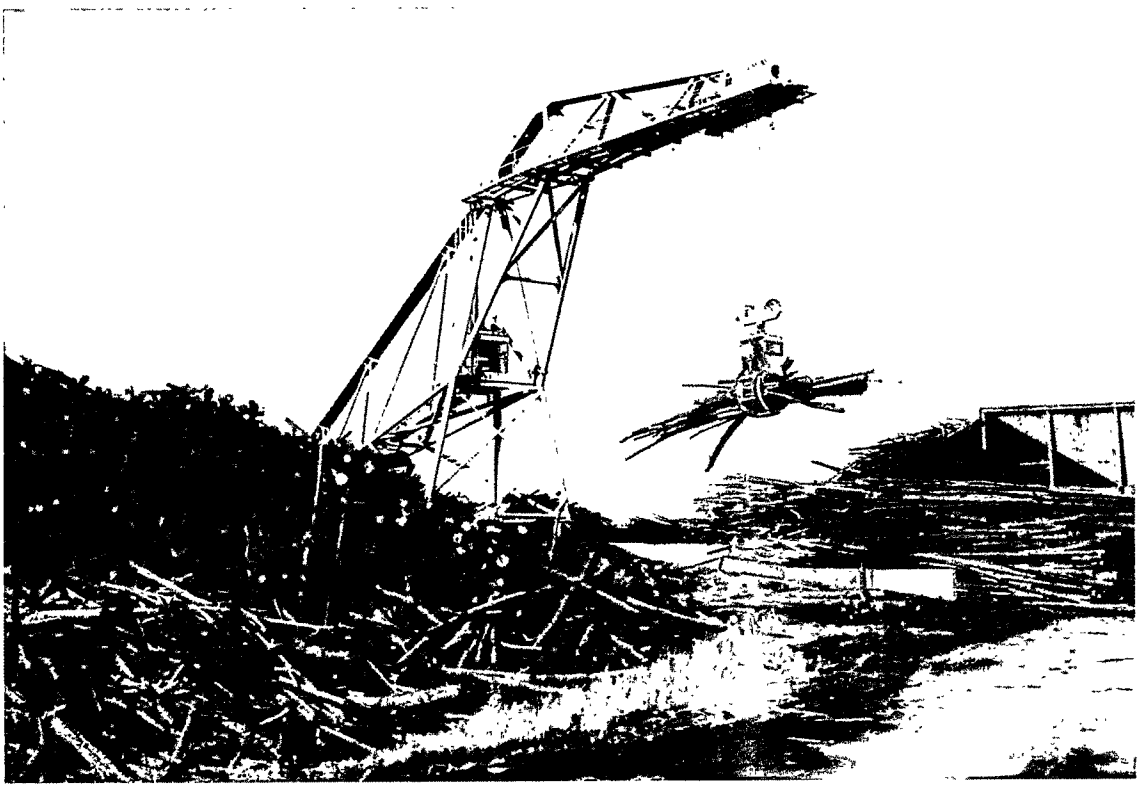
Another issue associated with clear-cutting and, by association, with chip mills, concerns the impacts of increasing timber harvest on wildlife diversity. Clear-cutting increases soil temperatures and dries surface soils out. That would be detrimental to amphibians such as salamanders that favor a cool, moist, shady environment. Large clear-cuts also could harm bird species that require large expanses of unbroken forest to successfully breed and nurture their young.

"Neo-tropical migrants such as the Acadian flycatcher, scarlet tanager, and hooded warbler require a minimum of 40 acres of interior forest per mating pair, and hundreds of acres for a viable population," says Steve Hall, invertebrate zoologist with the North Carolina Natural Heritage Program. "These species are already being stressed by deforestation on both ends of their migration routes. Any increase in cutting mature hardwood forests can only be detrimental to them."

Proponents of clear-cutting, including many hunting groups, counter that clear-cutting actually benefits many species, including deer, wild turkey, grouse, quail, and other birds, which seek out the increased food supply and cover provided by the tender shoots, saplings, and briars produced in early growth forests at certain times of the year. "Our experience with chip mills up here is that they haven't caused any problems—in fact, they are a plus," says Steve Henson, Habitat Chairman of the Southern Chapter of the Roughed Grouse Society and a member of the Wood Chip Production Study Advisory Committee. "Roughed grouse prefer a successional-type forest. You can best achieve that by clear-cutting and allowing a natural regeneration."

In addition, some non-game species may also benefit from clear-cuts. These include some neo-tropical birds such as the golden-winged warbler.

Cotton Creek Chip Company—a chip mill in Moore County.



John Mannel

Quicker than the felling of trees,
a single ringing of the bark
above ground opened a wild grove
the first summer of settlement.
... In five
years the standing trunks looked like stones
and statues in a graveyard as
crops rose and fell with the seasons.
In a decade the woods were gone.

—POET ROBERT MORGAN, "GIRDLING"

George Hess, professor of forestry at NCSU, is in charge of the wildlife component of the North Carolina Chip Mill Study. "We have a pile of studies that show negative impacts from clear-cutting on wildlife, and another pile that shows positive impacts," Hess says. "The environmental community seems to place a higher value on species that favor old growth forests (more than 80 years old), while the hunting community places a higher value on species that favor early successional forests (10- to 20 years old). It's a policy matter as to which one you choose."

Arguments about clear-cutting aside, many people worry that proliferation of chip mills will lead to increased harvest of smaller trees, which in turn will encourage a much shorter rotation of timber harvests—perhaps every 20 to 30 years instead of 60 to 70 years for hardwoods. A landscape dominated by immature trees could have devastating effects on wildlife. Numerous species of mammals and birds require tree cavities for nesting, and these are only found in older trees. The production of hard mast (acorns) needed by a variety of mammals is also associated with older hardwoods. Fred White is chief forester for the Forestland Group, a Chapel Hill-based organization that purchases and manages forestland for investors. Forestland Group focuses on the conservative management of hardwood forests and owns land from Michigan to Tennessee. White says the practice of shorter rotations is of serious concern but need not be a by-product of chip mills.

"The practice of accelerated harvests is an issue with modern forestry in general, and potentially a very serious problem," White says. "Ironically, the presence of a chip mill could be a beneficial player in that it would allow forest landowners to get periodic income through thinning for wood chip production, while allowing the bulk of the trees to grow to maturity. In any case, we need to come up with some policies that encourage longer rotations."

Forestry experts agree that a policy of encouraging longer rotation of timber would be a good idea, but they say it's hard to envision what such a policy would look like. White suggests that the state increase the percentage of cost-sharing for replanting, with the requirement that landowners retain the majority of trees for 40 to 50 years. But that, he says, would be very tough to enforce. More practical, he says, would be for the state to offer landowners a cash payment every 10 years or so for not removing more than a certain percentage of trees.

One of the biggest triggers of timber harvest on private land is when a landowner dies and the heirs are forced to raise money to pay the estate taxes. Timber harvests provide a ready source of cash. North Carolina has all but eliminated the state inheritance tax, but the federal estate tax is still significant at 50 percent of assets worth more than $1 million. While some sustainable forestry advocates call for reducing the federal estate tax, North Carolina policymakers have little control over this issue.

The N.C. Conservation Tax Credit, however, is a positive incentive for the protection of forestland. A landowner who places a conservation easement on forestland, along with a conservation-based forest management plan, may be eligible for a tax credit against state income taxes.[10]

Economic Concerns with Chip Mills

The economic argument against chip mills has more to do with related issues such as exports and jobs than with the mills themselves. Environmentalists are particularly galled that American forests are being cut down to supply wood chips to foreign countries, mostly Canada and Japan.

"Although only a small percentage of the wood chips produced in the South are exported, exports are unnecessarily increasing the burden on our forest resources and have a negative impact on jobs," says Danna Smith of the Dogwood Alliance. "Sawmills have already had to close

down because of the increase in prices driven by the export market."[11]

Chip exports from North Carolina ports began in 1989 with 36,000 tons and increased to more than 1 million tons projected for the 1998–99 fiscal year.[12] That constitutes roughly 6 percent of the state's total pulpwood harvest. Considerable public monies have gone into promoting the export trade. From 1995 to 1996, the state of North Carolina issued $11.5 million in revenue bonds to build chip-handling facilities at the Wilmington and Morehead City ports. In 1997, a tax credit available to companies that export a broad range of commodities was expanded to include wood chips.[13] The tax credit has a lifetime benefit of $2 million. When a company has received that much benefit, the credit no longer applies. State officials defend the credits as a way to help ensure that business goes to North Carolina ports instead of competing ports in Virginia and South Carolina.

Environmentalists remain opposed to the tax credit, which was originally scheduled to terminate in 1998, but now remains in effect through February 2001. The forest products industry itself is divided on the issue, with domestic manufacturers of finished wood products generally opposed because the credit effectively lowers the cost of manufacturing for foreign competitors. In a letter sent to Governor Hunt in September 1997, John T. Dillon, Chairman of International Paper Company, wrote:

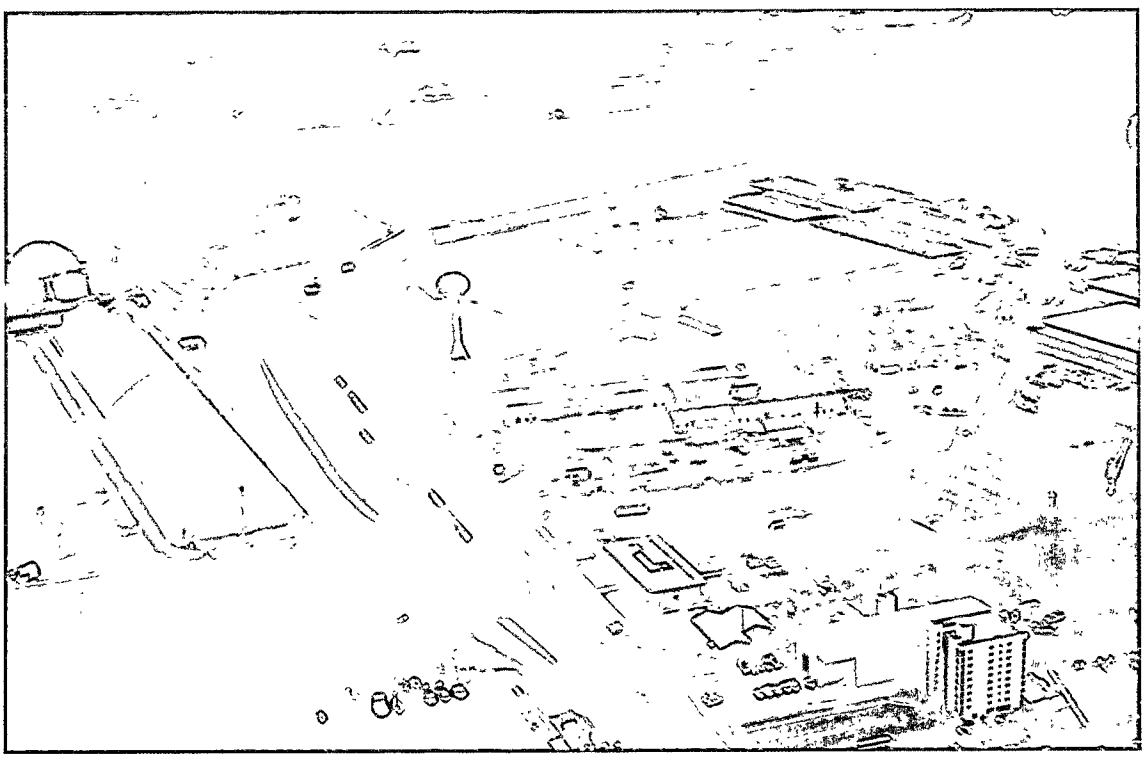
> "As I have stated to you before, International Paper is committed in its opposition to the export of wood chips, roundwood, and whole logs. We firmly believe that it is not in the best interest of our employees . . . of North Carolina taxpayers generally, and shareholders for the state to subsidize our foreign competitors, who ultimately compete with us for the sale of value-added products in the global marketplace."

While not advocating for or against the tax credit, the North Carolina Forestry Association

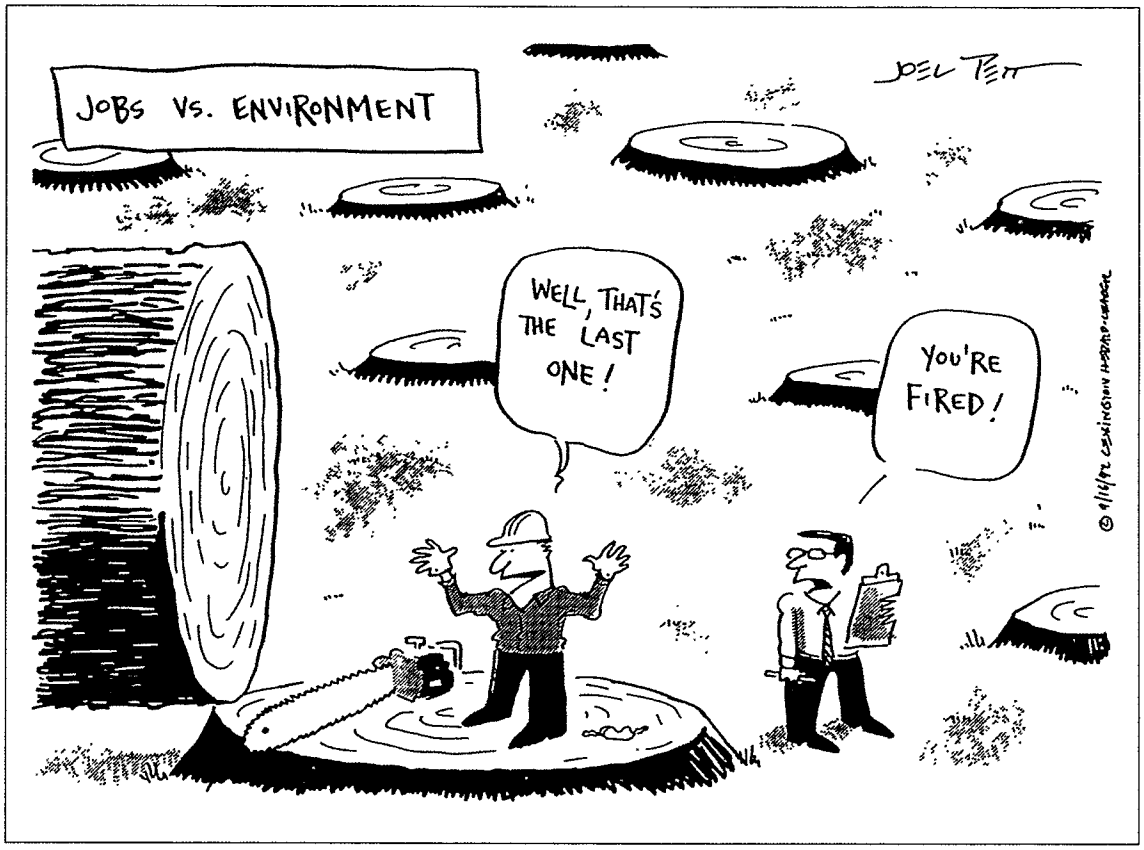
"Whether that tax credit exists or not is not going to affect the production of one wood chip,"

—BOB SLOCUM,
NORTH CAROLINA FORESTRY ASSOCIATION

Aerial view of the State Port in Morehead City, where wood chips represent a formidable portion of bulk cargo.



Courtesy of North Carolina Ports Authority



1992 Joel Pett, Lexington Herald-Leader. Reprinted by permission.

(NCFA) contends the tax credit has no effect on the amount of wood that is chipped in North Carolina for export. "Whether that tax credit exists or not is not going to affect the production of one wood chip," says Bob Slocum, NCFA executive vice president. "If it pays to export wood chips, they will go out somewhere, whether it's Morehead City, Charleston, or Savannah."

Another concern is that the demand for wood chips from the pulp and paper segment of the industry will come at the expense of the solid wood segment. In the early 1990s, a coalition of the hardwood-using businesses joined together in opposing the permitting of three chip mills in the Tennessee Valley because of concerns that the mills would spur the harvest of younger trees that represent the future wood supply of the saw mills. NCFA, whose members include both pulp and paper and hardwood manufacturers, says that is a false dichotomy.

"We've seen no indication that chip mills are encouraging the harvesting of younger timber," Slocum says. "Rather, the trees used for chipping are what is left over on a saw-timber harvest. Chip mills provide a market for the low-grade timber that is unmerchantable as saw timber. I would argue that chip mills will lead to more saw timber in the future, because they offer the landowner more financial incentives to keep the land in timber."

Finally, opponents of chip mills argue that forests have a high non-market value that is lost when they are clear-cut. Few would argue that clear-cuts have a negative visual impact, at least over the short run. Many are concerned that the spread of chip mills will lead to extensive clear-cutting that will compromise the scenic beauty of the state, with resulting harm to the tourism and outdoor recreation industries. In Tennessee, local chambers of commerce, tourism bureaus, and outdoor sports organizations spoke out in opposition to pending applications for three chip mill permits due to the potential impact on recreation and tourism.

Faced with a multiplicity of arguments on both sides of the fence, it is no wonder Governor Hunt asked for a study to sort out the details with respect to the economic and environmental impacts of chip mills. While not all of these issues will be addressed by the study, a considerable number of them will be. Not surprisingly, all sides are carefully following the make-up and methods of this group.

The Wood Chip Study Group

The North Carolina Wood Chip Study is being conducted by the Southern Center for Sustainable Forests, a consortium under the leadership of Frederick Cubbage, professor at NCSU's College of Forest Resources, Daniel Richter, professor at Duke University's Nicholas School of the Environment, and Bill Flournoy, Director of Special Projects for DENR. DENR conducted a year of public meetings and hearings to determine the issues that should be examined before contracting with the center to conduct the study. Shortly after being awarded the study, SCSF in turn contracted with the Natural Resources Leadership Institute (NRLI) at North Carolina State University to develop and lead a public participation program enabling stakeholders in the chip mill issue to have input into the study process. With the concurrence of DENR, the contract researchers assembled a Wood Chip Production Study Advisory Committee consisting of 19 members representing environmental groups, timber products industries, foresters, and forest landowners. In addition, representatives of 11 state and federal agencies with responsibilities in the area of forestry, wildlife, and air, land, and water quality have been given seats at the table. They serve as technical consultants to the advisory committee.

The advisory committee is charged with providing guidance to the study team in the development of the wood chip production study and assistance in planning for broader public information and feedback as the study progresses. To achieve this end, the advisory committee has been directed to carry out the following tasks: (1) suggest to researchers issues to be addressed in the study that are consistent with the overall study plan or assist in establishing priorities of selected issues; (2) identify issues for possible future study; (3) recommend methods to collect and analyze data; (4) provide early feedback on study procedures and findings; and (5) provide suggestions, support, and assistance for general public meetings.[14]

One of the first tasks the study team undertook was to refine the scope of the study. The Governor had directed that the study determine the impact of chip mills on North Carolina, but the team quickly acknowledged that wood chips are only part of a larger continuum of forest products and that chip mills themselves are simply one component of that production system.

The Southern Center for Sustainable Forests has determined that the research project will be developed as an integrated study of economic and ecological impacts of wood chip production in North Carolina. The economic component will examine direct financial impacts and broad economic issues of wood chip production. It will employ large-scale economic and timber supply models to examine: the impacts of wood chip production on timber supply; the effect of wood chip production on wood-based manufacturing firms; and the effects of improved timber markets for forest owners. It also will consider how market forces may change the way trees are harvested and processed and how those changes will affect forest management practices and the non-market value (such as scenic beauty) placed on those forests. Finally, the

The hundred-year oak curves aside
in its suppliant gesture, though others
that shadowed its growing have rotted
to stump holes. So history twists in
my psyche. Amputated limbs and thwarted
wills walk fields of the mind; rubble
of cotton gins and tin barns follows
footsteps through woodland: these farmed
rows and erosions with trees reclaiming
them buried in memory. . . .

—JAMES APPLEWHITE
"WHAT YOU DON'T SEE IS THERE"

John Mannel

Members of the North Carolina Wood Chip Study Group traverse a site in Moore County where best management practices were not followed in harvesting timber.

economic component will examine impacts of wood chip production on local economies, infrastructures, and communities.

The ecological component will evaluate the effects of expanded wood chip production on individual forest stands and regional landscapes by using literature reviews, field surveys, and models. The study will examine how wood chip production alters ecology of forest management practices in North Carolina, as well as direct, indirect, and cumulative effects of wood chip production on forest structure, plant and animal communities, soil erosion and fertility, and water quality. In addition, the ecological component will look at the impacts of wood chip mills on stormwater and waste water runoff from processing facilities; and forest management options for assuring sustainability of forest resources as harvest pressures continue to mount, and as forest values continue to increase.

Through February 1999, the advisory committee had met five times. The early meetings were dominated by procedural discussions, including confidentiality of data, qualifications and allegiances of the research team, and the need for public forums. Various staff members made presentations on the types of models and data sources they will be using to assess economic and ecological impacts. Some advisory committee members questioned the limitations of the models, but all were in favor of pursuing the studies as outlined. The fifth meeting involved a field visit to a chip mill, a saw mill, and a closed out and an active harvest site.

Policy Implications

Dressed in hard hats and hiking boots, two dozen members of the Chip Mill Study Group and its advisory committee stood beside a stream in the middle of a clear-cut in Moore County. The logging had been completed several years earlier and the stream was running clear. But bisecting the stream and disappearing up a hill was a 15-foot wide logging road laid bare of topsoil. Don Watson, water quality forester with the N.C. Division of Forest Resources, explained how he came upon the site and ordered the loggers to lay branches across the track to try and minimize erosion. His explanation of how a state agency responded to the situation did not satisfy Lark Hayes, senior attorney with the Southern Environmental

Law Center (SELC) and a member of the advisory committee. Hayes questioned whether the forester should have acted more aggressively by reporting the loggers to the Division of Land Resources, the state agency with broad ranging enforcement authority under the Sedimentation Control Act. The Division of Land Resources has the authority under the Sedimentation Control Act to issue civil and criminal penalties. The agency can stop work, issue fines, and require payment for reparation.[15]

"Why weren't these people reported to the Division of Land Resources?" Hayes asked. "I've heard that out of 158 logging sites that have been cited for violations [of the Sedimentation Control Act], only two were referred to Land Resources."

"That's because I'm focused on keeping the sediment out of the stream rather than gigging the logger," Watson says. "I need their cooperation, I don't need to alienate them."

"We look at it as a cooperative program," says David Brown, referring to the Division of Forest Resources' water quality inspection program. "We don't want landowners to consider us a burden. We've seen a whole lot of improvement since the Forest Practice Guidelines were implemented."

While it is not the Wood Chip Study Group's mandate to come up with policy recommendations, its findings are expected to be policy relevant, and the group could put forth policy options. Certain members of the advisory committee are clearly hoping that some significant policy changes will arise from this study. Put on alert by the outcry against the Rutherford and Stokes county chip mills, the public will be looking for some initiatives that will put their fears of widespread deforestation to rest. As the 1996 Report on the Governor's Task Force on Forest Sustainability states, "North Carolina's present citizenry has come to regard mature forests as part of its heritage, one of the many features that make them love this state. Thus, it is not hard to understand why certain forest management activities are seen as destructive of this heritage and a threat to the state's environment."[16]

At the same time, growing trees for harvest is a long-standing practice in North Carolina and will continue to be a vital part of the state's economy. Of the top 10 timber producing counties in North Carolina, almost all are located in eastern North Carolina. (See Table 3, p. 84.) But timber production occurs throughout the state and is very important in rural areas where the economy is less robust and diversified. Commercial foresters consider trees to be a renewable resource. They do not consider timber harvest to be deforestation, whether through clear-cutting or selective cuts. To the commercial forester, deforestation occurs when forests are cleared and the land put to another use, such as the site for a housing development or shopping center.

The forest products industry employs 143,367 North Carolinians and produces an annual payroll of more than $3.8 billion—second only to textiles in the state in terms of employment. (See Table 4, p. 85.) As worldwide demand for wood products grows and as the timber companies continue to concentrate in the South, increased levels of harvest are anticipated. So how can the state satisfy public concerns to preserve forests without unduly limiting the rights of private citizens and businesses or restricting the supply of timber needed to sustain the forest products industry?

As a first matter, it seems unlikely that the state would recommend or the General Assembly would approve a ban on chip mills. The production of wood chips is simply a step in the process of converting trees into a form that can be used to create a variety of products in high public demand. The mills themselves do not present an environmental hazard, and banning them would not solve the larger issues surrounding forest management that seem to be the public's real concern. However, it could be possible that the state will require a special permit that allows for consideration of secondary impacts and that gives the public a chance to comment on the proposed actions. The only permit required for chip mills is a general stormwater permit. These permits are routinely issued by the N.C. Division of Water Quality with little site-

After you have exhausted what there is in business, politics, conviviality, and so on—have found that none of these finally satisfy, or permanently wear—what remains? Nature remains.

—WALT WHITMAN

"NEW THEMES ENTERED UPON"

SPECIMEN DAYS AND COLLECT, 1882

specific scrutiny of potential environmental impacts and with no public notice or opportunity for public comment.

In April 1998, the Department of Environment and Natural Resources changed its policy to exclude new and expanded chip mills from the general stormwater permit and instead require individual permits. This action was promptly challenged administratively by the North Carolina Forestry Association.

"The state acted arbitrarily in excluding coverage for chip mills under the general permit," Slocum says. "They had no evidence to state that stormwater discharges are any different from any other facility for which they grant general permits. They said they needed more time to study the off-site impacts of chip mills. We said you don't have the authority to look at off-site impacts."

On March 19, 1999, Administrative Law Judge Robert Reilly ruled that the state had erred in its decision to exclude chip mills from the general stormwater permit. The ruling constitutes a recommendation to the Environmental Management Commission.

The Dogwood Alliance and the Sierra Club intervened on behalf of the state, with the Southern Environmental Law Center serving as legal counsel. "Part of what has fueled the anger toward chip

Table 3. Top Ten Timber-Producing N.C. Counties by Stumpage* Values, 1995

County	Softwood Stumpage* Values ($)	Percentage of Total Softwood (%)	Hardwood Stumpage* Values ($)	Percentage of Total Hardwood (%)	Combined Stumpage* Values (Softwood + Hardwood) ($)	Percentage of Combined (%)
Columbus	18,317,312	4.0	1,331,711	1.0	19,649,023	3.4
Beaufort	17,497,600	3.8	2,090,224	1.6	19,587,824	3.3
Bladen	16,517,376	3.6	1,901,053	1.5	18,418,429	3.1
Moore	13,994,718	3.1	1,992,414	1.5	15,987,132	2.7
Bertie	12,192,075	2.7	2,608,199	2.0	14,800,274	2.5
Craven	13,576,436	3.0	1,135,869	0.9	14,712,305	2.5
Johnston	11,228,383	2.5	3,368,702	2.6	14,597,085	2.5
Anson	13,591,235	3.0	844,393	0.6	14,435,628	2.5
Pender	13,170,594	2.9	1,330,223	1.0	14,500,817	2.5
Robeson	12,474,821	2.7	1,710,946	1.3	14,185,767	2.4
Total All N.C. Counties	**456,556,763**		**129,256,541**		**585,813,304**	

* *Stumpage values are the payments to forest owners for trees as they stand in the woods, that is, prior to processing or transportation.*

Source: P.B. Aruna, Frederick Cubbage, Rick A. Hamilton, "Table 1. 1995 Timber Harvest Stumpage Values by County in North Carolina," *Economic Impacts of Forestry on North Carolina*, North Carolina State University, Dept. of Forestry, College of Forest Resources, Raleigh, N.C., April 1998, pp. 10–11.

mills is that their permitting has been put on a fast-track basis with no opportunity for public input," says Lark Hayes of the SELC. "We would like to see individual permits that involve public notice and comment. That is the current situation and the current law [although it is under legal challenge]. We'd like to see the Environmental Management Commission uphold the individual permitting process that is currently in place for new and expanding chip mills. We're focusing on expansion and trying to give it close scrutiny." Hayes notes that the issue before the Environmental Management Commission represents "the big policy question going forward. How will the department [DENR] handle decisions about new and expanding mills?"

Individual permits for wood chip mills also are supported by the North Carolina Environmental Defense Fund, the state chapter of the national, New York-based nonprofit EDF, a 300,000 member organization with extensive involvement in policy and legal debates over private forest management. "EDF does support individual permitting for chip mills so that 1) the state can evaluate secondary and cumulative impacts, and 2) the public has an opportunity to participate and provide input into permitting decisions," says Dan Whittle, attorney at N.C. EDF.

Officials in the Department of Environment and Natural Resources note that there is no other industry in North Carolina where a special permit is required that does not relate to pollution generated directly by the industry. A separate permit was required for a slaughterhouse on the Cape Fear River, for example, but it had its own wastewater treatment plant. Still, environmentalists say secondary impacts were considered in the permitting process. "DENR included several conditions in that permit aimed at mitigating secondary and cumulative impacts," says Whittle. Two conditions that seemed to consider off-site impacts were a cap on the number of hogs that could be slaughtered to address concerns about proliferation of hog farms to feed the slaughterhouse and restrictions on buying pigs for slaughter from farms that are not in compliance with environmental laws. Chip mills create little pollution in and of themselves. The damage—if it occurs, occurs at timber harvests off site. Environmentalists say the conditions put on the slaughterhouse wastewater permit are parallel to regulating off-site impact of chip mills through a separate permitting process.

Hayes lauds the current DENR policy of requiring a separate permit for new and expanding chip mills as a progressive, open government type

Table 4. Number of Employees in Wood Products Industries—North Carolina, with Southeastern and National Rank, 1997

Industry	Number of N.C. Employees 1981	1989	1996	1997	% Change '81 to '97	% of Total N.C. Employment 1997	Rank in U.S. 1997	Rank in U.S. 1981
Lumber and Wood Products	35,000	35,502	41,973	42,806	+ 22%	1.2	4	5
Furniture and Fixtures	84,300	86,273	76,775	75,757	- 10%	2.1	1	1
Paper and Allied Products	21,400	22,874	24,651	24,804	+ 16%	0.7	10	12
Total Above Categories	140,700	144,649	143,399	143,367	+ 2%	3.9		
Total N.C. Work Force		**3,022,028**	**3,522,192**	**3,637,417**				

Sources: North Carolina figures: *Statewide Insured Employment and Wages in North Carolina by 2-Digit SIC Industry for Year 1997,* Employment Security Commission of North Carolina. U.S. figures: *Current Employment Statistics Program, 1998.* U.S. Bureau of Labor Statistics.

"It has come to this—that the lover of art is one, and nature another, though true art is but an expression of our love of nature. It is monstrous when one cares but little about trees and much about Corinthian columns, and yet this is exceedingly common."

—FROM THE JOURNAL OF HENRY DAVID THOREAU
OCTOBER 1854

of action because it allows for public input in the permitting process. She describes the broader general stormwater permit as an expedited, rubber-stamp type of permit that can catch the public off guard.

Federal permitting of chip mills may be required under special circumstances. If any filling of wetlands, crossing of streams, or stream alteration is required, the mill owner must apply for a permit from the U.S. Army Corps of Engineers under Section 404 of the federal Clean Water Act.[17] If the Corps determines that construction of a chip mill constitutes a "major federal action significantly affecting the quality of the human environment," the applicants are required to prepare an Environmental Impact Statement (EIS) as mandated by the National Environmental Policy Act (NEPA). An EIS requires the applicants to look not only at those impacts associated with the actual mill site, but also those cumulative and secondary impacts associated with that action, such as clear-cutting of forests to supply wood to the mill. To date, an EIS has only been required on one chip mill project. In 1993, the Corps required the Tennessee Valley Authority to conduct an EIS on three chip mills and their attendant barge terminals planned for a 12-mile stretch of the Tennessee River.[18] Based largely upon the secondary impacts associated with clear-cutting projected by the EIS, the TVA did not approve the proposed permits to build the mills.

Environmentalists have held out the hope that the Army Corps will consider every chip mill a "major federal action" because of their secondary impacts, but the Corps gives no indication of doing so. "We don't regulate chip mills as such," says Brooke Lamson, assistant district counsel for the Wilmington District of the Corps of Engineers. "If they [the mill owner] need to cross a stream or fill in a wetland to construct the mill, they might need to get a permit from us. Even then, we might not look at off-site impacts. Those are going to occur regardless of whether they bridge a stream or fill a wetland."

Federal agencies might get involved in the permitting of a chip mill if it directly affected an endangered species. The Endangered Species Act prohibits the taking (i.e. killing or harming) of any species of animal listed as endangered or threatened by the federal government.[19] But again, the construction of a chip mill per se will not trigger this act, even if logging within the source area is likely to affect an endangered species. The act would apply only to the landowner whose actions posed a threat to endangered species.

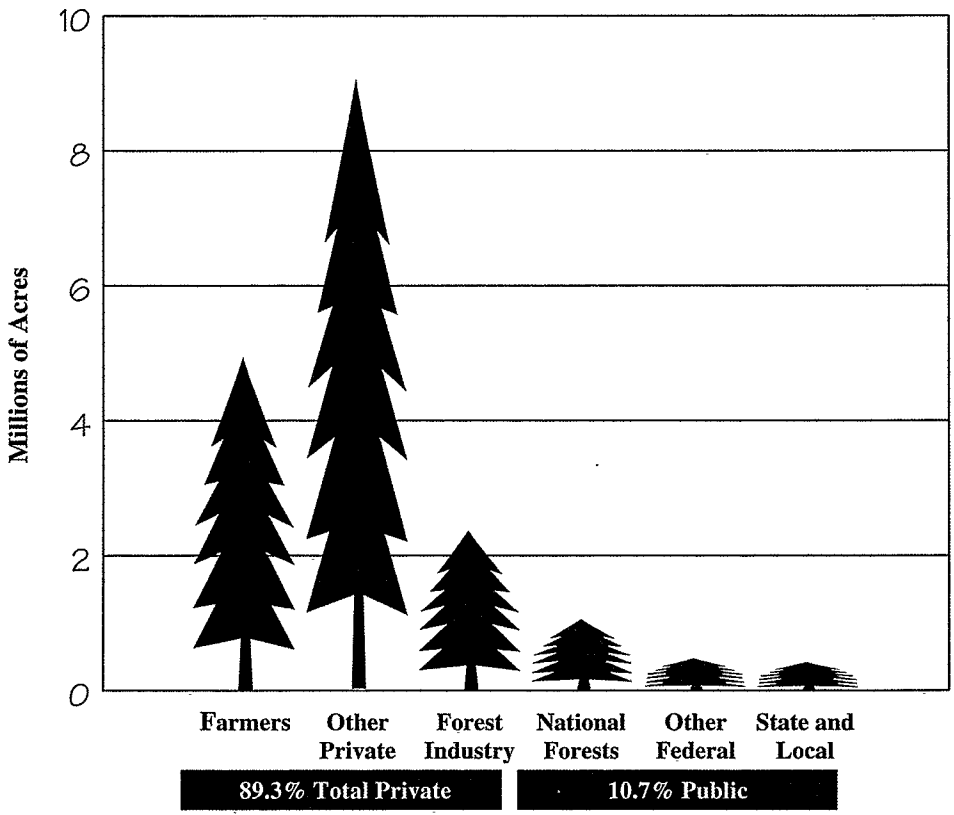
Because the public's major concern is with the secondary off-site impacts of chip mill construction—namely the harvesting of timber—that is where policymakers will most likely concentrate their attentions. Very little of what is harvested for chip production comes from state or national forests in North Carolina or throughout the South. Instead, the vast majority comes from private land, most of it from non-industrial private forests (NIPFs) of ten acres or more. There are more than 700,000 owners of non-industrial private forests in North Carolina, according to the U.S.D.A Forest Service. And 89.3 percent of the state's commercial forestland is privately held. To the degree that it is needed, effecting change on so numerous and diverse a group of people presents a significant challenge. Indeed, it is next to impossible to ensure that forestlands are managed in sustainable fashion when the state lacks good information about those lands and has few policies in place to promote or require sustainable forest practices.

Beason, the retired industrial forester, notes that the U.S. Department of Agriculture Forest Service currently is running a year behind on its 2000 inventory and that groups studying forest sustainability currently are working with decade-old data. He says there is a strong need for an up-to-date forest inventory that is never more than five years old. "Neither the environmental groups nor industry know the effect we are having on the forest resource since we have no up-to-date data," says Beason.

The concern over forest management on both public and private land is closely intertwined with the interest in preserving water quality in this state, and that is where regulation is currently focused. Forests are indisputably the source of the state's highest quality water. While other land uses, such as agriculture, industry, and urban development may contribute most pollutants to the state's waters, sedimentation in even a small, forested creek is of concern because of the value of such streams for water supply and recreation. In addition, it is difficult to know just how much silviculture contributes to sediment and nutrient pollution due to a lack of good monitoring data.

Historically, both the agriculture and forestry sectors of North Carolina have been exempted from regulations such as the Sedimentation Pollution Control Act that apply to other sectors of the economy. (For example, developers disturbing more than one acre must develop a sedimentation and erosion control plan, among other mandatory practices.) In 1974, a Forest Practices Act study committee concluded that forestry was not a major contributor of sediment, and recommended that voluntary Best Management Practices (BMPs) be

Figure 1. Who Owns Commercial Forestland in North Carolina (1990)*



* Per the N.C. Forest Service, 1990 data are the most recent data available.

Source: Johnson 1991. SE-120, Table 2. N.C. Forest Service.

developed and used during forestry activities. These BMPs are outlined in the state's *Forest Practices Guidelines Related to Water Quality*,[20] and include such practices as maintaining streamside buffers, prohibitions against leaving debris in streams that would obstruct flow, and keeping access roads and skid trails away from streams or laying down culverts or portable bridges where crossings are necessary.

In 1989, the legislature amended the Sedimentation Pollution Control Act, maintaining the forestry exemption, but only on the condition that site-disturbing forestry activities be conducted in accordance with the *Forest Practices Guidelines*. Some environmental groups say that BMPs should be mandatory on all commercial timber harvests. The forest industry responds that, in effect, they are mandatory.

"The regulations as they apply to forestry are performance-oriented, rather than prescriptive," Slocum says. "The law says you have to have a streamside management zone wide enough to prevent visible sediment from entering the stream. You can be fined if that is violated. In the flat coastal plain, that might be 20 feet wide. In the mountains where it's steep, you might need to go 100 feet. It makes much more sense to have a performance standard in this instance than a prescriptive one."

Asked to clarify whether BMPs are mandatory, Moreland Gueth, watershed protection forester in the Division of Forest Resources, answers, "With a qualification, no. Adherence to or compliance with Forest Practices Guidelines is required, and the means of compliance is through BMPs or other equally effective measures."

Mandatory or not, the key is to what degree loggers in North Carolina are complying with the standards. The N.C. Division of Forest Resources is responsible for evaluating BMP compliance, and the integrity of a performance-based program is dependent upon careful monitoring and strong state oversight. Currently, inspections are only done on sites on which the Division receives complaints, sites where the landowner is seeking state cost-sharing for reforestation, and sites which they come across "in our daily activities." In 1997–98, the Division inspected more than 3,700 sites statewide. Since notification of harvest is not required, Division officials do not know what percentage of harvests these 3,700 inspections represent. The Division now employs six water quality foresters statewide and is adding a seventh, although Division officers in each of the state's 100 counties assist with site inspections.

Aside from these routine inspections, the Division has conducted sampling surveys over the past few years specifically to determine the degree of compliance with BMPs. For 1996, overall compliance of the 200 sites inspected was rated at 95

Doug Richardson, Manager of Cotton Creek Chip Company in Moore County.

percent.[21] That is a figure widely touted by the Division of Forest Resources and the logging industry. However, Mickey Henson, former hydrologist with the Division of Forest Resources and the person who conducted the surveys, says the sites he inspected were not representative of the situation as a whole. "My surveys were skewed in that they took place after the jobs were complete and did not include many sites where water ran through the property," Henson says. "I would guess that total compliance with BMPs is probably 30–40 percent during on-going operations.

"The average Streamside Management Zone of all the sites I looked at was about 30–35 feet—nowhere near what they should be," Henson says. "I also saw major problems with violations of standards regarding stream crossings."

Henson says he strongly believes that BMPs should be mandatory for all commercial timber harvests in North Carolina. "There is no physical difference between a logging job and a development," Henson says. "Forestry and agriculture ought to be required to meet the same standards."

However, Brown says Henson was given the responsibility to develop, design, and implement the survey. "He developed criteria and selected sites." Brown disagrees that there is no physical difference between timber harvest and a real estate development. "There is a tremendous difference," he says.

In the past few years, several other Southern states have begun imposing tougher standards either on chip mills directly or on timber harvests. Missouri Governor Mel Carnahan has directed his state to undertake a study of chip mills and associated forest harvesting practices. In addition, he has directed the Missouri Department of Natural Resources to condition future permits for chip mills to require training in water quality protection for all timber suppliers to the mill, to require chip mills to provide the location of harvest areas so that professional foresters can offer assistance in developing forest management plans, to include "re-open clauses" that would allow reopening permits in order to address adverse impacts resulting from industry operations, and to limit the duration of permits related to chip mill operations to no more than one year. The former two conditions are being challenged by landowner and industry groups.

As part of its Silvicultural Water Quality Law,[22] Virginia in 1998 began requiring loggers to notify the Virginia Department of Forestry of any timber harvest of more than 10 acres. Notification must be made within three days of beginning the work, and can be done simply by calling a toll-free number. The Department of Forestry can require loggers to take actions deemed necessary to avoid sedimentation of streams. The department can issue civil penalties and/or stop work if their recommendations are not being followed.

"Where state agencies are held responsible for education and enforcement of laws related to water quality, they need to be informed of where timber harvests are taking place," says Mike Foreman, program manager for water quality in the Virginia Department of Forestry. "We tried a system of voluntary reporting and were only getting about 50 percent compliance, so we felt we needed to make it mandatory." Sen. Ellie Kinnaird (D-Orange), introduced a bill (SB 932) in the 1999 session of the North Carolina General Assembly modeled after the Virginia law, though the bill called for notification 30 days in advance of harvest, rather than the three days required in Virginia. The bill failed to pass in one house by the legislature's April 30 deadline in order to be considered during the 1999–2000 session. It can be reintroduced in 2001.

In 1996, Kentucky passed a Forest Conservation Act which mandates that by July 15, 2000, a master logger be on-site and in charge of every commercial timber harvest.[23] Loggers must take a three-day course to receive state certification. The law also requires Best Management Practices to be enforced on all commercial timber harvests, including preservation of 25-foot-wide streamside buffers on all slopes of less than 15 percent, and 55-foot-wide buffers on all slopes 15 percent or greater. The state must conduct an annual inventory of timber. The law also creates a program of incentives for forest stewardship, although that program has not been funded.

North Carolina currently sponsors various incentive programs that could help steer landowners toward responsible timber management. The N.C. Division of Forest Resources offers landowners the

I apologize to the cut-down tree
for the table's four legs.
I apologize to big questions for
small answers.

—WISLAWA W. SZYMBORSKA
"UNDER A CERTAIN LITTLE STAR"

consultative services of state foresters on any timber harvests. The state also offers a cost-sharing program to replant harvested sites. However, officials estimate that consulting foresters are only brought in on about 15 to 20 percent of timber harvests, and forest management plans are only prepared on about 5 percent of these jobs.

"The typical landowner involved in a timber harvest is over 40 years old, his daddy sold timber, and his daddy before," says Don Watson, water quality forester with the Hillsborough District of the N.C. Division of Forest Resources. "They know a logger who they want to do the work, and they don't feel they need any outside advice."

As an educator, Richter sees this as one of the most vexing issues. "In a time when the economic and environmental value of forests is increasing, we ought to be able to afford the involvement of a greater number of forest and environmental professionals to help landowners better plan management of their forest plans," he says.

Environmentalists would like to see the state educate woodland owners about environmental health and wildlife concerns on an equal footing with timber management. That kind of service is available through the Forest Stewardship Program,[24] a voluntary program that involves the N.C. Forest Service, the N.C. Wildlife Commission, and the N.C. Soil and Water Conservation Service in preparing a management plan for the property.[25] Since the program's inception in 1990, 1,490 plans have been prepared covering 240,294 acres. However, participation has been declining since the state ran out of federal cost share dollars in February 1999. "At this point, the people who request the service are generally the wildlife purists," says Mark Megalos, program coordinator for the N.C. Division of Forest Resources.

"There ought to be room for common ground between environmentalists and forest landowners. We both have the same objective of keeping as much land in forests as possible."

—RON BOST, EXECUTIVE DIRECTOR OF THE N.C. FOREST LANDOWNERS ASSOCIATION

Low participation in voluntary forest management programs and resistance to mandatory regulations might normally be considered a prescription for trouble. However, as Fred White of the Forestland Group says, the diversity of forest ownership in North Carolina argues against any drastic changes. "There are [700,000 plus] forest landowners out there with as many different mindsets as you can imagine," White says. "They may not agree to increased regulation of their land, but they're also not about to timber their land en masse just because a chip mill moves in."

Similarly, should the Wood Chip Study Group find that chip mills are not the threat to the environment that they initially appeared to be, this would not mean the group's efforts are in vain. "The significance of the chip mill debate is that it serves as a crowbar to pry open the issue of private forest management in North Carolina," says Lark Hayes. "For the first time, citizens are beginning to ask whether our laws and subsidies are shaping the behavior of private forestry in a responsible manner with respect to the environment."

While it is unlikely that those at opposite ends of the debate will ever be in agreement on how best to manage a forest, the study ought to be able to illuminate whether threats exist and what practices must be followed to ensure both environmental quality and ecological diversity. "There ought to be room for common ground between environmentalists and forest landowners," says Ron Bost, executive director of the N.C. Forest Landowners Association. "We both have the same objective of keeping as much land in forests as possible."

FOOTNOTES

[1] Average annual capacity for chip mills is taken from David Brown, *Roundwood Pulpwood from North Carolina Processed at Satellite Chip Mills in 1997*, N.C. Division of Forest Resources, p. 1. Calculations of the number of acres of trees that can be consumed per acre are based on the average number of cords per acre taken in a thinning operation.

[2] Robert Hagler, "Global Forest," *Papermaker*, Maclean Hunter Publishers, Vol. 56, No. 5 (1993), p. 5.

[3] Washington Administrative Code 222-30-010 through 22-30-110.

[4] Washington Administrative Code 222-30-010 through 22-30-110.

[5] Unpublished summary of an annual series of reports on Southern Pulpwood Production issued by the Forest Service, U.S. Department of Agriculture. Prepared by Rex Schaberg, Southern Center for Sustainable Forests, for the Advisory Committee of the North Carolina Wood Chip Study, January 26, 1999, p. 5. See also Howard Muse and Bill Finger, "Small

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Woodlot Management—a New Challenge for Smokey," *North Carolina Insight*, Vol. 6, No. 1, (June 1983), pp. 24–51 for a thorough review of the state of forestry in North Carolina in the early 1980s.

[6] David Brown, *Roundwood Pulpwood from North Carolina Processed at Satellite Chip Mills in 1997.* Available from N.C. Division of Forest Resources, Raleigh, N.C, p. 1.

[7] Unpublished summary by Rex Schaberg to the Advisory Committee of the North Carolina Wood Chip Study, January 26, 1999, p. 22.

[8] W. Scott Burleson and Frederick W. Cubbage, *North Carolina's Forests 1938 to 1990,* Tables and Figures. Available from the Department of Forestry, North Carolina State University, Raleigh, N.C., January 1999, Figure 48.

[9] *Ibid.,* Figure 53.

[10] Under N.C.G.S. 105-151.12 and N.C.G.S. 105-130.34.

[11] Danna Smith, *Chipping Forests and Jobs: A Report on the Economic and Environmental Impacts of Chip Mills in the Southeast,* available from the Dogwood Alliance, P.O. Box 4193, Chattanooga, TN, 37405, p. 30.

[12] Brown, *Ibid.,* p. 3. The 1998-99 projected figure was provided by the North Carolina Ports Authority in a telephone interview with the Center.

[13] N.C.G.S 105-151.22(b).

[14] Group Charter, North Carolina Wood Chip Production Study Advisory Committee, as amended 11/19/98, available

2. The legislature should amend the Sedimentation Pollution and Control Act to make Best Management Practices mandatory on all commercial timber harvests. Best Management Practices are intended to preserve water quality during forestry activities through such practices as maintaining streamside buffers, prohibitions against leaving debris in streams that would obstruct flow, and keeping access roads and skid trails away from streams or using culverts or portable bridges where crossings are necessary. Thus far, the forestry industry has been exempted from the state's Sedimentation Pollution Control Act on the condition that Best Management Practices are followed, as outlined in the state's *Forest Practices Guidelines.* Industry officials say that Best Management Practices are thus already mandatory. If that is true, they shouldn't mind this being clarified in state statutes and regulations.

Official accounts from the N.C. Division of Forest Resources boast of sample surveys, the latest in 1996, showing a compliance rate of up to 95 percent. Unofficial accounts beg to differ. Mickey Henson, who conducted the surveys in his role as hydrologist with the Division of Forest Resources but has since resigned, says the survey sites were not representative. "My surveys were skewed in that they took place after the jobs were complete and did not include many sites where water ran through the property," says Henson. "I would guess that total compliance with BMPs is probably 30 to 40 percent during on-going operations."

If Best Management Practices are implicitly mandatory, the industry should not mind if observance of Best Management Practices is mandated explicitly in the Sedimentation Pollution Control Act. This will aid both in compliance with and enforcement of these guidelines. Increased sedimentation of the state's streams and rivers is one of the greatest environmental threats posed by the increased clear-cutting brought on by stand-alone chip mills. Increased observance of Best Management Practices can mitigate the risk and thus should be made mandatory.

An inducement to export could lead to depletion of the state's forest resources, damage to the environment, and inadequate supplies of both chips and saw timber for domestic industry.

3. The General Assembly's amendments to the Sedimentation Pollution Control Act should include a requirement that commercial timber harvesters notify the Division of Forest Resources of intent to harvest to aid the task of water quality inspectors. Mandatory notification is imposed by Virginia as part of its Silvicultural Water Quality Act and provides a good model for North Carolina to follow. As long as state agencies are assigned the task of education, inspection, and enforcement of water quality laws, they need to know where and when timber harvesting is taking place. Currently, the Division of Forest Resources employs six water quality foresters and is hiring a seventh. Division officers at the county level also conduct site inspections. More than 3,700

from Natural Resources Leadership Institute, Raleigh, N.C.

[15] N.C.G.S. 113A-50.

[16] Report of the Governor's Task Force on Forest Sustainability, June, 1996, p. 7. Available from N.C. Division of Forest Resources, Raleigh, N.C.

[17] 33 U.S. Code Section 1311 et seq.

[18] *Final Environmental Impact Statement, Chip Mill Terminals on the Tennessee River,* Tennessee Valley Authority, U.S. Army Corps of Engineers, and U.S. Fish and Wildlife Service, TVA/RG/EQS-93/92.

[19] 16 U.S. Code 1531-1543.

[20] 15 N.C. Administrative Code 11.0101- .0209.

[21] Mickey Henson, *Best Management Practices Implementation and Effectiveness Survey on Timber Operations in North Carolina,* N.C. Division of Forest Resources, Raleigh, N.C., 1996, p. 17. Available from N.C. Division of Forest Resources, Raleigh, N.C.

[22] 1999 Va. Acts 10.1-1181.2.

[23] *Kentucky Forest Conservation Act* (Ky. Rev. Stat. Ann. sec. 149. 330-355), fact sheet available from Kentucky Division of Forestry, 627 Comanche Trail, Frankfort, KY 40601.

[24] 16 U.S. Code Section 2103a.

[25] *Woodland Owner Notes No. 23: Enrolling in North Carolina's Forest Stewardship Program,* available from the N.C. Cooperative Extension Service, N.C. State University, College of Agriculture and Life Sciences, Raleigh, N.C.

sites were inspected in 1997–98. Division officials do not know what percentage of actual harvests these inspections represented since notification of harvest is not required. As few water quality inspectors as North Carolina has in the field, their job should be made as easy as possible. Notification of harvest would give the Division of Forest Resources the opportunity to contact the landowner about desirable forest management practices and it would allow for timely inspection of the harvest site.

Virginia law requires loggers to report the location of any harvest of more than 10 acres within three days of beginning work. The state has set up a toll-free number where loggers can call in and leave a message. The number receives about 140 calls per month. Informing the Division of Forest Resources of intent to harvest in order to protect water quality seems a prudent step that would not impede harvests in any appreciable way.

4. The N.C. Division of Forest Resources should develop a plan for enhancing its reforestation program to further the goal of sustainable forestry. The Division should seek funding for the plan, and the governor should include this in the budget proposed for 2001. The only state policy that directly applies to sustainability and reforestation is the Forest Development Program, which provides qualifying private landowners with up to 40 percent cost-sharing for replanting seedlings after a timber harvest. In order to qualify, landowners must comply with Forest Practices Guidelines after a timber harvest. As a first step, the Division of Forest Resources should develop a strategy for assuring that all landowners know about the reseeding program, perhaps by requiring that before commencing a cut, loggers notify landowners in writing of the program's existence.

But it may be that more is needed to sustain the state's forest resource for future generations. Among the possibilities is encouraging longer timber rotations by increasing the percentage of cost-share for replanting for those landowners who are willing to retain the majority of trees on a tract for 40 to 50 years. Such a program would allow some cutting during this time period so the landowner could maintain a stream of income. Yet another idea might be similar to the old federal land bank for farmers—provide qualifying timber owners a cash payment every decade or so for not removing more than a certain percentage of trees. This is not to suggest an age limit for harvesting trees—merely incentives to encourage longer rotations.

These four recommendations will not make chip mills palatable to everyone. They will, however, guard against the threat of wholesale decimation of the state's forests. Ending the tax credit for exporting will insure against the unintended consequence of depleting a precious resource to help the state's ports. Bringing logging operations under the Sedimentation Pollution and Control Act will guard against the worst environmental degradation from poorly managed logging sites. And enhancing the state's reforestation program will assure a ready supply of timber for future generations. Meanwhile, the state must continue to monitor and evaluate stand-alone chip mills to assure that the visual blight created by clear-cutting remains contained and the harvest of timber does not begin to outstrip supply. Should timber harvests exceed a sustainable level, the state will need to revisit the issue of additional regulation of wood chip mills.

—Mike McLaughlin