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Forest Service

Southeastern Forest
Experiment Station

Resource Bulletin
SE-88

North Carolina's Forests

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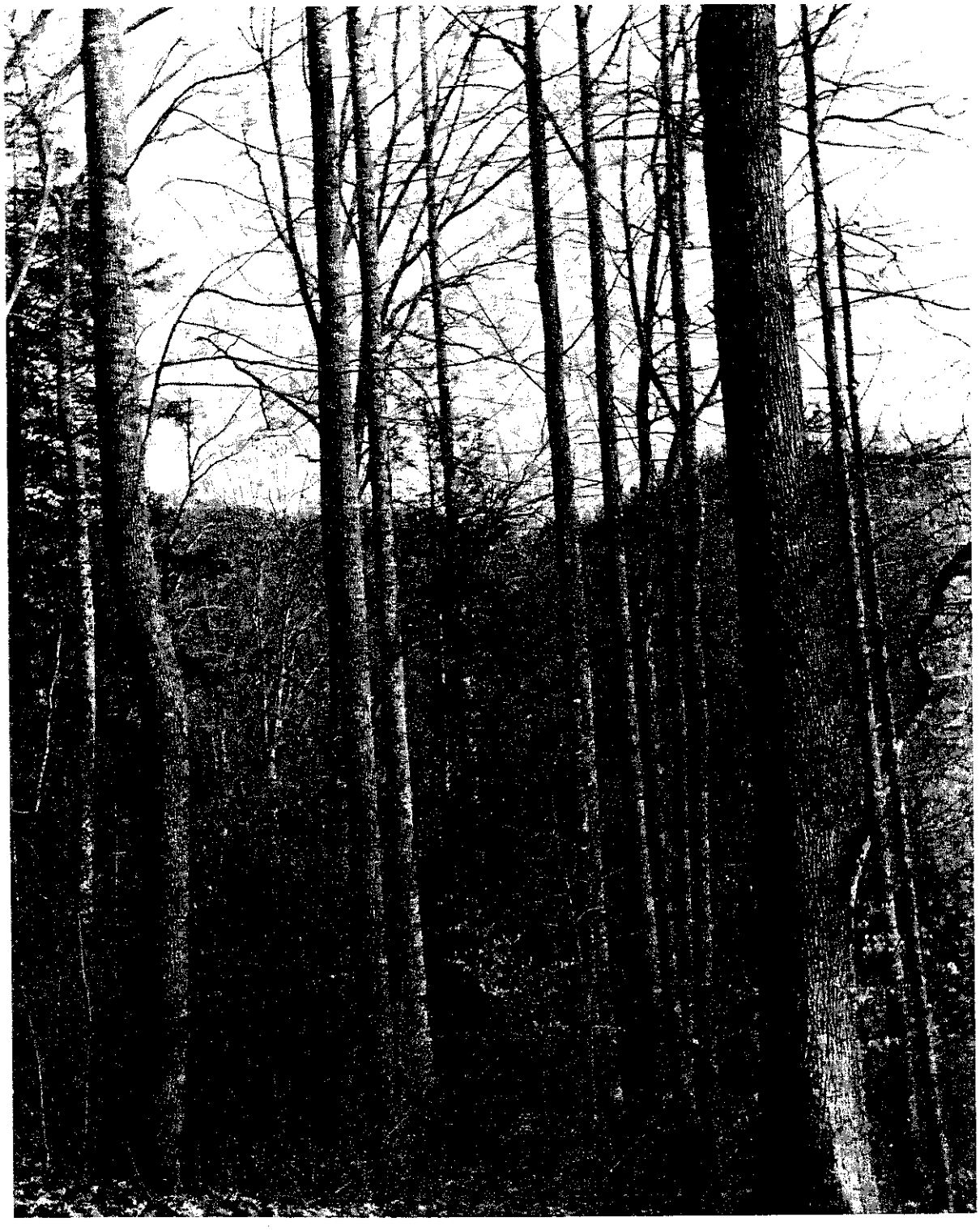

August 1986
Southeastern Forest Experiment Station
P.O. Box 2680
Asheville, NC 28802

Foreword

In accordance with the Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974, the fifth inventory of North Carolina's forests was expanded to accommodate nontimber as well as timber resources. This report presents the principal findings concerning the extent and condition of forest land, associated timber volumes, and rates of growth and removals. Nontimber evaluations will be dealt with separately.

The field inventory was started in November 1982 and completed in September 1984. Four previous statewide inventories, completed in 1938, 1956, 1964, and 1974, provide statistics for measuring changes and trends over the past 46 years. Previously reported figures have been adjusted in some cases to provide the best estimate of real change.

RPA and the Forest and Rangeland Renewable Resources Research Act of 1978 authorize these forest inventories and evaluations, which are a continuing, nationwide undertaking by the Regional Experiment Stations of the Forest Service, U.S. Department of Agriculture. In Florida, Georgia, North Carolina, South Carolina, and Virginia, these appraisals are conducted by the Forest Inventory and Analysis (Forest Survey) Research Work Unit at the Southeastern Forest Experiment Station, with headquarters in Asheville, NC. The primary objective of these periodic evaluations is to develop and maintain the resource information needed for formulating sound forest policies and programs.

The combined efforts of many people have gone into this inventory and evaluation of North Carolina's forest resources. Appreciation is expressed to all Work Unit and Station personnel who participated in the field and office work. The Southeastern Station gratefully acknowledges the cooperation and assistance provided by the Division of Forestry, North Carolina Department of Natural Resources and Community Development, and the Tennessee Valley Authority. Appreciation is also expressed for the excellent cooperation of other public agencies, forest industries, and private landowners in providing information and allowing access to the sample locations.

To facilitate both inventory and analysis, North Carolina is divided into four areas called Survey Units. A report highlighting the inventory findings and containing detailed data summaries has already been published for each of the Survey Units. Copies of these reports can be obtained from the Southeastern Forest Experiment Station. Information contained in Forest Inventory and Analysis reports includes the most commonly used forest resource statistics, but additional data can often be obtained. A Forest Information Retrieval (FIR) service is available for the custom compilation of forest resource data for any area within the five Southeastern States. Those requesting custom compilations or additional information provided from the raw inventory data are expected to pay the retrieval costs. Costs may range from less than $100 for a relatively simple request to several thousand dollars for a complex retrieval involving the services of a computer programmer. Although we strive to serve each request promptly, other work will sometimes delay attention to requests of this kind.

Requests for information may be directed to:

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North Carolina's Forests

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Forest Inventory and Analysis
Asheville, North Carolina

Highlights

Since the fourth inventory of North Carolina's forest resources was completed in 1974—

• *area classified as timberland declined from 19.5 to 18.5 million acres, or by almost 6 percent.* This net loss of timberland resulted from land use changes on nearly 1.7 million acres. Only 0.3 million acres of new timberland were added, while 1.4 million acres of timberland were diverted to other land uses, primarily agriculture and urban development. Net reductions in timberland acreage occurred in each of the State's four Survey Units, but they exceeded 8 percent in the Northern Coastal Plain and Piedmont. Almost three-fifths of North Carolina's land is classified as timberland.

• *area of timberland owned by nonindustrial private forest (NIPF) landowners declined by more than 9 percent.* NIPF owners still control 14.0 million acres, or 76 percent of the timberland. Forest industry controls 2.5 million acres of timberland, compared with 2.3 million acres in 1974. Public agencies control the remaining 10 percent of the timberland, about 1.9 million acres. National forests make up 1.1 million acres of that total.

• *area of timberland classified as natural pine stands dropped from 5.9 to 4.7 million acres.* Increases in pine plantation acreage compensated for about half the reduction in natural pine acreage; pine plantation acreage rose from 1.0 to 1.6 million acres. Most of the reduction in pine acreage occurred in pond pine and shortleaf pine forest types. Because loblolly pine is the favored species for plantations, acreage of loblolly pine increased by 4 percent to 3.4 million acres. Hardwood stands dominate North Carolina's timberland, covering 9.8 million acres—3 percent less than in 1974. Acreage in oak-pine stands dropped 8 percent to 2.3 million acres.

• *volume of softwood growing stock on timberland increased from 10.5 to 11.2 billion cubic feet, or by 7 percent.* Softwood inventories on NIPF land dropped slightly, while those on forest industry land increased by 50 percent. Nearly two-thirds of the softwood volume increase took place in the Southern Coastal Plain. While volume increases were noted in all diameter classes except the 6-inch class, the most significant gains were in the larger size categories. Loblolly pine volume totals 5.7 billion cubic feet, about one-half the total inventory of softwood growing stock, and has increased by 12 percent. The volume of shortleaf, pond, and longleaf pines fell during the same period.

• *volume of hardwood growing stock on timberland increased from 15.6 to 17.7 billion cubic feet, or by 14 percent.* Most of this increase occurred in the 12-inch and larger diameter classes. Increases in volume of hardwood growing stock were recorded for all the major ownership groups and in each of the State's physiographic regions. A diverse group of oak species totals 6.3 billion cubic feet and accounted for 20 percent of the hardwood gain. Yellow-poplar is the most abundant single hardwood species, with 2.8 billion cubic feet of growing-stock volume. It accounted for 27 percent of the hardwood volume increase.

• *number of small-diameter softwoods and hardwoods has declined.* Reductions in tree numbers occurred in the 2-, 4-, and 6-inch diameter classes. This trend was most severe on NIPF land and can be attributed to changing rates of stand establishment over time. Developing pine plantations on forest industry land created large gains in numbers of softwood stems on this land in the 4-, 6-, 8-, and 10-inch diameter classes.

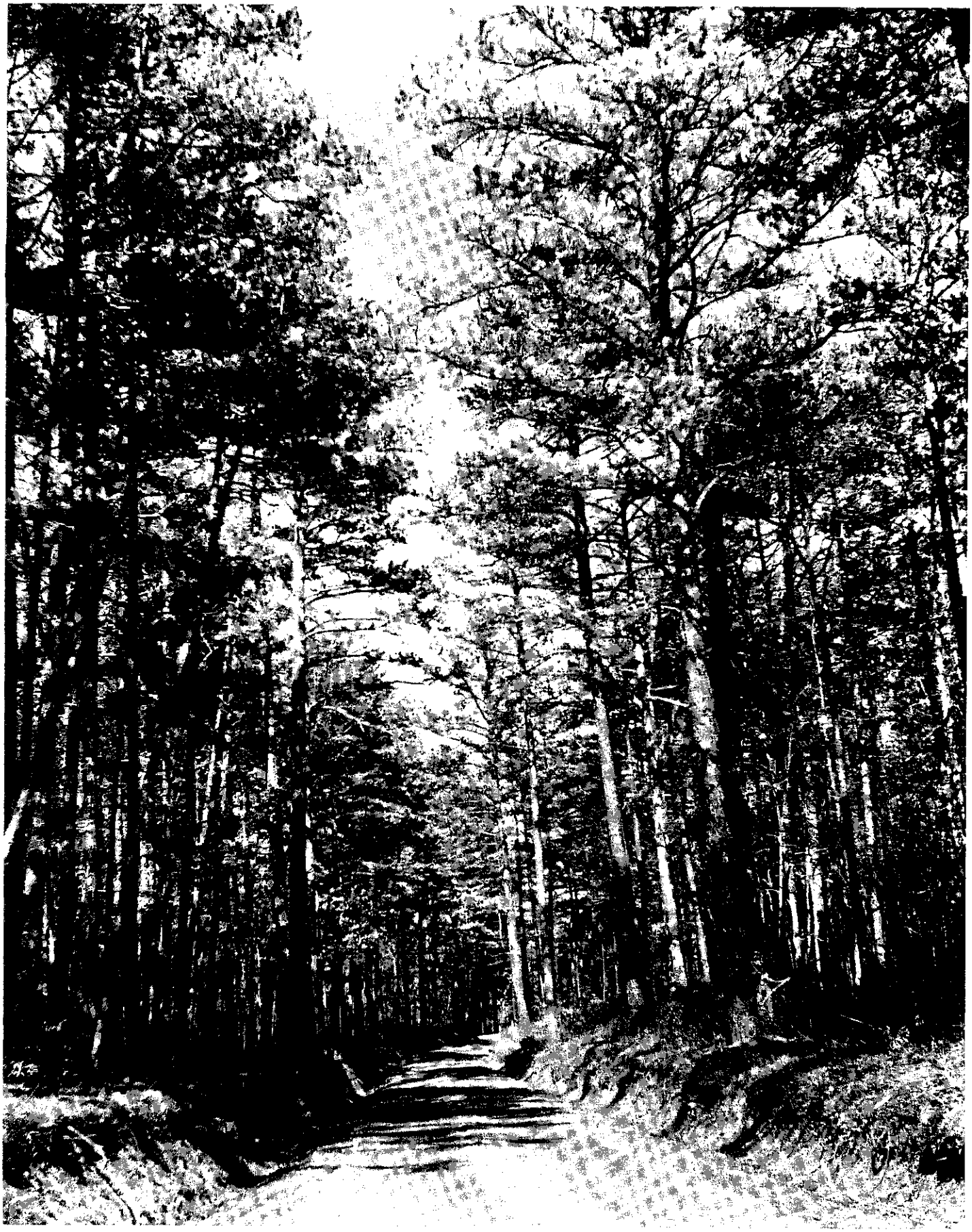
• *net annual growth of softwoods dropped from 536 to 501 million cubic feet, a decline of 7 percent.* Almost all the decline occurred on NIPF land, where softwood net growth declined by 20 percent from the previous inventory. In contrast, softwood net growth rose by 83 percent on forest industry land, partially offsetting the NIPF decline. An analysis of hardwood growth trends which eliminated the possible impact of changes in the proportion of hardwoods classified as growing stock indicates that net annual growth of hardwoods has also declined. On a per-acre basis slight increases in hardwood growth more than offset declines in softwood growth to increase annual growth per acre from 61 to 62 cubic feet (merchantable volume). Across all ownerships, annual softwood growth exceeded annual softwood removals by 16 percent while hardwood growth exceeded hardwood removals by 99 percent.

• *about 260,000 acres have been harvested annually and retained in timberland.* Significant volumes of timber were removed from another 165,000 acres of timberland each year during partial harvests, commercial thinnings, and other miscellaneous cuttings. The annual volume of growing stock removed totaled 746 million cubic feet. Softwoods accounted for 58 percent of this total. Rates of softwood and hardwood removals have changed little since the fourth inventory. About 82 percent of the annual removals of growing stock were converted into roundwood products. Another 10 percent of the removals resulted from cultural practices, land clearing, or other actions where trees were removed from timberland but not used. The remaining 8 percent was left in the woods as logging residues.

• *saw logs and pulpwood were the leading roundwood products, accounting for nearly four-fifths of the total roundwood output.* Roundwood output for both saw logs and pulpwood changed little over the past decade. The increased use of hardwood plant byproducts helped boost total pulpwood output from 324 million cubic feet in 1973 to 366 million in 1983. Plant byproducts currently account for 29 percent of the total pulpwood output. The use of wood for domestic fuel has risen dramatically. With an estimated annual harvest of 130 million cubic feet, domestic fuelwood is the third leading roundwood product harvested in North Carolina.

• *annual rate of stand establishment averaged 224,000 acres, or about 86 percent of the acreage undergoing a final harvest.* Pine stands account for almost all the shortfall in acres established. About 125,000 acres of pine stands were harvested annually, while 96,000 acres were regenerated back to a pine forest type each year. Tree planting accounted for more than two-thirds of the pine regeneration. The deficit in acres of pine stands established exists only on NIPF and public land. Forest industry established new pine stands on 25 percent more acres than it harvested off its own lands. An increase of 84 percent in the annual rate of planting on NIPF land since the previous survey indicates substantial progress in pine regeneration on this ownership. Harvest:regeneration rates are nearly balanced for hardwood-dominated stands—oak-pine and hardwood forest types.

• *significant changes in prospective timber supplies are becoming more evident.* Current resource data and objective projections show that hardwoods offer the greatest opportunity for increasing timber harvests. Prospective increases in softwood supplies over the next 30 years are small and will be concentrated on forest industry land.



Forest Trends

North Carolina encompasses some 31.2 million acres of land plus 2.5 million acres of inland water (appendix table 1). Almost 61 percent of the land area is forested. Forests occupy a diversity of physiographic conditions, ranging from poorly drained pocosins and swamps along the seacoast to some of the most rugged and highest mountain peaks in the Eastern United States. Because of these basic geographic differences, North Carolina has been divided into resource regions or Survey Units for inventory and analytical purposes. Four Survey Units are recognized: Southern Coastal Plain, Northern Coastal Plain, Piedmont, and Mountains (fig. 1).

Area of Timberland Drops 1.1 Million Acres

Between 1974 and 1984, area of timberland (formerly called commercial forest land) in North Carolina declined by 1.1 million acres to 18.5 million acres (table I). Timberland losses have accelerated; between 1964 and 1974 timberland acreage dropped by 0.4 million acres. Prior to 1964, surveys measured net increases in timberland area because farmland abandonment supplied enough acreage to more than offset diversions of timberland.

The most recent decline in area of timberland occurred in all four Survey Units, but losses were most severe in the Northern Coastal Plain and Piedmont, where declines exceeded 8 percent of the 1974 base. Statewide, the net reduction resulted from land use changes on almost 1.7 million acres during the 10-year period. Only 0.3 million acres of new timberland were added, while 1.4 million acres of timberland were diverted to nontimber uses.

Agricultural uses siphoned off 722,000 acres of timberland, or 52 percent of all diversions. In the Coastal Plain Units, agriculture accounted for more than two-thirds of the timberland clearing. Cropland expansion has been especially prevalent in the Northern Coastal Plain. Even in the upland areas of the State, agricultural uses, primarily cropland, accounted for more than one-third of total timberland losses.

Diversions to urban and related uses totaled 478,000 acres. This category includes residential, industrial, recreational, and institutional developments, highways, utility rights-of-way, and many other uses rather permanent in nature. Losses to urban development and other uses were concentrated in the heavily populated Piedmont Survey Unit. Almost 60 percent of all diversions to urban occurred in this region. Residential development accounted for one-half of the diversions to an urban use; utilities, transportation, and industrial development were other major urban uses consuming areas of timberland.

New water impoundments and the placement of timberland in reserved status accounted for the remaining diversions. About 119,000 acres of timberland were flooded by the creation of new lakes, most notably B. Everett Jordan and Falls of the Neuse Lakes in the Piedmont. Diversions to reserved timberland totaled 72,000 acres. New parks, natural areas, and wilderness are included in these withdrawals. Laws designating new national forest wilderness areas were passed after the fifth inventory of North Carolina was underway. Consequently, 30,000 acres recently classified as wilderness on the Croatan National Forest are not included in the diversions to other forest land in table I.

More than 83 percent of the total area added to timberland resulted from the natural reversion and planting of idle agricultural land. Most (54 percent) of these additions occurred in the Piedmont. The rate of timberland additions due to agricultural land abandonment was little more than one-third that for the previous survey period. Acreage classified as idle cropland has declined in each of the past two surveys. The area of idle cropland was 0.9 million acres in 1964, 0.6 million acres in 1974, and less than 0.5 million acres in 1984. Another contributing factor to reduced rates of reversion to forest is that other land uses, urban for instance, are consuming some of these idle acres before they revert to forest.

Another source of new timberland was the reclassification of reserved timberland back to timberland. Normally, this source is relatively minor; it is inflated somewhat in the latest inventory because of the manner in which national forest wilderness study areas were handled during the fourth survey in the Mountain Survey Unit. All of the national forest land in the Mountains under consideration as wilderness was classified as reserved in 1974. The areas not subsequently classed as wilderness were put back into the timberland base during the fifth inventory and are shown as additions in table I.

Nontimber land uses will continue to draw away a large acreage of timberland each year. Current rates of addition to timberland will not be adequate to counter these diversions. In the long run, the State's agricultural economy will largely determine the interchange of acreage between timberland and agricultural uses. The declining trend in timberland acreage might be temporarily altered by the planting of trees on highly erodible cropland under the nationwide Conservation Reserve Program authorized by the 1985 Farm Bill. At this time, however, the effects of that program on timberland acreage trends in North Carolina are not known.

NIPF Acreage Down 9 Percent

Area of timberland owned by nonindustrial private forest (NIPF) landowners declined by more than 9 percent between 1974 and 1984. All of the net loss in timberland in North Carolina was in this ownership. Within the NIPF category (also referred to as other private), all the loss occurred in the farm sector. Farmer-owned timberland declined from 8.4 to 5.5 million acres, or by 35 percent. Declines in farm timberland have been occurring for at least three decades. Some of the recent

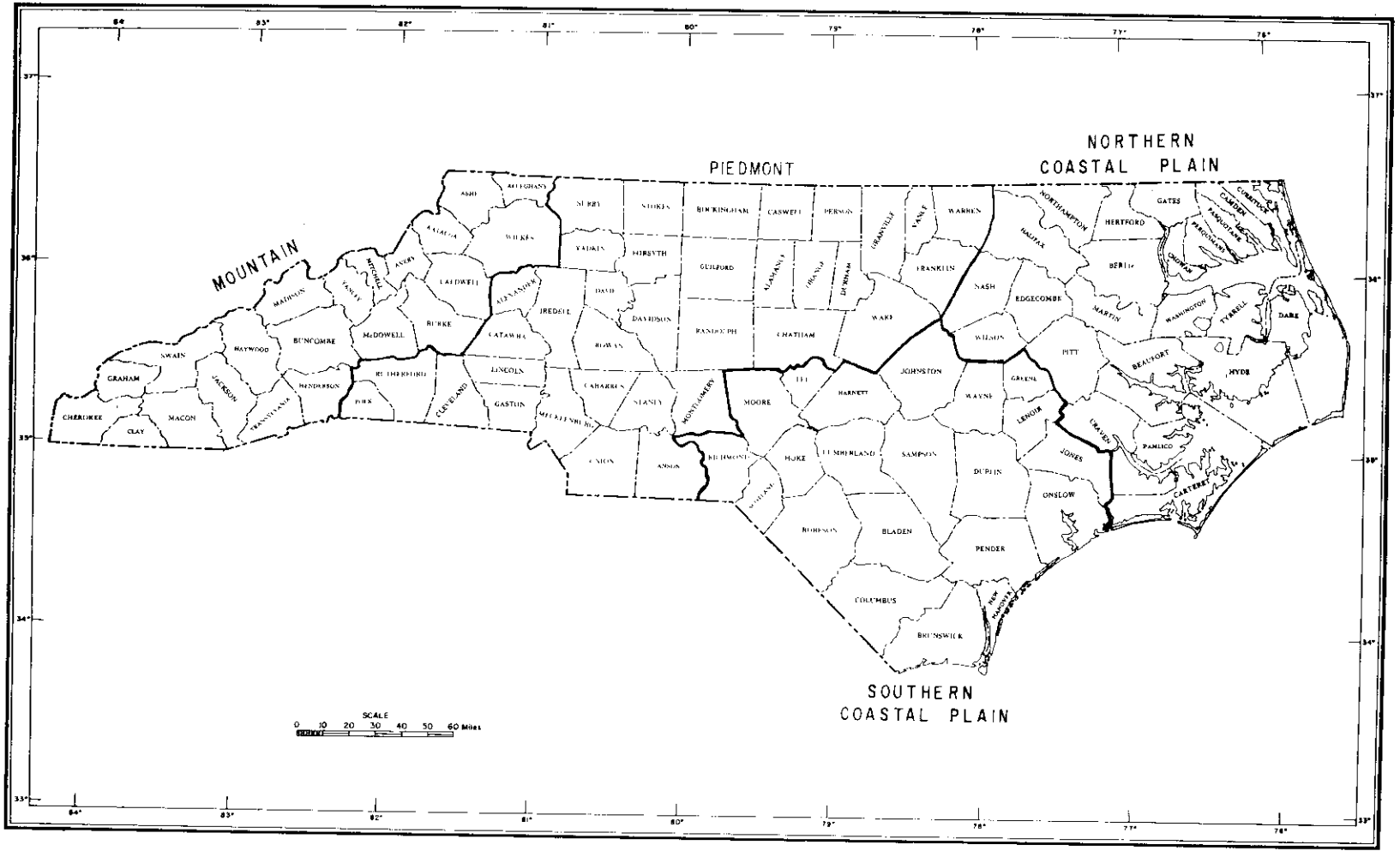


Figure 1.—Forest Survey Units in North Carolina.

Table 1.—Changes in area of timberland, by Survey Unit, North Carolina, 1974-1984

Survey Unit	Area of timberland in—		Net change	Changes							
					Additions from—			Diversions to—			
	1974	1984		Total gain	Nonforest	Other forest land	Total loss	Other forest land	Agriculture	Urban and other	Water
	Thousand acres										
Southern Coastal Plain	5,391.9	5,265.7	−126.2	58.1	57.7	0.4	184.3	1.3	125.6	49.2	8.2
Northern Coastal Plain	4,110.4	3,761.3	−349.1	33.8	30.7	3.1	382.9	26.9	290.1	59.3	6.6
Piedmont	6,028.0	5,514.9	−513.1	134.8	132.9	2.1	648.0	14.0	243.8	285.7	104.5
Mountains	4,014.5	3,908.4	−106.1	70.3	26.2	44.1	176.4	30.1	62.7	83.6	—
State	19,544.8	18,450.3	−1,094.5	297.1	247.4	49.7	1,391.6	72.3	722.2	477.8	119.3

reduction was due to forest clearing for agricultural uses, but most was due to land transactions, changes in owner occupation, and incorporation of farm ownerships. The trend toward less farmer control of the timber resource was apparent throughout the State. Increases in acreage held by other individuals and other corporate owners partially compensated for the decrease in farm woodlots. Timberland under the control of other individuals increased by nearly 1.0 million acres to 6.9 million acres, surpassing farmers as the dominant owner group in North Carolina. Corporate holdings (excluding forest industry) increased from 1.1 to nearly 1.7 million acres.

Even with the shrinking NIPF acreage, this group collectively still controls 76 percent of North Carolina's timberland. NIPF owners control 14.0 million acres of timberland (appendix table 2).

Reports for previous inventories in North Carolina have usually included in the other private or NIPF class acres owned by NIPF owners but leased to forest industries under long-term contracts (one forest rotation or longer). This analysis and its accompanying tables include leased timberland with forest industry or list the leased category separately.

About 2.5 million acres of timberland in the State are either owned by or leased to forest industry. In 1974, forest industry controlled 2.3 million acres. Leased land makes up less than 200,000 acres of the current forest industry total. Forest industry controls only 3 percent of the timberland in the Mountains and 5 percent in the Piedmont, but it controls 22 percent in the Southern Coastal Plain and 25 percent in the Northern Coastal Plain. Statewide, forest industry controls management and timber supplies on less than 14 percent of the timberland acreage.

Since 1974, area of timberland held by public agencies has increased from 1.7 to 1.9 million acres. Not included in the 1984 total is the timberland in the Alligator River National Wildlife Refuge, established in March 1984. The Croatan, Nantahala, Pisgah, and Uwharrie National Forests contain more than 1.1 million acres of public timberland. Other large public holdings of timberland include Fort Bragg and Camp Lejeune military reservations; Bladen Lakes State Forest; and Sandhill and Holly Shelter Game Lands. By Survey Unit, the proportion of public ownership varies from 27 percent of the timberland in the Mountains to less than 10 percent in all other Units.

In addition to timberland, 460,000 acres of publicly owned forest land were classed as reserved timberland. More than 85 percent of these forests are located in the Mountains, mostly in the Great Smoky Mountains National Park and in wilderness areas on national forests. As stated previously, the reserved timberland area presented in this Bulletin understates the actual present total by 30,000 acres because these acres were set aside on the Croatan National Forest after the Survey was completed in that area.

Less Timberland in Most Forest Types

Reductions in timberland area were recorded in all three broad forest types—pine, oak-pine, and hardwood. The declines were most severe, over 8 percent, for pine and oak-pine. Pine stands now occupy 6.3 million acres; oak-pine stands cover nearly 2.3 million acres. Timberland area classed as a hardwood forest type declined by 3 percent to 9.8 million acres (appendix table 8).

The 8-percent drop in pine acreage resulted from an even larger drop in acres classified as natural pine stands. Area in natural pine stands declined from 5.9 to 4.7 million acres between 1974 and 1984. Concurrently, pine plantation acreage rose from 1.0 to 1.6 million acres to compensate for about one-half the loss in natural pine.

The decline in area of pine forest types occurred in the Piedmont and Coastal Plain regions. Pond and shortleaf pine types accounted for more than 80 percent of the loss of pine stands. Declines in both of these types have been occurring for several decades. Pond pine stands occupied nearly 2.0 million acres at the time of the first survey in 1938; they now cover only 0.7 million acres. Clearing of timberland for cropland in the Coastal Plain, primarily in the last two decades, has been the major cause for this decline. In 1938, shortleaf

pine stands covered more than 3.0 million acres. Shortleaf has not regenerated itself very well after harvest nor have managers favored the species because of its slow growth. As a result, shortleaf pine stands now occupy only 0.5 million acres.

At 3.4 million acres, loblolly pine is the dominant softwood forest type in the State. The natural range of loblolly spans the Coastal Plain and about one-half of the Piedmont, but the species is routinely planted farther west. Loblolly is the favored species for forest plantations in most of North Carolina. This factor contributed to a 4-percent rise in area of loblolly type since 1974. Loblolly pine accounts for 83 percent of the current acreage in pine plantations.

More than 84 percent of the decline in hardwood acreage occurred in the Mountain and Piedmont Units. Oak-hickory forest type sustained the majority of the hardwood type reduction, declining by 4 percent. At 6.6 million acres, oak-hickory is still by far the most prevalent forest type. It occurs throughout the State, but the species composition, physiographic condition, and other site and stand characteristics vary widely. The second most abundant hardwood type, oak-gum-cypress, increased in area by 3 percent and now covers 2.3 million acres. Oak-gum-cypress is the dominant hardwood forest type in both Coastal Plain Survey Units.

A complete assessment of the factors causing forest type changes is complex and was not conducted for this analysis. Numerous treatments and disturbances, singly or in combination, cause losses and gains much greater than that suggested by the net change within any one type. Major factors behind these changes vary for each broad type.

Less than three-fourths (73 percent) of the stands classified as pine in 1974 were still in timberland and classified as pine in 1984. Timber harvesting and land clearing were two major factors diverting acreage from the pine type category, accounting for nearly three-fourths of the change. Between 1974 and 1984, a final or partial harvest (excluding commercial thinning) occurred on more than 1.3 million acres of pine stands. Artificial regeneration followed the harvest on more than 0.3 million acres, and over 95 percent of these planted areas remained in pine forest type. On the remaining 1.0 million acres of harvested pine stands, pine stocking was sufficient for classification as a pine forest type on only 30 percent of the acreage. Although some portion of these areas were just recently harvested and insufficient time had passed to allow for planting or natural pine regeneration, the trends suggest that landowners must plan for the regeneration of pine stands after harvest. Otherwise, hardwoods are likely to dominate the stocking of subsequent stands.

Land clearing results in more permanent loss of pine land than that described above. Nearly 46 percent of the timberland acreage diverted to another land use was classified as a pine type prior to clearing. Pine type losses of this kind totaled more than 0.6 million acres.

The conversion of former oak-pine and hardwood stands to a pine type partially compensated for the losses of pine stands, leaving the net pine reduction of 0.6 million acres. Naturally occurring stand structural changes, artificial regeneration, and reversion of nonforest land to timberland were all significant factors in moving acres into a pine type. Many of these stands were composed of a mixture of pines and hardwoods in 1974. During stand development, the pines gained dominance on some of these sites.

Causes of shifts in oak-pine acreage are difficult to assess. In oak-pine type, pines make up at least 25 but less than 50 percent of the tree stocking. Because of this narrow range of pine stocking, stands move to and from this type more often than for other types. Only 39 percent of the stands classified as oak-pine in 1974 were still oak-pine in 1984. More than half the undisturbed oak-pine stands shifted to either pine or hardwood in the 10-year period.

Hardwood forests were the most stable of the three forest type groups. Less than 16 percent of the area classed as hardwood in 1974 shifted to another type during the 10-year period. Land clearing, naturally occurring stand structural changes, and establishment of pine plantations were the major factors moving acres from hardwood to an oak-pine or pine type. Gains in hardwood type acreage nearly offset the losses. By far the leading activity adding acreage to the hardwood category was the harvest of pine and oak-pine stands without subsequent pine regeneration. Hardwoods commonly form dense understories in pine stands and assume dominance once the pine overstory is removed unless site preparation or other control measures are used. These stands typically do not produce the high-quality hardwood trees needed by industry.

Softwood Inventory Down On NIPF Land

Volume of softwood growing stock on timberland in North Carolina increased from 10.5 to 11.2 billion cubic feet, or by 7 percent, between 1974 and 1984. By ownership class, the changes in softwood inventory volume varied. Softwood inventory on NIPF land actually dropped slightly.

There are at least three major reasons for the drop in softwood inventory on this ownership. First, almost all the acreage of timberland diverted to other land uses was in NIPF ownership. Second, net growth was down and, third, annual softwood removals were up for this owner category. Despite these trends, NIPF owners still control 8.6 billion cubic feet of softwood growing stock, more than three-fourths of the State's total (appendix table 26).

In contrast, softwood inventories increased substantially on both forest industry and public holdings. Softwood volume on forest industry land increased from 1.1 to 1.7 billion cubic feet, or by 50 percent. The increase on this ownership accounted for three-fourths of the total softwood increase. Many pine plantations on forest industry land developed to merchantable size during the 1974 to 1984 period, leading to the boost in volume. The remaining increase in softwood growing stock occurred on public land, where a 23-percent rise in softwood volume pushed the current inventory to 1.0 billion cubic feet.

Nearly two-thirds of the increase in softwood volume occurred in the Southern Coastal Plain; the remaining one-third took place in the Mountains. In the Piedmont, softwood volume

changed little between 1974 and 1984; much of the statewide increase in the previous inventory period (1964-1974) occurred in the Piedmont. Softwood inventory was unchanged in the Northern Coastal Plain during the latest inventory period, an improvement over the previous survey period when volume of softwood growing stock declined by 3 percent. This positive change was fueled by significant jumps in pine growth on forest industry land in this region.

When all ownerships are grouped, a volume increase for softwoods occurred in all diameter classes except for the 6-inch class (fig. 2). Volume of softwood growing stock declined by 4 percent in the 6-inch diameter class. In contrast to the previous inventory period (1964-1974), the most significant gains in softwood volume were recorded in the larger size trees. Volume increases of more than 21 percent occurred in the 18-inch and larger classes; increases were less than 8 percent in all other diameter classes. During the previous survey period, much of the softwood volume increase was concentrated in the 8- and 10-inch categories.

The inventory of softwood growing stock includes nearly 39.0 billion board feet of sawtimber, an increase of 10 percent since 1974. By Survey Unit, the increase in softwood sawtimber volume followed much the same pattern as that for growing stock: most of the gains were in the Southern Coastal Plain and Mountain Units. By ownership, the most substantial increases in softwood sawtimber occurred on public timberland, where board-foot volumes rose by 33 percent since 1974. Volume of softwood sawtimber increased by 22 percent on forest industry land and by 7 percent on NIPF land. More than half the net sawtimber gain was recorded on NIPF land.

Buildup in Large-Diameter Hardwoods

Volume of hardwood growing stock on timberland increased from 15.6 to 17.7 billion cubic feet, an increase of 14 percent. Essentially all of this increase occurred in the 12-inch and larger diameter classes (fig. 3). This buildup of large hardwoods is consistent with the age structure of hardwood stands in the State. Two-thirds of all hardwood stands where a manageable stand of trees is present are more than 40 years of age (appendix table 10). North Carolina's hardwood resource is more mature than at any point in recent history due to several decades of relatively low harvesting activity. Properly conducted stand harvests could supply wood for consumptive use and replenish the resource with vigorous new stands.

The larger and more mature hardwood resource does not automatically translate into a bountiful supply of raw materials for all consumers of hardwoods. Both the hardwood resource and the consumers of hardwood timber are quite diverse. Hardwood consumers who can use a broad range of species and tree qualities probably encounter few problems with hardwood supplies. But hardwood consumers requiring high-quality material of select species often find that adequate supplies are difficult to obtain. Hardwood stands are typically heterogeneous, containing a mixture of species, tree sizes, and grades (appendix table 25). Preferred species and material may make up only a small part of the total volume of such stands; the remaining material is essentially unmarketable. Other typical problems affecting availability include limitations due to stand accessibility and operability and owner restrictions or attitude.

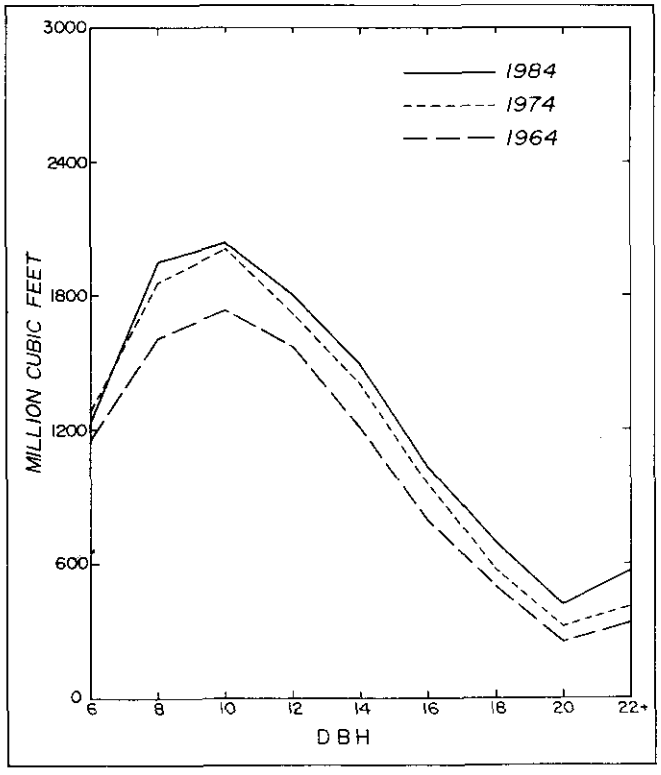


Figure 2.—Volume of softwood growing stock, by tree diameter, 1964, 1974, and 1984.

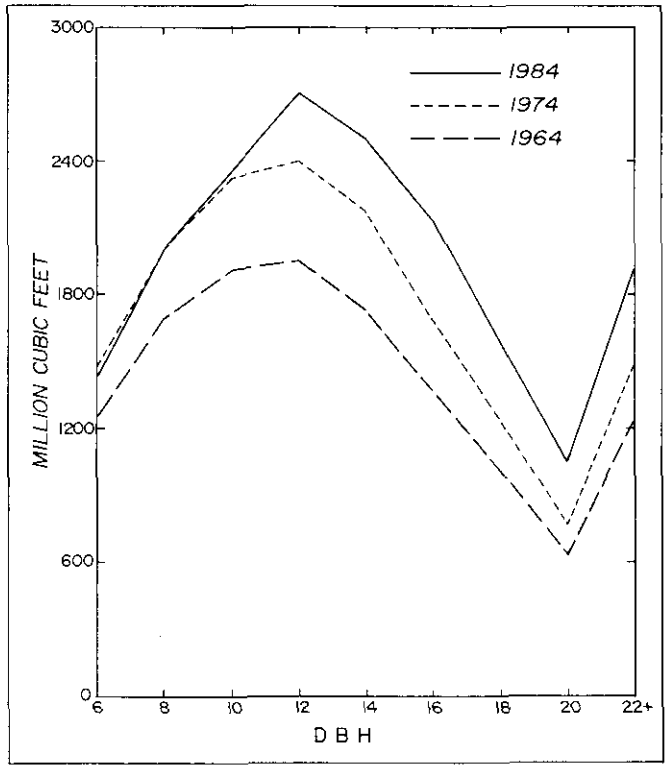


Figure 3.—Volume of hardwood growing stock, by tree diameter, 1964, 1974, and 1984.

The buildup in hardwood inventory occurred in all three major ownership groups. NIPF owners presently control four-fifths of the State's hardwood volume. Nearly two-thirds of the hardwood gain occurred on NIPF lands. Volume on public timberland showed the largest percentage gain (38 percent), rising from 1.6 to 2.2 billion cubic feet. Hardwood inventory on forest industry land increased by 12 percent to 1.4 billion cubic feet.

Significant increases in hardwood growing stock were recorded in each of North Carolina's Survey Units. Gains ranged from 18 percent in the Mountains and Southern Coastal Plain to 9 percent in the Northern Coastal Plain. The inventory of hardwood growing stock includes 52.9 billion board feet of sawtimber, 23 percent more than in 1974. Substantial increases in hardwood sawtimber volume occurred in each of the Survey Units and for each of the major ownership groups.

Loblolly Pine Is Dominant Species

Although hardwoods collectively account for more volume than softwoods, the most abundant single species in North Carolina is loblolly pine. It is the species used in plantations in most of the State, and it is the most prevalent natural pine type. Loblolly pine growing stock currently totals nearly 5.7 billion cubic feet, about half the total inventory of softwood growing stock (appendix table 19). Between 1974 and 1984, loblolly volume rose by 12 percent (fig. 4).

Other major softwood species with significant gains in growing-stock volume included Virginia pine (16 percent increase), eastern white pine (37 percent), and other softwoods, mostly cypress (36 percent). Two softwood species—shortleaf and pond pine—lost significant volumes over the past remeasurement period. Volume of shortleaf pine declined from 1.6 to 1.3 billion cubic feet; pond pine volume fell from 1.0 to 0.8 billion cubic feet. The volume of longleaf pine dropped by 4 percent to 0.4 billion cubic feet.

The hardwood resource includes a host of species, with no individual species making up a major share of the volume. Collectively, oak species total 6.3 billion cubic feet and make up 36 percent of all hardwood growing stock. Because there are 17 individual oak species with significant timber volumes, oaks with similar characteristics are customarily grouped. Each of the oak species groups registered substantial gains in volume (fig. 5). Together, however, they accounted for only 20 percent of the gain in hardwood volume. The most abundant oak species are white oak (1.6 billion cubic feet), chestnut oak (1.0 billion), northern red oak (0.8 billion), scarlet oak (0.8 billion), black oak (0.5 billion), and southern red oak (0.4 billion).

Yellow-poplar is the most abundant single hardwood species, with 2.8 billion cubic feet of growing-stock volume, or 16 percent of the hardwood total. Volume of yellow-poplar rose by 28 percent between 1974 and 1984 and accounted for 27 percent of the gain in hardwood volume. Volume of soft maples, primarily red maple, increased from 1.3 to 1.8 billion cubic feet. Sweetgum volume increased by 10 percent to 1.8 billion cubic feet. Volume of tupelo and blackgum increased by only 2 percent; hickory volume fell by 1 percent.

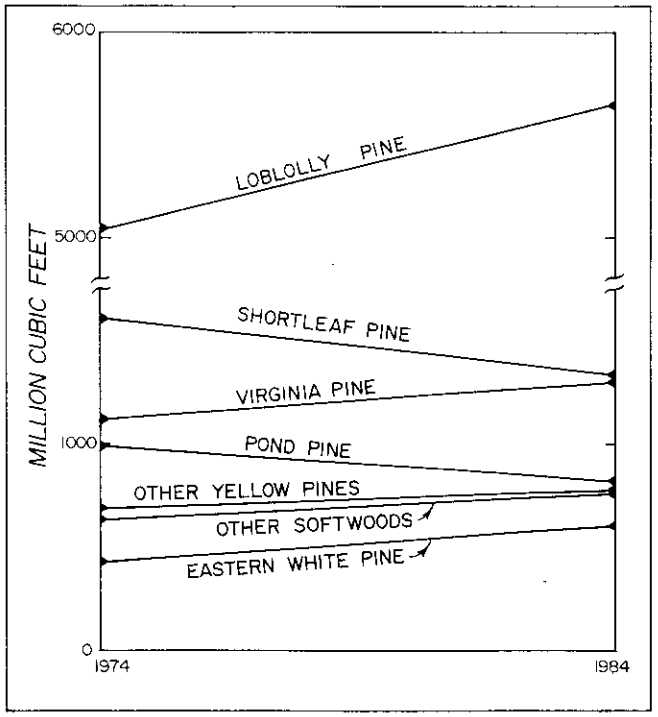


Figure 4.—Change in volume of softwood growing stock, by species, 1974 to 1984.

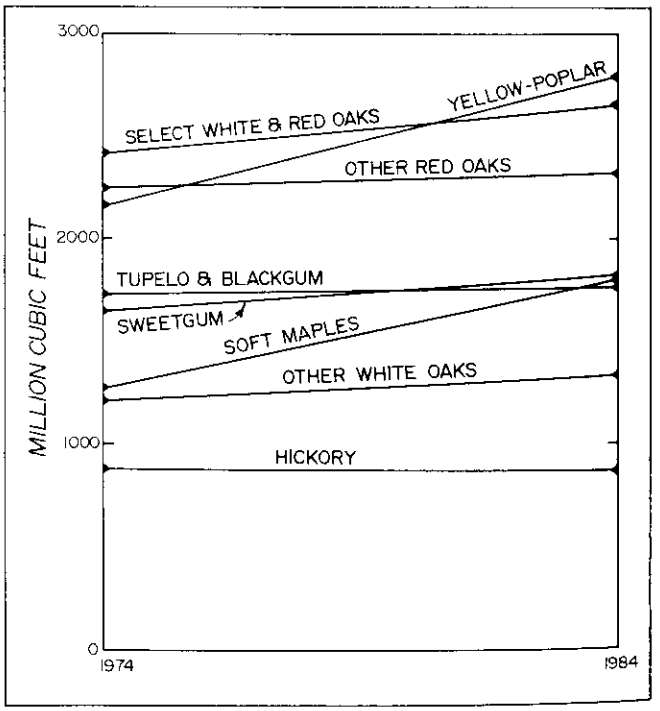


Figure 5.—Change in volume of hardwood growing stock, by species, 1974 to 1984.

Fewer Small-Diameter Trees

Numbers of small-diameter softwood and hardwood trees have declined since 1974 (table II). This trend is consistent with recent findings in other States in the Southeast for softwood, but the drop in small hardwoods is more pronounced in North Carolina than in any other recently inventoried Southeastern State. For softwoods, number of 2-, 4-, and 6-inch live trees on timberland declined by 34, 20, and 2 percent, respectively. Softwood reductions were almost entirely confined to yellow pine species. Number of softwoods in the 8-inch and larger diameter classes increased; the most significant increases were in the 16-inch and larger classes. Number of hardwood live trees in the 2-, 4-, and 6-inch diameter classes dropped by 12, 8, and 3 percent, respectively. Eight-inch hardwood numbers were essentially unchanged. Increases in hardwood numbers occurred in all larger diameter classes, with the largest increases in the 16-inch and larger classes.

Trends in number of trees are virtually identical to the volume trends, by diameter class, discussed earlier. The stand table trends differ considerably by ownership, however, and provide a reliable index of changes in volume between 1974 and 1984, by species groups and diameter class, for the three broad owner categories.

Increases in the acreage of public timberland caused gains in numbers of small diameter hardwoods and softwoods on public land. Tree numbers increased for almost all tree sizes on public land. The highest gains were found in the large-diameter trees, a finding consistent with the relatively old stands on public lands (appendix table 11).

Forest industry efforts to manage pine on much of its land on short rotations caused large increases in numbers of softwoods in the 4-, 6-, 8-, and 10-inch diameter classes. These increases were fueled by the development of a relatively large acreage of pine plantations established between 1964 and 1974 (appendix table 12). Number of 2-inch softwoods on industry land declined by 39 percent between 1974 and 1984 because industry's rate of pine plantation establishment decreased. In addition the acreage of young, natural pine stands, which contain high numbers of pine saplings per acre, also declined. Numbers of hardwoods in most diameter classes also increased on land under industry control. Part of this buildup can be attributed to an 8-percent increase in timberland acreage.

The most extensive and serious declines in numbers of small-diameter trees occurred on NIPF land. For softwoods, reduced tree numbers were measured in the 2- through the 10-inch diameter classes. Significant increases were recorded only for 16-inch and larger softwoods. The declines in small-diameter softwoods are due to two major factors. One, the acreage decline in North Carolina was essentially absorbed by the NIPF ownership group, particularly pine-growing timberland. The second, more influential factor is found in the age structure of pine stands on NIPF land (appendix table 13). Between 1944 and 1964, unusually large acreages of natural pine stands were

Table II.—Number of live softwood and hardwood trees on timberland, by diameter and ownership classes, 1984, and change between 1974-1984, North Carolina

Diameter class	All ownerships		Public		Forest industry [a]		Other private	
	Inventory 1984	Change 1974-1984	Inventory 1984	Change 1974-1984	Inventory 1984	Change 1974-1984	Inventory 1984	Change 1974-1984
				SOFTWOODS (in million trees)				
2	1,141.4	−589.9	112.0	+52.4	208.5	−135.8	820.8	−506.5
4	725.2	−177.7	52.8	+4.5	193.9	+25.0	478.5	−207.2
6	488.1	−12.4	37.1	+4.6	145.8	+70.7	305.1	−87.7
8	320.3	+17.2	25.2	−1.0	76.6	+39.8	218.5	−21.5
10	178.1	+2.5	15.1	+.9	26.7	+8.5	136.2	−7.0
12	96.9	+4.6	9.6	+2.2	11.7	+2.1	75.5	+.3
14	53.7	+3.5	5.1	+.8	5.4	+.7	43.2	+1.9
16+	53.3	+8.0	5.8	+1.7	5.1	+.7	42.4	+5.7
				HARDWOODS (in million trees)				
2	7,750.7	−1,087.7	685.0	+163.9	1,195.1	+8.4	5,870.7	−1,260.0
4	1,948.4	−168.9	195.6	+13.3	212.8	+3.8	1,540.0	−186.0
6	771.1	−22.4	88.7	+19.5	69.7	+3.6	612.6	−45.5
8	409.3	−.3	44.9	+8.0	32.9	−2.8	331.5	−5.5
10	242.9	+3.9	28.4	+6.5	18.0	−.6	196.5	−2.0
12	165.8	+19.2	18.5	+3.1	13.1	+2.6	134.2	+13.6
14	103.1	+13.6	12.6	+3.6	6.8	−.2	83.7	+10.3
16+	147.2	+32.9	21.8	+6.6	12.2	+3.0	113.1	+23.4

[a]Including inventory on lands under long-term lease.

established in the State, many of them on abandoned farmland. The current age distribution confirms that fewer natural pine stands have been established in each of the two decades since 1964. Increased planting rates have failed to compensate for the dwindling acreage of young natural stands, resulting in the reduction of small softwood trees.

A situation somewhat similar to that for softwoods is developing in the hardwood resource on NIPF land. Numbers of hardwood trees on this ownership also declined in the 2- through the 10-inch diameter class, while a buildup in larger diameter classes continued. An accumulation of older hardwood stands is evident for NIPF owners (appendix table 13). Low cutting rates for hardwoods in recent decades relative to higher cutting rates earlier in this century have led to the imbalance in the hardwood age structure (Knight 1977). An increase in timber harvesting for both softwoods and hardwoods on NIPF land during the last decade has resulted in an increase in hardwood acreage in the 0- to 10-year age class. As many as two out of five of these young hardwood stands were on former pine land now classified as oak-pine or hardwood after a timber harvest removed most of the pine. Another reason for the drop in number of small hardwoods is increased mortality in the small-diameter hardwoods. This change is also related to the accumulation of mature and overmature hardwood stands. A final reason for the decline in number of small hardwoods is an increase in cutting from the smaller diameter classes.

Forest Biomass Totals 1.6 Billion Tons

North Carolina's timberland supports a total inventory of aboveground wood fiber of 43.3 billion cubic feet, with an associated green weight of wood and bark of more than 1.6 billion tons (appendix table 22). Biomass as a measure of timber inventory is becoming increasingly important. Growing-stock volume and sawtimber volume (see definitions of terms) are the longstanding measures whose merchantability guidelines are based on a saw-log standard. The advent of whole-tree chipping, increased manufacture of products from wood chips, and a rekindled interest in wood as a fuel make non-growing-stock volumes a resource worthy of more thorough documentation.

Large quantities of raw material not qualifying as growing stock exist on timberland areas in North Carolina. The inventory of growing stock totals nearly 29.0 billion cubic feet; however, the 1984 inventory also measured an additional 1.9 billion cubic feet of timber volume (to conventional merchantability standards) in trees failing to qualify as growing stock because of species, poor form, or excessive internal rot. Conventional volumes include only the net volume in trees 5.0 inches d.b.h. and larger, from a 1-foot stump to a minimum 4.0-inch top diameter outside bark. Inclusion of nonconventional sources—stumps, tops and limbs, and saplings—adds another 12.4 billion cubic feet to the inventory. The resulting total inventory represents 50 percent more volume than that for growing stock alone. Hardwoods account for 77 percent of this added volume. The total inventory is equivalent to 1.6 billion green tons of biomass, an average of 89 tons per acre of timberland.

Softwood Net Growth Down 7 Percent

Net annual growth of softwoods in North Carolina has peaked and turned downward. In 1973, net annual volume increment for softwood growing stock totaled 536 million cubic feet; the same figure in 1983 was 501 million cubic feet, down 7 percent (fig. 6). Annual softwood removals have been stable for the past two decades. As a result there has been no widespread overcutting. The decline in softwood growth has simply narrowed the gap between growth and removals.

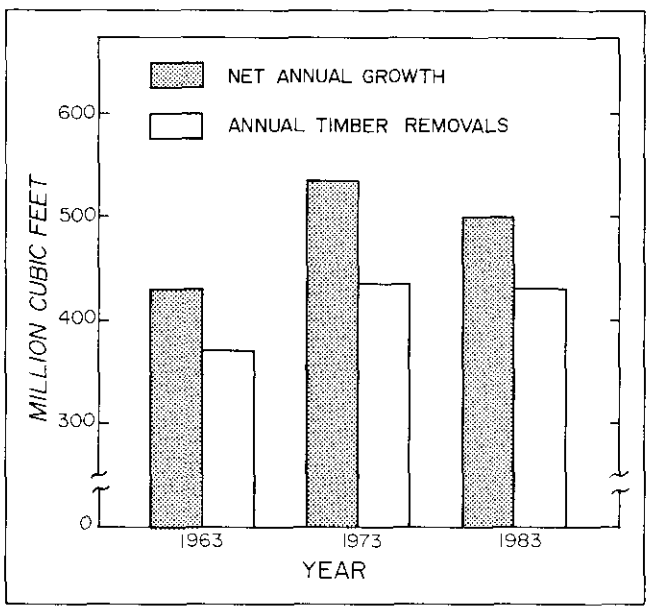


Figure 6.—Net annual growth and annual timber removals of softwood growing stock, 1963, 1973, and 1983.

Almost all the decline in softwood growth occurred on other private or NIPF land; softwood net growth dropped from 435 to 346 million cubic feet on this ownership, a reduction of 20 percent. Softwood growth escalated by 83 percent on forest industry land, going from 66 to 120 million cubic feet annually. This increase only partially offset the softwood growth reduction on NIPF land. Geographically, most of the reduction in softwood net growth took place in the Piedmont and Mountain regions of the State, the areas with the highest proportion of NIPF and public land.

Net growth of hardwood growing stock continued an apparent upward trend (fig. 7), but the rate of increase was much smaller than earlier ones. Net annual growth of hardwood growing stock totaled 627 million cubic feet in 1983, compared with 589 million cubic feet in 1973. Hardwood removals have changed little over the past three decades, leading to higher growth:removal ratios and mounting hardwood inventories.

Although the growth of hardwood was upward when based on growing stock, an examination of hardwood growth based on all hardwood trees regardless of tree class reveals a different trend. Net annual growth of all hardwoods 5.0 inches d.b.h. and larger was down slightly—653 million cubic feet per

year in 1973 versus 643 million cubic feet in 1983. The increase in net growth indicated for hardwood growing stock is largely attributable to an increase in the proportion of hardwood trees classified as growing stock in the latest inventory. Because there is little basis for substantial improvement in the proportion of hardwoods classed as growing stock, we view the changes documented for all hardwoods as more indicative of the true trend in hardwood growth.

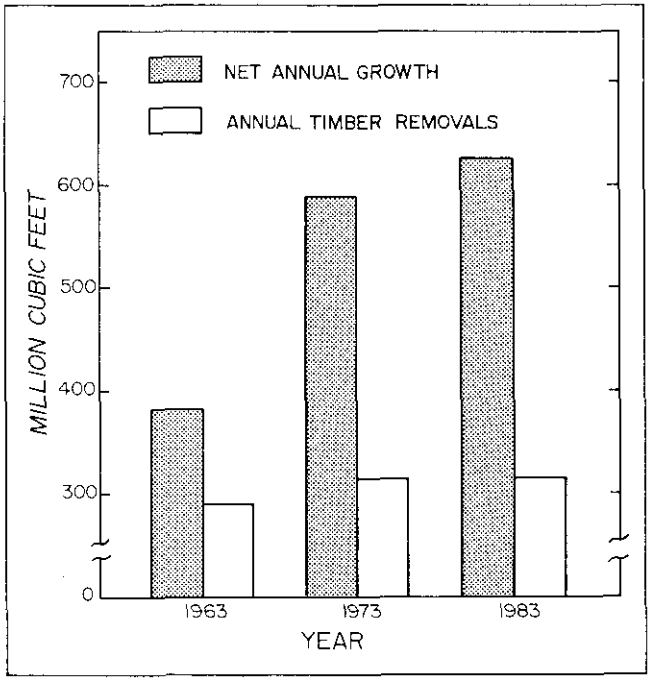


Figure 7.—Net annual growth and annual timber removals of hardwood growing stock, 1963, 1973, and 1983.

Regardless of the basis for comparison, growing stock or all hardwoods, hardwood net growth was higher in 1983 compared with 1973 on public and forest industry land. Any drop in the level of hardwood growth has occurred on NIPF land. Slower hardwood growth was documented for the Piedmont and Mountain Survey Units.

In 1983, net annual growth of merchantable timber (growing stock plus cull trees) in North Carolina averaged 62 cubic feet per acre of timberland. Ten years earlier, growth averaged 61 cubic feet per acre. Hardwood growth rose by 2 cubic feet per acre, whereas softwood growth per acre declined by 1 cubic foot. Changes in average growth were quite different for the three major ownership groups (fig. 8). Because of lower softwood growth, net growth per acre on both public and NIPF land dropped by 4 percent. In contrast, dramatic increases in pine growth boosted per-acre growth on forest industry land from 45 cubic feet in 1973 to 69 cubic feet in 1983. The rapid growth increases on forest industry are indicative of the productivity improvements that are possible. A substantial acreage of pine plantations was established on forest industry land in the 1960's and early 1970's; these plantations have developed to merchantable size and have pushed the level of softwood growth on this ownership rapidly upward.

A detailed breakdown of gross growth into its various components, by Survey Unit and species group, along with the distribution of mortality and removals, identifies the recent sources of annual change in timber volume (table III). For all species, survivor growth, the volume increment on growing-stock trees 5.0 inches d.b.h. and larger in the inventory at the beginning of the year and surviving to its end, accounted for 86 percent of gross growth. Ingrowth, the net volume of growing-stock trees reaching 5.0 inches d.b.h. during the year, and subsequent growth on these trees, accounted for another 13 percent. Growth on removed trees before removal and growth on dead trees before they died, made up the remaining 1 percent.

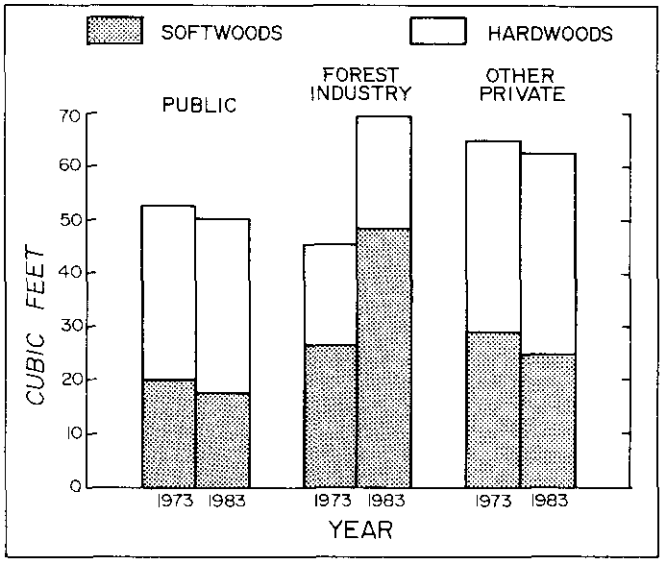


Figure 8.—Net annual growth per acre of timberland, by ownership class and species group, 1973 and 1983.

By region, net annual growth per acre of timberland averaged 53 cubic feet in the Mountains, 58 cubic feet in the Southern Coastal Plain, 62 cubic feet in the Piedmont, and 72 cubic feet in the Northern Coastal Plain. Total hardwood growth increased in the two Coastal Plain Survey Units between 1973 and 1983 but declined in the upland areas of the State by about 10 percent. Reduced hardwood ingrowth plus increased hardwood mortality combined to turn hardwood net growth downward in upland areas.

Increases in softwood net growth also were confined to the Coastal Plain Units, where they averaged 18 percent. The rapid development of pine plantations on forest industry land helped boost softwood ingrowth and survivor growth in the Coastal Plain Units. Reductions in softwood net growth in the Piedmont and Mountain Survey Units more than offset the increases in the Coastal Plain. Softwood net annual growth in the two upland Survey Units dropped to two-thirds of its level in the previous inventory. Declines in softwood ingrowth and survivor growth were evident for both upland Survey Units; softwood ingrowth dropped to one-half its previous volume in the Piedmont. A substantial increase in softwood mortality also contributed to reduced levels of softwood net growth. Softwood mortality in the two upland Units reduced potential net growth there by 27 percent.

Table III.—Annual components of change in the volume of growing stock on timberland, by Survey Unit and species group, North Carolina, 1983

Survey Unit and species group	Gross growth	Components of growth					Mortality	Net growth	Removals	Net change
		Survivor growth	Ingrowth	Growth on ingrowth	Growth on removals	Growth on mortality				
	Million cubic feet									
Southern Coastal Plain										
Softwood	219.1	183.1	28.3	3.4	3.5	0.8	24.7	194.4	142.4	+52.0
Hardwood	126.4	109.7	14.5	.9	1.1	.2	13.4	113.0	58.5	+54.5
Total	345.5	292.8	42.8	4.3	4.6	1.0	38.1	307.4	200.9	+106.5
Northern Coastal Plain										
Softwood	156.3	128.4	22.2	2.5	2.4	.8	26.8	129.5	129.4	+.1
Hardwood	153.8	133.1	17.6	1.2	1.6	.3	13.2	140.6	84.5	+56.1
Total	310.1	261.5	39.8	3.7	4.0	1.1	40.0	270.1	213.9	+56.2
Piedmont										
Softwood	176.5	146.8	24.1	2.1	2.4	1.1	42.0	134.5	125.1	+9.4
Hardwood	231.1	206.2	20.7	1.4	2.3	.5	24.5	206.6	120.1	+86.5
Total	407.6	353.0	44.8	3.5	4.7	1.6	66.5	341.1	245.2	+95.9
Mountains										
Softwood	65.1	54.9	8.7	.3	.7	.5	22.6	42.5	33.8	+8.7
Hardwood	190.5	171.7	16.7	.9	.8	.4	24.0	166.5	51.9	+114.6
Total	255.6	226.6	25.4	1.2	1.5	.9	46.6	209.0	85.7	+123.3
State										
Softwood	617.0	513.2	83.3	8.3	9.0	3.2	116.1	500.9	430.7	+70.2
Hardwood	701.8	620.7	69.5	4.4	5.8	1.4	75.1	626.7	315.0	+311.7
Total	1,318.8	1,133.9	152.8	12.7	14.8	4.6	191.2	1,127.6	745.7	+381.9

In 1983, mortality of all growing stock, statewide, totaled 191 million cubic feet. Compared with 1973, 1983 mortality was up 51 percent for softwoods and 18 percent for hardwoods. Softwoods accounted for 61 percent of the mortality. The leading causes of death for softwoods were insects and suppression. Disease, suppression, and weather were the most prominent causes for hardwood species.

What are the underlying causes of the apparent slowdown in softwood and, to some extent, hardwood growth in the upland areas of North Carolina? There are a number of causes; some of them apply to both softwoods and hardwoods. The following list is not in order of importance.

1. A substantial loss in acreage of timberland. The clearing and diversion of land to other land uses erodes the tree base on which volume growth occurs. Since per-acre growth is also down in the case of softwoods, other factors must also be involved.

2. Another important factor behind slowing softwood and hardwood growth in the Piedmont and Mountains is changing rates of new stand establishment over time. Fewer new hardwood stands have been established in most recent decades than was the case some 50 years ago or before. Hardwood stands are accumulating in the older age classes; as more stands move into the older age classes slower hardwood growth rates can be expected. The importance of adequate levels of pine regeneration can be found in the escalating softwood growth on forest industry land, mentioned earlier. On NIPF land, the rate of pine plantation establishment in the past two decades has not compensated for the reduction in acreage of new natural pine stands established over the same period. Recent reductions in number of softwood and hardwood trees in the smaller diameter classes have resulted from the changes in stand establishment rates over time. Fewer small softwoods and hardwoods have lowered the volume of ingrowth in the upland areas. To the extent that the decline in number of trees extends into the 6-inch and larger diameter

classes, the volume of survivor growth is also reduced since growth is occurring on fewer trees than in the previous inventory.

3. Increased mortality of both softwoods and hardwoods. Since mortality volume is subtracted from gross growth to determine net growth, an increase in mortality has a negative effect on net growth trends.

4. A decline in the rate of individual-tree diameter growth for pines is another factor contributing to the reduction in net growth for softwoods in the Piedmont and Mountains of North Carolina (Sheffield and others 1985). This factor has received the most attention. It is important to remember, however, that softwood net growth in the upland areas of North Carolina would probably have declined because of the above three factors even if diameter growth rates had remained at previous levels. Also, declines in average diameter growth do not automatically translate into lower net growth. The available evidence suggests that the diameter growth slowdown extends back as much as three decades. Thus, a 21-percent increase in net growth measured between 1963 and 1973 occurred in spite of the slowing rates of individual-tree diameter growth during that period. Pine diameter growth reductions should not discourage the use of proven methods of improving productivity.

Photo courtesy of the Division of Forestry, North Carolina Department of Natural Resources and Community Development.

Timber Removals and Product Output

This section and associated appendix tables (36-40) present estimates of timber removals and timber products output in North Carolina for calendar year 1983. Total timber removals were developed from the remeasurement of permanent sample plots. Although annual removals are assigned to a single year (1983), they are based on average removal rates between 1973 and 1983 as determined from remeasurement of permanent sample plots. As such, the reported values are more indicative of the period removal levels than actual removals for a given year at the end of the period.

Estimates of wood receipts, product output, and plant residues were obtained from canvasses of all primary wood-using plants in the State in 1976, 1979, and 1983. The canvasses were conducted by the North Carolina Department of Natural Resources and Community Development. Some 484 primary wood-using plants operated in North Carolina in 1983 (fig. 9).

Felled trees were measured at logging operations throughout the State to obtain utilization factors for each product. These factors combined with remeasurement data from the permanent plots were used to estimate volume of logging residues. Estimates of other removals were developed from the plot remeasurement data.

Little Change in Annual Timber Removals

Annual removals of growing stock during the latest inventory totaled 746 million cubic feet (see table III). Softwoods accounted for 431 million cubic feet, or 58 percent of the total. Softwood and hardwood removal levels have changed little since the previous survey (see figure 6). The gap between softwood growth and removals has narrowed considerably; softwood removals currently equal 86 percent of the annual softwood growth. Hardwood volumes equivalent to only one-half the annual hardwood growth were removed from timberland each year. By ownership, 83 percent of the removal of all species was from NIPF land, 13 percent from forest industry land, and 4 percent from public timberland (appendix table 30). Removals on forest industry land declined by 30 percent since the previous survey period; an 8-percent increase in removals on NIPF land compensated for this reduction.

Timber cut from North Carolina's timberland provided raw material for the State's forest products industry. The forest products industry was the second largest component of North Carolina's economic base in 1980 (Schallau and others 1985). In 1982, the forest products industry employed approximately 119,000 people and generated an annual payroll of more than $1.5 billion (U.S. Department of Commerce 1985). North Carolina leads the South in forest products industry employment.

Timber products accounted for 611 million cubic feet, or 82 percent, of the total removals of growing stock from timberland in 1983 (appendix table 38). About 10 percent of the annual removal of growing stock resulted from cultural practices, land clearing, and other actions where trees are removed from timberland but not used for products. Logging residue, the unused growing-stock volume cut or destroyed during logging operations, made up the remaining 8 percent of the total. Products from sources other than growing stock on timberland added 89 million cubic feet to total roundwood output (appendix table 37). These sources include cull trees, salvable dead trees, trees less than 5.0 inches d.b.h., stumps, tops and limbs of growing-stock trees, and all material taken from nonforest land. The use of 137 million cubic feet of plant byproducts boosted timber products output in North Carolina to 837 million cubic feet in 1983 (appendix table 36).

Saw-Log Output Stable

Saw-log production statistics from the industry canvasses show little evidence of substantial growth of the lumber industry in the State. In the latest survey period, production of saw logs was virtually unchanged from that reported for the previous survey. The lack of growth in saw-log output in North Carolina probably reflects the effects of two major underlying factors: (1) the most recent survey period encompasses two significant recession periods for the building industry, and (2) an increasing volume of imported softwood lumber.

Output of saw logs in North Carolina declined by 2 percent, from 272 to 267 million cubic feet. Saw logs currently account for 37 percent of roundwood output in the State, compared with 43 percent in 1973. Softwood saw-log output increased from 182 to 192 million cubic feet, while hardwood output dropped from 90 to 75 million cubic feet. The decline in hardwood saw-log output is based on rather low production during the mid-1970's, evidenced by low hardwood saw-log output in a 1976 industry canvass. Results from two more recent canvasses (1979 and 1983) show substantially higher hardwood saw-log production than that presented here.

In contrast to the general trend in most areas toward fewer but larger sawmills, the number of sawmills in North Carolina increased from 355 in 1973 to 429 in 1983. Most of the increase occurred in the Piedmont and Mountain regions where large numbers of small sawmills have long existed. Many of these low-volume sawmills close when lumber demand is low and return to production when more favorable conditions return.

Total output of saw logs included 6.0 million cubic feet from plant byproducts (veneer cores) and 8.4 million cubic feet of logs from non-growing-stock sources. Growing stock, almost solely sawtimber-size trees, accounted for 97 percent of the round saw-log output.

North Carolina imports about twice as many saw logs as it exports to other States. Imports account for 9 percent of the

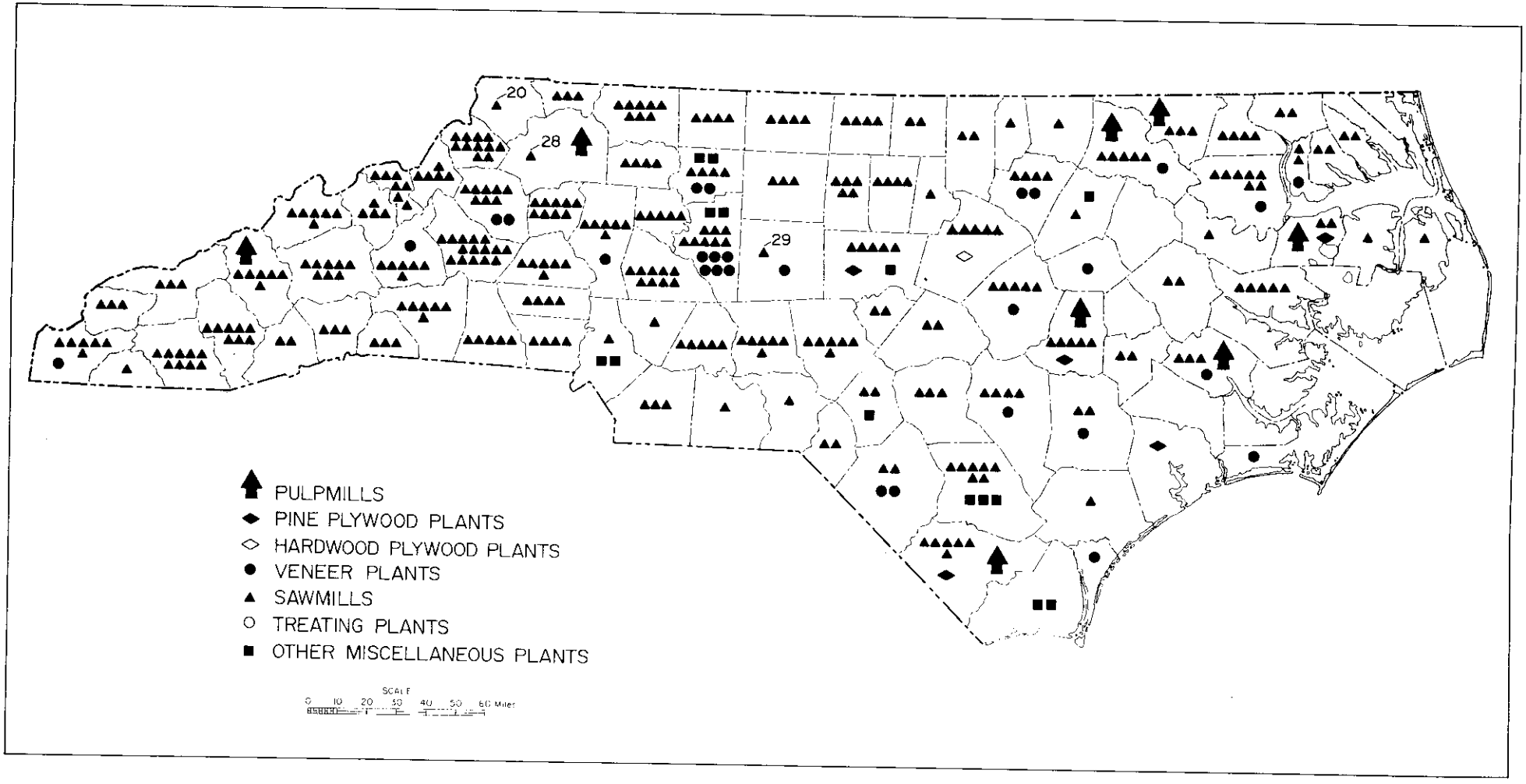


Figure 9.—Location of primary wood-using industries in North Carolina, 1983.

roundwood, saw-log mill receipts; exports account for 5 percent of the round saw logs produced in the State. Interchange of saw logs is mainly with the adjacent States of Georgia, South Carolina, Tennessee, and Virginia.

Pulpwood Production Up Slightly

The pulp and paper industry in North Carolina continued to grow during the past decade, but at a slower pace than in earlier years. Pulpwood production statistics for the last 23 years indicate rather small production increases since 1973, compared with the more substantial increases during the 1960's and early 1970's (fig. 10). Annual production rose from 4.2 million cords in 1973 to 4.8 million in 1983. The statistics also indicate a continuing increase in reliance on the State's abundant hardwoods. Hardwoods accounted for 40 percent of the pulpwood production in 1983, compared with 34 percent in 1973. The daily pulping capacity of eight pulpmills in North Carolina for 1983 totaled 7,875 tons per day, compared with 6,275 tons in 1973.

Pulpwood was the second leading timber product harvested from North Carolina's forests, accounting for 37 percent of the roundwood product output in 1983. More than 259 million cubic feet of roundwood was annually cut for pulpwood, compared with 251 million reported for the previous inventory. The increased use of hardwood plant byproducts has helped boost total pulpwood output from 324 million cubic feet in 1973 to 366 million cubic feet in 1983. Sawmills and other wood-using plants provided pulpmills with 107 million cubic feet of wood in the form of chips and other plant residues in 1983. These materials accounted for 29 percent of total pulpwood output. When plant residues are included, pulpwood is the leading timber product produced by the State's timber products industry; 44 percent of the total output of timber products in 1983 was pulpwood.

North Carolina's exports of round pulpwood exceed imports by 42 percent. In 1983, pulpmills outside the State drew away 24 percent of the round pulpwood produced in the State. Imports made up 18 percent of the round pulpwood receipts at North Carolina pulpmills. The interstate movement of round pulpwood primarily involved the adjacent States of South Carolina and Virginia.

The use of wood chipping equipment has increased the difficulty of distinguishing between roundwood chips and byproduct chips. Although the total 1983 pulpwood production in this report agrees with the North Carolina total in Resource Bulletin SE-79, "Southern Pulpwood Production, 1983," the breakdown between roundwood and byproducts is somewhat different. Results from recent industry canvasses provided a higher but more accurate measure of roundwood chipped and are used in this report.

Domestic Fuelwood Use Soars

The first survey of North Carolina's forest resources in 1938 determined that more wood was used for fuel than any other purpose. Fuelwood output declined steadily throughout the next three and one-half decades as oil, gas, and electricity quickly replaced wood as an energy source. This declining trend reversed during the past 10 years in response to large price increases in conventional heating fuels and electricity. Homeowners, industries, and public agencies have turned to wood as an alternative fuel because of its economic advantages and local abundance. Domestic round fuelwood output from growing-stock trees increased more than threefold from 1973 to 1983 and now totals 79 million cubic feet. Cull trees, dead trees, tops, limbs, saplings, and material removed from nonforest lands added another 51 million cubic feet to boost total domestic fuelwood roundwood output to 130 million cubic feet. Almost 5 million cubic feet of plant byproducts were also used for domestic fuel. Hardwoods account for 86 percent of the roundwood used for domestic fuel. Domestic fuelwood accounts for 21 percent of removals of hardwood growing stock and for 37 percent of total hardwood roundwood product output. An additional 33 million cubic feet of plant byproducts were used as an industrial fuel source.

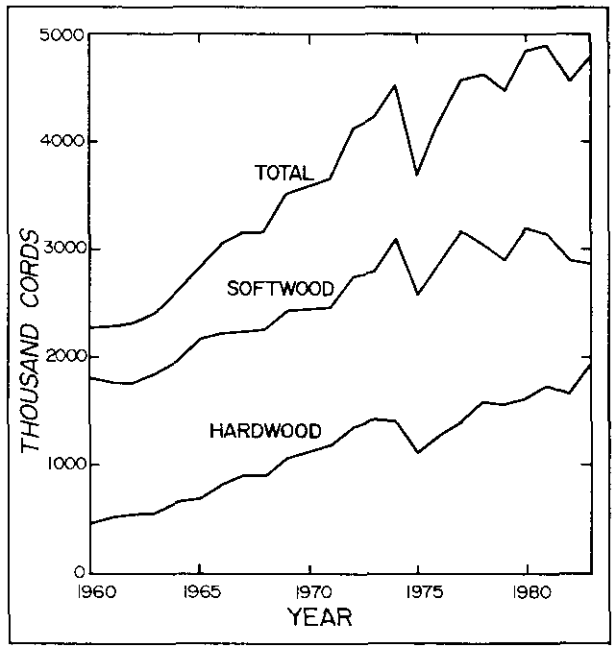
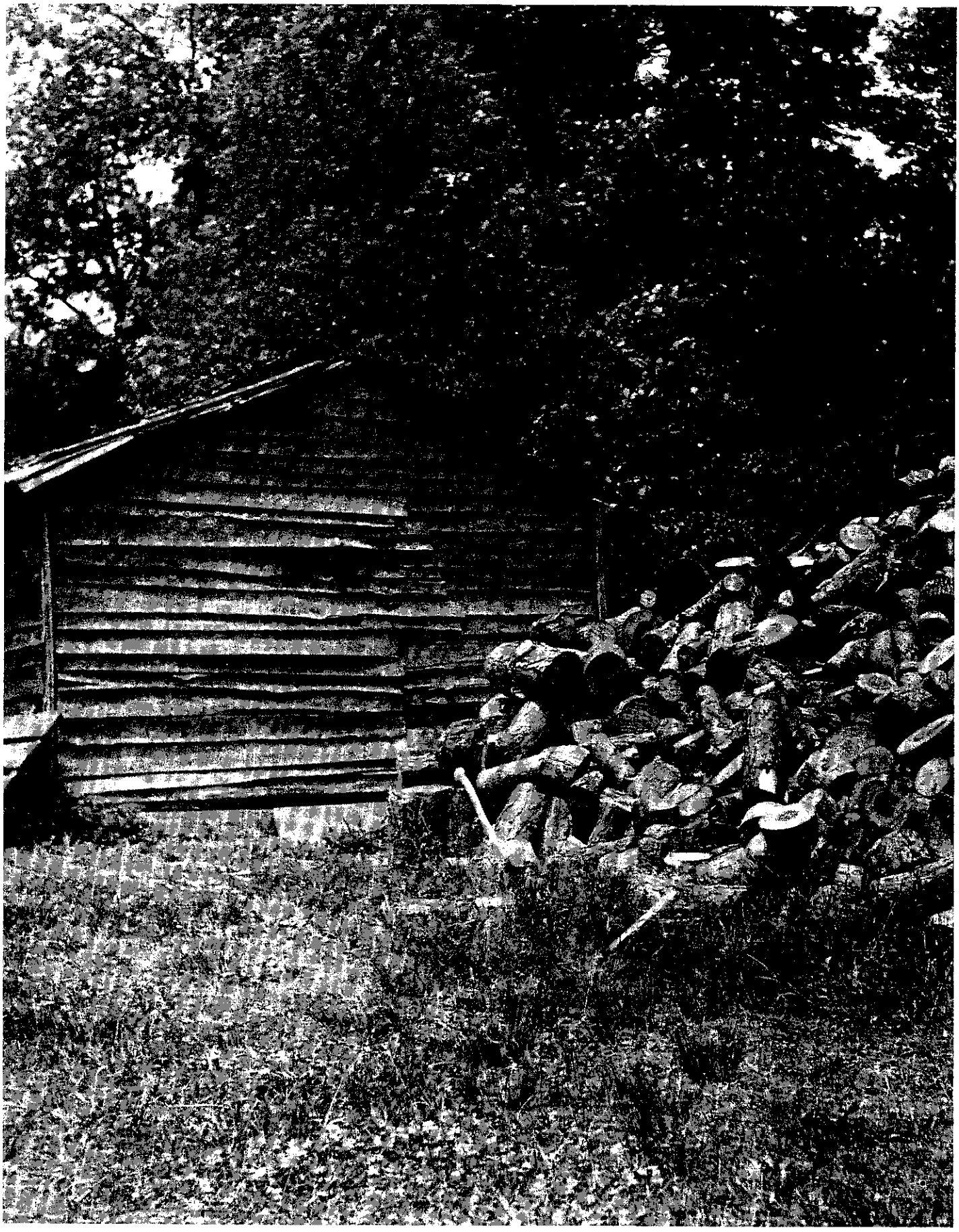


Figure 10.—Pulpwood production in North Carolina, 1960 to 1983.

Veneer-Log Output Down One-Third

Output of veneer logs and bolts declined 33 percent since 1973. The drop was most severe—51 percent—for hardwoods. Hardwood plywood and veneer plants receiving roundwood in 1983 numbered 29, down from 32 in 1973. Output of pine peeler logs for the State's pine plywood industry also declined by 27 percent, even though the number of mills rose from four in 1973 to five in 1983. Several depressed years in the home-building and furniture industries, resultant production drops, and some temporary plant shutdowns have all combined to suppress veneer-log output. At 45 million cubic feet, veneer logs are the fourth leading product harvested from North Carolina's timberlands, accounting for 6 percent of the roundwood output.

The pine plywood, hardwood plywood, and veneer industries imported significant quantities of wood from outside North Carolina. Imports made up 15 percent of softwood peeler log receipts and almost one-fourth of the receipts of hardwood veneer logs.



Output of Other Industrial Products Up

Collectively, the output of poles, pilings, posts, raw material for particleboard, and other miscellaneous products increased from 21 to 24 million cubic feet between 1973 and 1983. These products accounted for only 3 percent of total output and less than 1 percent of roundwood output. Particleboard is the primary product within this group; plant byproducts account for 80 percent of the furnish for these timber products.

The fast-growing oriented strand board and flakeboard product lines did not impact the output presented in this report. Recently completed and planned installations, however, suggest that these products will become increasingly important.

More Plant Residues Utilized

Primary wood-using plants in North Carolina generated an estimated 194 million cubic feet of wood residue in 1983, excluding bark. Only 6 percent of this material went unused. In 1973, about 20 percent of the residues was not used. Increased volumes of plant residues were used for products, litter, mulch, and industrial fuel. The current level of utilization at primary wood-using plants suggests that further increases in product output will probably have to come from roundwood. Any major increase in contribution from plant residues will have to come from expansion of plant output rather than from improvements in utilization.

Improved Timber Utilization

The most recent timber removal and roundwood output data reveal substantial improvement in utilization of growing-stock volume removed from timberland. The proportion of growing-stock removals going into roundwood products has increased from 76 to 82 percent. This change resulted from reduced volumes of logging residue and other removals.

Other removals include the volumes in growing-stock trees cut or destroyed in land clearing; those in trees girdled, poisoned, or removed in cultural operations; and those in trees left standing but removed from timberland because of a land use change. Such removals totaled 74 million cubic feet in 1983, down from 109 million cubic feet in 1973. Other removals still account for 10 percent of the volume of growing stock removed annually. Hardwoods make up just over one-half of the other removal volume.

Logging residue includes the unused, merchantable portions of growing-stock trees cut or destroyed during timber harvesting. The volume of logging residue in 1983 totaled 61 million cubic feet, about 8 percent of growing-stock removals. Logging residues totaled 68 million cubic feet in 1973, or about 9 percent of removals.

While improved utilization of the timber resource is limited by economic feasibility, it is reasonable to expect that additional progress is possible. Another opportunity is to utilize increased volumes of non-growing-stock material and roundwood from other sources for products. In 1983, cull trees, dead trees, tops, limbs, saplings, and material taken off nonforest land accounted for 89 million cubic feet, or about 13 percent, of roundwood output.

Timber Supply Outlook

Although the timber resource is renewable and expandable up to the limits of tree and land capabilities, the benefits of actions taken now will not affect timber supplies for many years. Timber supplies available over the next decade or longer have been determined by actions already taken, actions foregone, and past social and economic changes. In this chapter, we estimate short-term timber supply trends based on resource data. We also examine prospective long-term (30-year estimate) timber supplies given certain assumptions about levels of management.

Pine Regeneration Shortfall

The long-term balance between rates of stand establishment, or regeneration, at the beginning of a rotation and rates of harvesting at the end will be a major factor in determining future timber supplies. Thus, it is helpful to examine current harvest: regeneration relationships.

Between 1974 and 1984, approximately 260,000 acres annually underwent a final harvest in North Carolina (table IV). Areas harvested and subsequently cleared to a nonforest land use are excluded from this figure. Area regenerated successfully each year totaled about 86 percent of the final harvest acreage, or 224,000 acres (table V). Pine stands account for almost all the gap between final harvest and regeneration. Nearly 125,000 acres of pine stands (mostly natural) were harvested each year; in contrast, about 96,000 acres were regenerated each year back to a pine type. Over two-thirds of the pine regeneration was due to planting.

NIPF and public lands accounted for all the shortfall in acres of pine regeneration. About 85,000 acres of pine stands were harvested annually on NIPF land, while only 50,000 acres of new pine stands were added each year on this ownership. More than 6,000 acres of pine stands on public land were harvested each year, about 36 percent more than the area regenerated to pine. About 23 percent of the pine regeneration on NIPF land occurred as planting or natural reversion on nonforest land. The remainder usually occurred after a stand harvest on lands already classified as timberland. In some cases the stand harvest occurred prior to the fourth inventory in 1974, with the new pine stand becoming established between 1974 and 1984.

Forest industry efforts to grow pine on much of the land under its control are demonstrated by its harvest:regeneration ratio. Between 1974 and 1984, about 33,000 acres of pine stands on forest industry land were harvested annually during the 1974 to 1984 period. During the same period, forest industry established nearly 42,000 acres of new pine stands each year. More than 95 percent of the forest industry pine regeneration total was due to pine plantation establishment. More than 43 percent of the total acreage regenerated to pine occurred on forest industry land. Thus, forest industry's share of the pine inventory in North Carolina is likely to rise sharply in the next one to two decades from the current 15 percent.

The area artificially regenerated has averaged about 73,000 acres annually for the last two survey periods—1964 to 1974 and 1974 to 1984. There have been significant changes by ownership class, however. Area artificially regenerated on forest industry land has declined from 54,000 to 42,000 acres annually. The area planted annually on NIPF land jumped from 15,000 to 28,000 acres, indicating substantial improvement in pine regeneration on this ownership. The current rate of planting on public land, 4,000 acres each year, has not changed substantially.

Rates of final harvesting and regeneration for hardwood-dominated stands, broad management classes oak-pine, upland hardwood, and lowland hardwood, are nearly in balance in North Carolina. Collectively, about 135,000 acres of these stands were harvested each year between 1974 and 1984; more than 127,000 acres were regenerated to these forest types each year. Most of the small deficit in hardwood regeneration to these hardwood dominated stands was in lowland hardwood. The near balance in hardwood harvest:regeneration ratio does not mean that there is not a need for improved management of hardwoods, particularly the establishment of vigorous, high-quality hardwood regeneration. The hardwood regeneration totals include a diversity of stands, heterogeneous as to species mix and quality, site quality and suitability for growing hardwood, and prior stand type. The next chapter will explore treatment needs for hardwoods related to stand regeneration and treatment.

Additional Cutting on 165,000 Acres Annually

Significant volumes of timber were removed from another 165,000 acres of timberland each year during partial harvests, commercial thinnings, and other miscellaneous cuttings. Partial harvests occurred on 60,000 acres each year. These cuttings included a preponderance of high grading with a minor component of true selection cutting. More than 92 percent of the partial harvests occurred on NIPF land; nearly four-fifths of the total occurred in oak-pine or hardwood stands. Commercial thinning occurred on nearly 30,000 acres each year; about 43 percent of the commercial thinning took place in natural pine stands, another 36 percent in pine plantations, and the remaining 21 percent in oak-pine and hardwood stands. Stand improvement cuttings and other miscellaneous cutting occurred on 74,000 acres annually.

Prospective Supply From Plantations

To date, pine plantations in North Carolina have contributed only minor amounts to the supply of timber in the State. During the past remeasurement period, less than 4 percent of the softwood growing-stock removals came from pine plantations. Since more than two-thirds of all pine regeneration during the past decade was due to planting, we can expect plantations to provide an increasing share of softwood timber supplies in coming years.

Field crews determined the origin of each sample stand visited during the latest survey. Evidence of tree planting or direct seeding was observed on more than 1.7 million acres of timberland (table VI). The acreage of plantations by Survey Unit suggests that 78 percent of the prospective supply from plantations will be in the Coastal Plain region. About 15 percent of all timberland in these two Units are plantations; nearly one-third of all pine stands there are planted. Plantation acreage distribution by age class indicates that the rate of planting apparently peaked in the two Coastal Plain Survey Units at least 10 years ago. Area of plantations established during the most recent decade (0- to 10-year age class) is 8 percent lower than that established during the previous decade (11- to 20-year age class). This reduction in acreage planted is due to the reduction in planting on forest industry land, mentioned earlier. The reduction on forest industry land was also ac-

Table IV.—Area of timberland treated or disturbed annually, by broad management and ownership classes, North Carolina, 1974-1984

Broad management [a] and ownership classes [b]	Major stand treatments				Natural disturbance
	Final harvest	Partial harvest [c]	Commercial thinning	Other cutting	
	Acres				
Pine plantation					
Public	—	—	842	25	704
Forest industry	936	—	4,189	2,269	8,724
Other private	1,721	680	5,539	725	5,759
Total	2,657	680	10,570	3,019	15,187
Natural pine					
Public	6,466	21	4,047	1,637	7,336
Forest industry	32,259	816	1,262	4,382	11,904
Other private	83,538	11,736	7,629	15,951	67,489
Total	122,263	12,573	12,938	21,970	86,729
Oak-pine					
Public	904	840	352	1,755	2,248
Forest industry	5,478	75	368	329	1,286
Other private	28,356	9,234	1,016	9,264	20,825
Total	34,738	10,149	1,736	11,348	24,359
Upland hardwood					
Public	2,998	1,659	531	769	4,922
Forest industry	8,144	357	—	674	910
Other private	64,255	23,284	2,775	31,122	39,591
Total	75,397	25,300	3,306	32,565	45,423
Lowland hardwood					
Public	568	319	—	—	634
Forest industry	5,560	662	312	1,812	4,396
Other private	18,593	10,683	997	3,785	19,921
Total	24,721	11,664	1,309	5,597	24,951
All classes					
Public	10,936	2,839	5,772	4,186	15,844
Forest industry	52,377	1,910	6,131	9,466	27,220
Other private	196,463	55,617	17,956	60,847	153,585
Total	259,776	60,366	29,859	74,499	196,649

[a]Broad management class before treatment or disturbance.
[b]Ownership class in 1984. Forest industry includes lands under long-term lease.
[c]Includes high grading and some selective cutting.

companied by a significant reduction in timber removals on this ownership. A possible explanation for some of these changes is that industry was quickly converting natural stands on its own land to plantations during the late 1960's and 1970's and has since shifted to a lower, more sustainable level of harvest and plantation establishment.

In the Piedmont only 6 percent of the timberland is planted. Nearly one-half of these plantations are 10 years old or less, a result of increased planting on NIPF land in this region. Only 1 percent of the timberland in the Mountains is planted. The distribution and extent of plantations versus natural stands indicates that most timber supplies in the near term will continue to come from natural stands. Even in the Coastal Plain, natural stands will have to be relied on for the bulk of softwood supplies for another 10 to 15 years.

Table V.—Area of timberland regenerated annually, by broad management and ownership classes, North Carolina, 1974-1984

Broad management[a] and ownership classes[b]	Total regeneration	Type of regeneration					
		Artificial regeneration after a harvest	Natural regeneration after a harvest	Other artificial regeneration on forest land	Other natural regeneration on forest land	Artificial regeneration on nonforest land	Natural reversion on nonforest land
	Acres						
Pine plantation							
Public	3,363	2,027	—	882	—	454	—
Forest industry	39,660	28,490	—	11,170	—	—	—
Other private	23,409	16,824	301	4,487	316	1,072	409
Total	66,432	47,341	301	16,539	316	1,526	409
Natural pine							
Public	1,399	—	1,326	—	—	—	73
Forest industry	1,949	—	1,343	—	606	—	—
Other private	26,717	—	10,031	—	6,532	—	10,154
Total	30,065	—	12,700	—	7,138	—	10,227
Oak-pine							
Public	1,379	—	770	—	609	—	—
Forest industry	2,962	713	1,272	576	401	—	—
Other private	29,525	3,366	17,055	1,193	5,795	—	2,116
Total	33,866	4,079	19,097	1,769	6,805	—	2,116
Upland hardwood							
Public	4,170	364	2,008	—	1,798	—	—
Forest industry	2,830	269	2,084	159	318	—	—
Other private	67,324	1,015	52,174	—	9,975	—	4,160
Total	74,324	1,648	56,266	159	12,091	—	4,160
Lowland hardwood							
Public	173	—	173	—	—	—	—
Forest industry	2,247	318	1,770	—	—	159	—
Other private	16,577	—	10,174	—	3,607	—	2,796
Total	18,997	318	12,117	—	3,607	159	2,796
All classes							
Public	10,484	2,391	4,277	882	2,407	454	73
Forest industry	49,648	29,790	6,469	11,905	1,325	159	—
Other private	163,552	21,205	89,735	5,680	26,225	1,072	19,635
Total	223,684	53,386	100,481	18,467	29,957	1,685	19,708

[a]Broad management class after regeneration.

[b]Ownership class in 1984. Forest industry includes lands under long-term lease.

Few Young Natural Pine Stands

Stand-age profiles provide a more detailed look at the age structure of North Carolina's timberland (fig. 11). In the illustration, timberland is divided into pine forest types and hardwood forest types. These broad types are separated further into pine plantation or natural pine, and oak-pine or hardwood. Stands poorly stocked (generally less than 60 percent) with suitable trees of roughly equal size are excluded from the age classes and are designated as lacking a manageable stand.

Fewer natural pine stands have fed into the population in recent years than 20 to 40 years ago. Until the most recent decade (0- to 10-year age class), pine plantation establishment has more than compensated for the reduced area of natural pine established. The dropoff in pine acreage in the youngest age class plus the changed composition of more recent stands from natural to plantation are causes for the reduction in small-diameter pine trees found in the most recent inventory. In its entirety, the pine age structure does not support dire predictions of pending softwood timber shortages. Pine stands are concentrated in the younger age classes, where the most rapid growth occurs.

By ownership, the outlook is quite different from that for the State as a whole. Reductions in softwood growth over the past decade and the present pine age structure indicate that reductions in pine timber supplies on NIPF land are likely in the next one to two decades. NIPF owners have a disproportionate acreage of pine stands between 21 and 40 years of age (appendix table 13). Pine stands 20 years and younger make up considerably less area than these older stands. Pine plantation establishment in the past two decades on NIPF land, while rising substantially, has failed to compensate for reductions in establishment of natural pine stands. Once these older stands on NIPF land are harvested, they will not be fully replaced because equivalent pine acreages do not now exist in the 0- to 20-year classes. NIPF landowners currently account for 80 percent of the pine removals in North Carolina; they will be hard pressed to continue this size of contribution in the long run unless increases in pine stand establishment are achieved.

The age structure of forest industry pine stands explains large softwood growth increases on this ownership during the past decade (appendix table 12). Future pine timber supplies should

Table VI.—Area of timberland, by Survey Unit, stand origin, and stand-age class, North Carolina, 1984

Survey Unit and stand origin[a]	All classes	Stand-age class (years)						
		0-10	11-20	21-30	31-40	41-50	51-60	61+
	Thousand acres							
Southern Coastal Plain								
Planted	782.8	299.1	323.0	158.9	1.8	—	—	—
Natural	4,482.9	640.3	548.4	495.8	730.7	715.7	616.4	735.6
Total	5,265.7	939.4	871.4	654.7	732.5	715.7	616.4	735.6
Northern Coastal Plain								
Planted	568.8	237.4	263.0	65.2	3.2	—	—	—
Natural	3,192.5	461.4	242.0	364.5	469.6	473.3	481.7	700.0
Total	3,761.3	698.8	505.0	429.7	472.8	473.3	481.7	700.0
Piedmont								
Planted	332.2	160.0	88.5	75.6	8.1	—	—	—
Natural	5,182.7	608.3	604.6	654.5	782.1	770.9	697.1	1,065.2
Total	5,514.9	768.3	693.1	730.1	790.2	770.9	697.1	1,065.2
Mountains								
Planted	47.8	8.4	14.3	14.2	6.9	4.0	—	—
Natural	3,860.6	238.9	151.9	246.0	448.6	675.9	668.6	1,430.7
Total	3,908.4	247.3	166.2	260.2	455.5	679.9	668.6	1,430.7
State								
Planted	1,731.6	704.9	688.8	313.9	20.0	4.0	—	—
Natural	16,718.7	1,948.9	1,546.9	1,760.8	2,431.0	2,635.8	2,463.8	3,931.5
Total	18,450.3	2,653.8	2,235.7	2,074.7	2,451.0	2,639.8	2,463.8	3,931.5

[a]Planted acreage includes all stands in which evidence of planting or direct seeding exists.

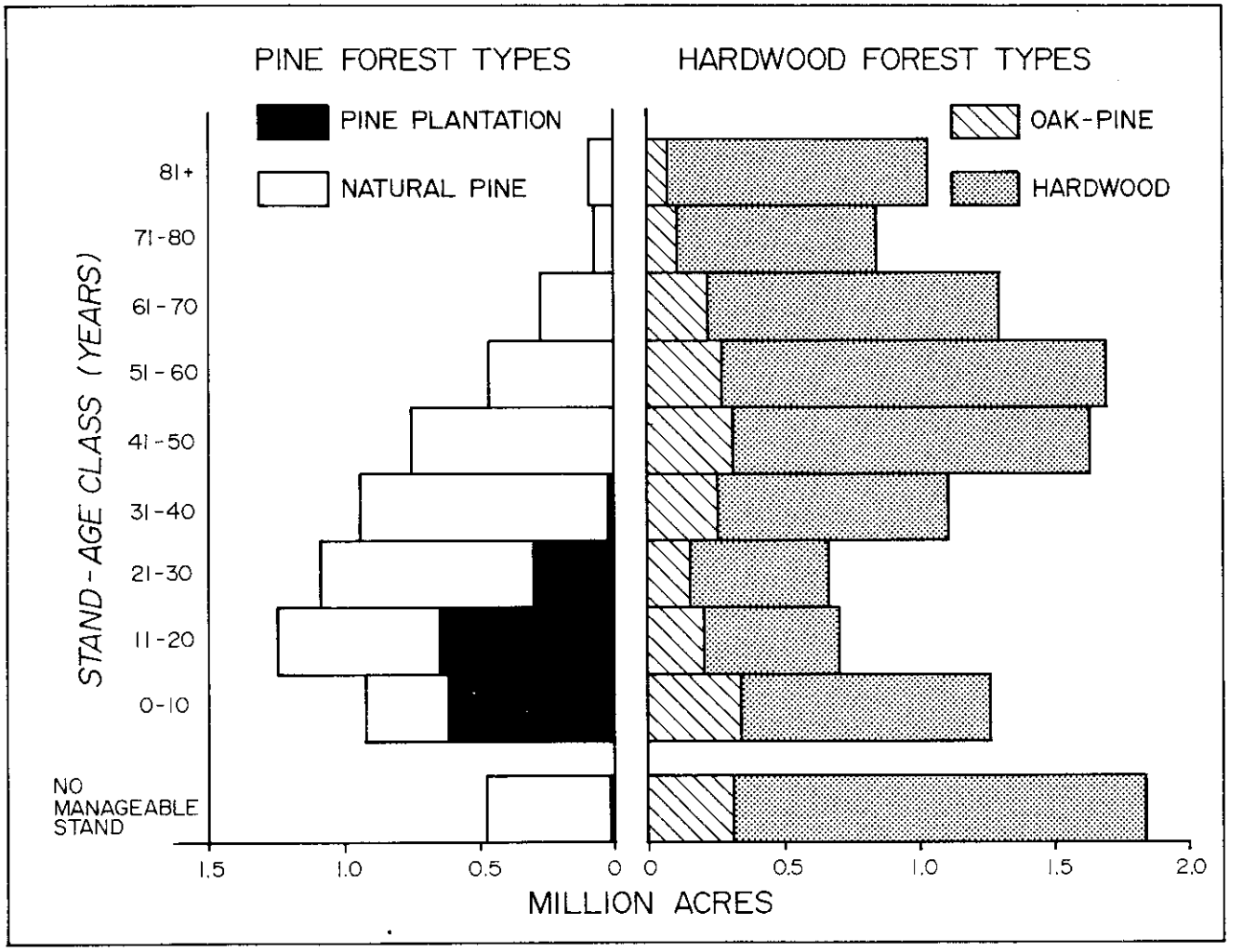


Figure 11.—Profile of area of timberland, by stand-age and broad management classes, North Carolina, 1984.

also be enhanced by the concentration of pine stands now less than 20 years of age. The large acreage in the 11- to 20-year age class should boost available pine timber supplies in the next 10 to 15 years. In the longer run, supplies of pine timber on forest industry land may be somewhat erratic because of the inconsistent rate of planting evident in the youngest age class.

Public forests supplied only 3 percent of the pine removals during the latest survey period. Given the limited pine acreage on public land and the diversity of management objectives, little increase in volume of pine timber supplies can be expected from these forests in coming years.

Almost 0.5 million acres of pine forests are so sparsely stocked that a manageable stand does not exist. These stands contain an average of only 298 cubic feet of growing stock per acre. Pond pine and longleaf pine stands on the Coastal Plain account for two-thirds of this acreage.

Most Hardwood Stands Are Over 40 Years Old

The age profiles for hardwood and oak-pine stands in North Carolina indicate an accumulation of acreage in the older age classes. Excluding hardwood stands that do not have a manageable stand of trees, almost two-thirds of the hardwood types are currently over 40 years of age. On the surface, it would seem that this accumulation of older, hardwood-dominated stands should provide ample supplies of hardwood timber for the forseeable future. Growth:removal relationships for hardwood are still positive, and the harvest of 135,000 acres of these stands annually poses no serious threat of depleting the hardwood resource. In fact, growth totals suggest that the harvest might be increased substantially. This observation, however, fails to discount for physical terrain restrictions, owner restrictions, and a host of other factors related to the heterogeneous hardwood resource and its users. This report does not analyze the impact of these restrictions but we acknowledge that they significantly reduce effective hardwood timber supplies. For instance, some 14 percent of the older hardwood stands are on public timberland; volume on this land is not as available as that on private timberland. Steep slopes or year-round water problems on private timberland limit the availability of timber on another 21 percent of older hardwood stands. These two factors alone seriously restrict availability of hardwood timber in 35 percent of the hardwood stands now more than 40 years old.

A sharp dropoff in acreage of well-stocked hardwood stands less than 40 years old can potentially detract from future hardwood timber supplies. The most serious shortage of young hardwood is in the 11- to 30-year age range. An increase in establishment of young hardwood stands has occurred in the last decade. Almost all this increase in acreage of young hardwood stands occurred on NIPF land and is attributed to increased stand harvest on this ownership. More than 41 percent of all hardwood and oak-pine stands in the 0- to 10-year age class resulted from the harvest of a pine stand; an additional 14 percent was oak-pine before harvest. The heterogeneous species mix on these acres, the wide range of tree sizes due to significant numbers of residuals, and the generally poor quality of trees limit the productivity of these stands and their contribution to future hardwood timber supplies.

More than 1.8 million acres of oak-pine and hardwood stands are so poorly stocked that a manageable stand of trees does not exist. Volume of growing stock averages 513 cubic feet per acre in these stands. Timber cutting and natural disturbances contributed to the current poor stocking of 55 percent of these stands; approximately 35 percent of the stands were pine types prior to cutting or disturbance. Conditions on the remaining acreage were, in most cases, influenced by timber cutting prior to the latest remeasurement period.

Timber Supply Projections

In this section, we provide more objective estimates of future timber supply. More than the usual amount of uncertainty shadows projections of prospective timber supplies in North Carolina. The latest inventory measured significant slowdowns in many of the long upward trends in inventory, growth, and removals. In some cases, we identified reversals of past trends. Questions about future trends for such important factors as tree diameter and stand growth rates, mortality losses, timberland acreage, and tree planting rates hamper any projection of timber supply.

There is just as much uncertainty about the future demand for timber products in North Carolina as there is about supply. Most estimates of future timber demands are developed at the national and regional levels. It is difficult to allocate these demand estimates by State. In recent years, a sharp increase in imports of timber products from outside the Nation has softened demands on the domestic resource. The recent increase in fuelwood use may or may not continue, depending upon what happens with alternative sources or energy. Attempts to substitute more hardwood for pine in some of the conventional products further clouds the outlook by species.

Despite uncertainty about the future and limited success of past projections, this assessment of North Carolina's timber resources would be incomplete without some estimates of prospective timber supplies. A major southwide reassessment of future timber supplies is currently underway. A State allocation of these regional results will be available when the study is completed. Since these results are not available at this time, an independent effort was made to project North Carolina's timber resources ahead for 30 years. Some differences can certainly be expected when the regional projections are completed and the State allocations are made.

Since the area assumptions in the southwide study have been made by State, the same estimates developed for North Carolina were accepted and used in these projections. Area of timberland is assumed to decline by another 1.2 million acres over the next 30 years, with most of this decline occurring within the next 10 years. The area estimates were developed from a land use model that relates changes in timberland to changes in population, personal income, and land use incomes from forestry and agriculture (Alig 1986). Recent changes in farm policies might alter these past relationships. The best guess is that new policies would reduce the assumed decline in timberland.

Most recent projections of timber supply have been made by using the Timber Resource Analysis System (TRAS). This analysis utilized a new model, the Timber Resource Inventory Model (TRIM), to project timber inventories and timber growth (Tedder 1983). This is the model being used in the southwide study. Whereas TRAS projects annual numbers of trees and their associated volumes by species and diameter classes, TRIM is an area-based, yield-table system that projects acres by type and stand age for periods consistent with the stand age classes. In the North Carolina projections, 5-year age classes were used.

Area of timberland in North Carolina was divided into three broad ownership classes: (1) public, (2) forest industry, and (3) other private. Within each of these ownership classes, the area of timberland was further divided into four broad management types: (1) hardwood, (2) mixed pine-hardwood, (3) natural pine, and (4) pine plantations. Empirical yield tables were developed for each of these management types blended across the range of sites and stocking levels. Yields 10 percent higher than those developed for existing pine plantations were used for a fifth management type intended to reflect the results of genetic improvement and more intensive management. Projected area estimates by ownership and management type from the southwide study and historical rates of regeneration and shifts among management types guided the overall projections.

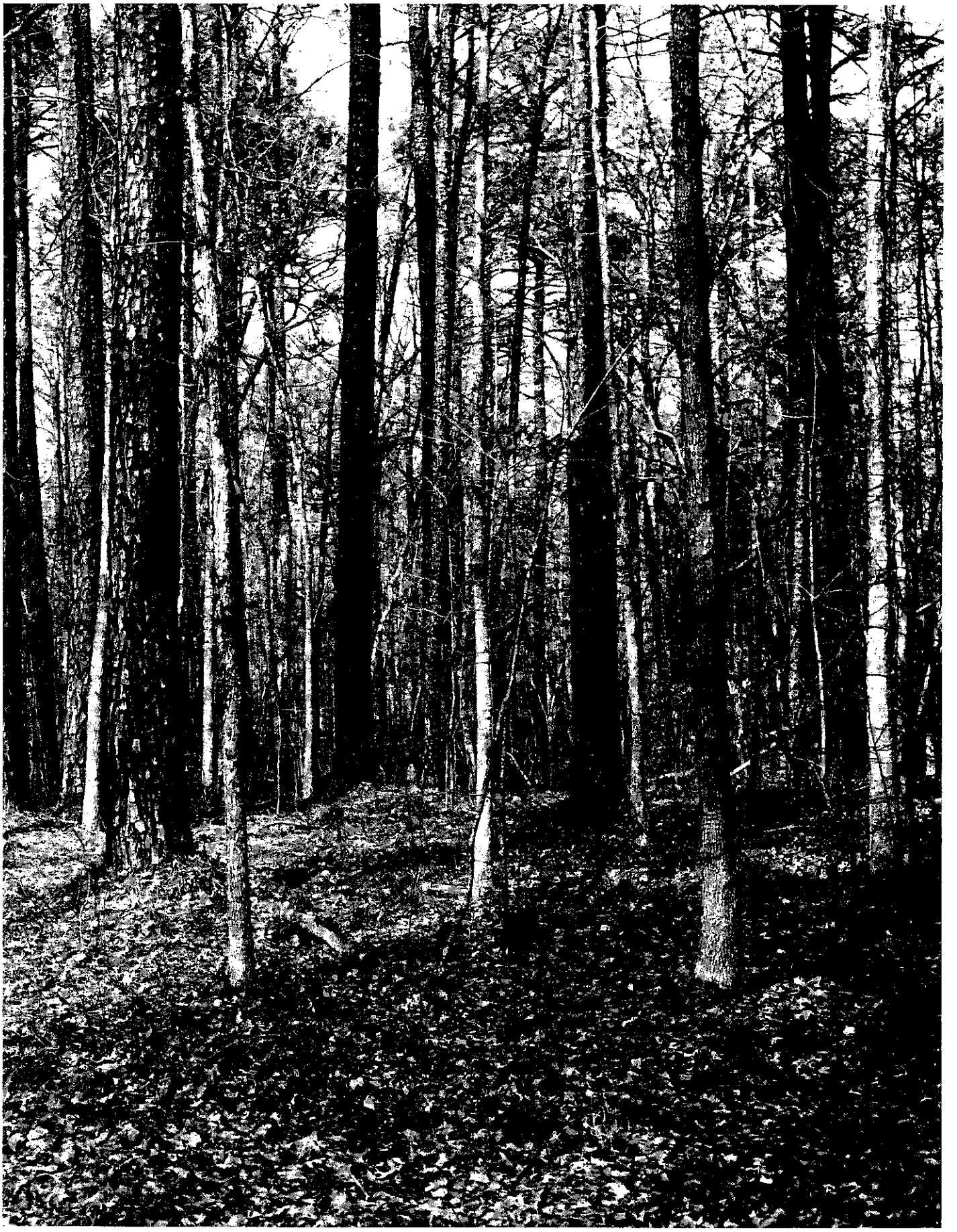
In the absence of any firm estimate of timber demand, by State, near maximum increases were assumed in timber removals over the next 30 years, without significantly reducing existing inventories. Because hardwood growth greatly exceeds hardwood removals at the beginning of the projections, some further buildup in hardwood inventories is assumed. Although the projections were made by ownership class, the results are presented for all owners combined (appendix table 41).

With the assumptions used, the TRIM results indicate that the decline in softwood volume growth experienced on NIPF lands between 1974 and 1984 will continue at least through 1994. This prospective reduction in softwood growth on NIPF land more than offsets a further increase in softwood growth on industry lands. The TRIM projections also point to some overall decrease in hardwood volume growth over the next 10 years across most ownerships. Most of the prospective decrease in softwood growth on NIPF land is attributed to inadequate regeneration of pine following harvesting in past years. The prospective decrease in hardwood growth is attributed to an accumulation of older hardwood stands along the flat part of the yield curves. Overall, the net annual growth of

growing stock is expected to decrease by more than 10 percent over the next decade. Growth is then projected to turn upward and approach 1.2 billion cubic feet by 2013.

The demand assumption results in an 88-percent increase in annual removals of growing stock between 1983 and 2013. Hardwoods account for more than three-fourths of this prospective increase. An increase of this magnitude in hardwood cut would require much greater substitution of hardwood for pine in the pulp and paper industry, in conventional building products, and in the development of new products. With the assumptions used, the prospective softwood resource would support a 35-percent increase in removals without any significant reduction of existing inventories. Practically all of the increase in softwood cut would have to come from industry and public land. The hardwood resource will support an increase in cut across all ownerships.

The projection results reflect the impacts of past and present resource conditions and assumptions about future resource trends. No significant improvements in management have been assumed. Since many acres of timberland are understocked and not under intensive management, there are opportunities to increase prospective supplies toward the end of the projection period and beyond through the application of improved management practices.



Management Opportunities

Prospective changes in softwood timber supplies and the ever-present demand for quality hardwood require an objective assessment of opportunities to improve the timber resource in terms of quantity and quality. The implementation of actions to achieve these goals is constrained by a shrinking timberland base, environmental concerns, a diversity of owner attitudes and objectives, and the high costs of stand management. However, these limitations only intensify the need to take action on all acres possible.

Treatment opportunities discussed in this chapter are based on conditions encountered in each sample stand; treatments that would significantly improve growth and quality of the stand were assigned to each plot. The assigned treatment opportunities describe those actions needed to improve growing conditions, not all actions that could be undertaken. For instance, a vigorously growing, young hardwood stand would not be regarded as a harvest opportunity, even though it contains substantial volumes that could be harvested. Stand conditions and treatment opportunities vary widely by ownership and stand type (table VII).

Adverse Sites Limit Opportunities on 15 Percent of Timberland

Opportunities to undertake stand management are limited on 2.8 million acres of timberland by steep slopes or year-round excesses of water. Steep slopes (40 percent and steeper) make up 84 percent of these adverse sites; the bulk of the acreage classified as adverse supports hardwood stands. Public timberland includes a disproportionate share of these adverse sites. Nearly 40 percent of all public timberland is classed as adverse; most of these 0.8 million acres are on national forest land in the Mountains. In contrast, only 8 percent of forest industry land and 13 percent of NIPF land are classified as adverse.

Timber was cut from less than 1 percent of the acres classed as adverse each year during the past decade. The comparable rate for operable sites was more than three times as great. Net annual growth of all species on adverse sites was more than triple the volume of removals. Because of the relative absence of timber cutting over the years, stand volume averaged 2,066 cubic feet of growing stock per acre on adverse sites, 40 percent more than the comparable volume on operable sites. Forest biomass totaled 120 tons per acre.

Because of the difficulties of practicing intensive management on these acres and the relative absence of such management, adverse sites are excluded from the management opportunities in table VII. These stands should not be ignored as resources to be managed, however. Site limitations only restrict the type of management on these acres. Less intensive stand management is often a viable option.

Half the Timberland Supports Stands in Good Condition

Nearly 9.2 million acres, or 50 percent of North Carolina's timberland, supported stands in relatively good condition and on sites not classed as adverse. These stands were usually 60 percent or better stocked with immature trees of acceptable quality and free from significant damage or competition. Volume of growing stock on these acres averaged 1,482 cubic feet per acre; forest biomass averaged 82 green tons.

Exclusive of acres classified as adverse, 61 percent of the stands on forest industry were in good condition, compared with 58 percent on NIPF land and 57 percent on public land. The proportion of timberland suitable for intensive management and in good condition ranged from a low of 48 percent for lowland hardwood to 77 percent for pine plantations. About three-fifths of the comparable acreage in natural pine, oak-pine, and upland hardwood was in relatively good condition.

Although the inclusion of stands in this treatment opportunity category implies that they should continue to be reasonably productive over the next decade in their present condition, it certainly does not preclude the undertaking of actions to further improve these stands. No doubt, these stands will provide a substantial share of the State's timber supply in the next decade and beyond.

Opportunities on 6.4 Million Acres

More than 6.4 million acres of North Carolina's timberland offer significant opportunities to improve the quantity and quality of the State's timber supply. Conditions on these acres range from deficit stocking to overmaturity. Six management opportunities are identified.

1. *Salvage and regenerate seriously damaged stands on 59,000 acres.* Pine and oak-pine stands dominated the salvage opportunity, making up more than three-fourths of the total. Insects were the primary damaging agent in these stands. Stands needing salvage averaged 49 years of age and contained 2,204 cubic feet of growing stock and 123 green tons of forest biomass per acre. Further mortality and growth loss will occur unless these stands are liquidated and regenerated to appropriate species. A larger acreage would be assigned to this category were it not for the fact that damaging agents often cause substantial mortality, reducing stand stocking below acceptable levels. Such stands are included in the regeneration opportunity.

2. *Harvest and regenerate mature stands on 1.9 million acres.* These stands are characterized by high volumes and older ages; volume of growing stock averaged 2,679 cubic feet per acre and forest biomass more than 141 green tons per acre. The average age was 76 years. Slow growth rates and high

Table VII.—Area of idle cropland and timberland, by broad management, ownership, and treatment opportunity classes, North Carolina, 1984

Broad management and ownership classes[a]	Total area	Broad treatment opportunity class							
		Salvage	Harvest	Commercial thinning	Other stand improvement	Stand conversion[b]	Regeneration[c]	Stands in relatively good condition	Adverse sites or conditions[d]
	Thousand acres								
Idle cropland									
Public	—	—	—	—	—	—	—	—	—
Forest industry	—	—	—	—	—	—	—	—	—
Other private	470.6	—	—	—	—	—	470.6	—	—
Total	470.6	—	—	—	—	—	470.6	—	—
Nonstocked forest									
Public	28.0	—	—	—	—	—	18.9	—	9.1
Forest industry	78.9	—	—	—	—	—	76.9	—	2.0
Other private	221.3	—	—	—	—	—	219.0	—	2.3
Total	328.2	—	—	—	—	—	314.8	—	13.4
Pine plantations									
Public	108.2	0.9	—	11.4	4.8	—	2.9	84.2	4.0
Forest industry	1,036.9	—	—	212.3	26.5	3.7	7.2	784.0	3.2
Other private	468.7	—	—	67.1	17.7	3.7	3.9	365.0	11.3
Total	1,613.8	0.9	—	290.8	49.0	7.4	14.0	1,233.2	18.5
Natural pine stands									
Public	479.0	5.7	56.9	13.2	10.8	—	102.4	222.8	67.2
Forest industry	472.6	2.8	50.8	56.9	26.1	10.2	40.5	279.9	5.4
Other private	3,674.4	22.2	383.2	438.2	310.7	9.5	206.0	2,156.7	147.9
Total	4,626.0	30.7	490.9	508.3	347.6	19.7	348.9	2,659.4	220.5
Oak-pine stands									
Public	217.8	—	43.6	—	9.2	—	55.5	70.3	39.2
Forest industry	205.3	—	20.0	2.4	23.3	—	18.7	114.6	26.3
Other private	1,828.9	13.3	203.6	10.2	204.0	14.4	210.4	1,037.9	135.1
Total	2,252.0	13.3	267.2	12.6	236.5	14.4	284.6	1,222.8	200.6
Upland hardwood stands									
Public	936.2	—	63.0	—	10.3	4.4	37.7	213.6	607.2
Forest industry	229.0	—	21.2	—	36.8	2.8	25.8	95.5	46.9
Other private	5,836.2	8.1	604.8	26.9	467.0	111.8	619.6	2,674.9	1,323.1
Total	7,001.4	8.1	689.0	26.9	514.1	119.0	683.1	2,984.0	1,977.2
Lowland hardwood stands									
Public	152.4	—	12.9	—	11.2	2.7	18.5	71.9	35.2
Forest industry	478.4	—	98.5	6.1	42.7	7.4	67.5	131.0	125.2
Other private	1,998.1	6.4	349.1	24.1	163.6	46.9	291.1	860.5	256.4
Total	2,628.9	6.4	460.5	30.2	217.5	57.0	377.1	1,063.4	416.8
All classes									
Public	1,921.6	6.6	176.4	24.6	46.3	7.1	235.9	662.8	761.9
Forest industry	2,501.1	2.8	190.5	277.7	155.4	24.1	236.6	1,405.0	209.0
Other private	14,498.2	50.0	1,540.7	566.5	1,163.0	186.3	2,020.6	7,095.0	1,876.1
Total	18,920.9	59.4	1,907.6	868.8	1,364.7	217.5	2,493.1	9,162.8	2,847.0

[a]*Forest industry includes lands under long-term lease.*

[b]Areas occupied with species unsuitable for the site from the standpoint of timber production.

[c]Includes 164.4 thousand acres where good-quality hardwood regeneration could be accomplished by felling residual trees to release advance understory hardwood reproduction and promote stump sprouting.

[d]Areas where management opportunities are severely limited because of steep slopes or poor drainage.

mortality are probable on these acres in their present condition. Hardwood stands accounted for 60 percent of this opportunity, pine stands 26 percent, and oak-pine stands the remaining 14 percent. More than four-fifths of the harvest opportunity occurs on NIPF land. An additional 0.8 million acres of timberland in the adverse sites category in table VII were classified as harvest opportunities.

3. *Thin young, immature stands densely stocked with merchantable trees on nearly 0.9 million acres.* These stands averaged 27 years of age and were so heavily stocked that crop trees were receiving substantial competition from each other. The opportunity is to thin these stands, concentrating future growth on fewer trees while maintaining rapid stand growth. Stands in need of commercial thinning supported an average of 2,493 cubic feet of growing stock and 124 tons of forest biomass per acre. Pine stands accounted for 92 percent of the commercial thinning opportunity; plantations contributed about 36 percent of the pine total.

Few hardwood stands were assigned a commercial thinning opportunity despite heavy stocking in many hardwood stands. Nearly 2.4 million acres of hardwoods were fully stocked or overstocked, but only 57,000 acres of hardwood stands were assigned commercial thinning. This paradox cannot be explained with certainty. Hardwood stands are concentrated in the older age classes judged to be past the point of adequate response to a thinning. They are also extremely heterogeneous in species composition, stand structure, and tree quality as opposed to the more uniform conditions found in pine stands. Young stands with a substantial component of cull trees and other trees left after a harvest of older stands are included in other stand improvement. For many hardwood management objectives, we acknowledge that substantial acreage of hardwoods, though not so identified in table VII, would benefit from thinning.

4. *Remove undesirable trees and competing vegetation from immature stands on 1.4 million acres.* Stands in this category averaged 16 years of age and contained substantial numbers of rough trees and other inhibiting vegetation that were competing with the crop trees. Also included in this treatment were stands needing a precommercial thinning. Growing-stock volume averaged 771 cubic feet per acre, while forest biomass averaged 57 green tons per acre. Oak-pine and hardwood stands accounted for 71 percent of this opportunity. Final harvests and partial cutting during the past decade contributed to the existing conditions on one-third of the stands needing such improvement. The remainder are the results of similar harvests more than a decade ago. Residual trees in these harvested stands suppress the development of adequate regeneration and hinder the growth of existing reproduction.

5. *Convert stands with species obviously unsuitable for the site from the standpoint of timber production to a more productive species on 218,000 acres.* These acres supported a manageable stand of trees averaging 29 years old but will produce far less than the site's potential unless converted to another species. Volume of growing stock per acre averaged 710 cubic feet, and forest biomass averaged 55 tons per acre. About 88 percent of the stands needing conversion were dominated by hardwoods.

6. *Regenerate 2.0 million acres so poorly stocked with acceptable trees that a manageable stand does not exist.* Prior timber harvests contributed to current conditions on most of this acreage. Remnants of former stands, inferior seedlings and saplings, and other inhibiting vegetation dominate most of these stands. Without treatment, conditions are unlikely to improve substantially on most of these acres. For instance, of the acres classified as needing regeneration during the previous survey, nearly one-half remained in a poorly stocked condition in the most recent inventory. Many stands do restock with natural regeneration over time, but the quality and productivity of these stands is often less than desirable. Volume of growing stock averaged 439 cubic feet per acre, and forest biomass averaged 33 tons per acre. These low stand volumes and the poor quality of the trees normally prevent a removal of the stand in a commercial sale. From a silvicultural perspective, however, removal is the most appropriate action on most of these acres.

Of the timberland needing regeneration, almost 16 percent was classified as nonstocked, 17 percent as natural pine, 14 percent as oak-pine, 34 percent as upland hardwood, and 19 percent as lowland hardwood. This distribution is not necessarily indicative of the species these acres would be best suited to grow. As noted earlier, many of the current hardwood stands currently classified as needing regeneration were pine stands prior to harvest. Such stands, currently dominated by poor-quality hardwood, would be more productive if regenerated back to pine.

Many hardwood stands needing regeneration are on sites best suited to growing hardwood. Felling residual trees to release advance hardwood reproduction in the understory and to promote stump sprouting is a viable and little-used option to regenerate such stands. Field crews identified 0.2 million acres of hardwood-dominated stands that offered such an opportunity during the latest inventory.

Another 471,000 acres of idle cropland were added to the regeneration opportunity in table VII, bringing the total to 2.5 million acres. The idle cropland acres represent an opportunity to expand the timberland base in North Carolina. More than 81 percent of the total regeneration opportunity occurs on NIPF land, nearly 10 percent on forest industry, and 9 percent on public forests.

Regenerate Acreage Harvested

Perhaps the most important and certainly the most practical action to increase prospective timber supplies is the prompt regeneration of harvested timberland with species best suited to the site. The establishment of vigorous new stands of high-quality trees should be planned prior to stand harvest. Species composition and stocking must be controlled soon after harvest. Otherwise, poorly stocked and poor-quality stands will dominate many acres. Stand growth will be far less than is possible, and corrective action years later will be costly.

Financial and professional assistance in timber management are available to North Carolina timberland owners from a variety of sources. The Forestry Incentives Program has been available since 1974 to share the cost of tree planting and forest management with owners of small holdings. An alternate

source of Federal cost-sharing is provided under the Agricultural Conservation Program (ACP). Another important source of cost-share assistance is North Carolina's Forest Development Program (FDP). These funds are made available through State appropriation and a tax assessment on primary forest products. Professional advice and services are available from private forestry consultants, from the Division of Forestry of the North Carolina Department of Natural Resources and Community Development, and from Extension Forest Resources, North Carolina State University. Many wood-using companies also offer landowners technical assistance.

Literature Cited

Alig, Ralph J. Modeling acreage changes in forest ownerships and cover types in the Southeast. Res. Pap. RM-260. Fort Collins, CO; U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station; **1986.** 14 pp.

Knight, Herbert A. Stand-age profile of North Carolina's timberland. Resour. Bull. SE-38. Asheville, NC; U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station; **1977.** 15 pp.

Schallau, Con H.; Maki, Wilbur R.; Foster, Bennett B.; Redmond, Clair H. North Carolina's forest products industry: performance and contribution to the State's economy, 1970 to 1980. Res. Pap. PNW-343. Portland, OR; U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station; 1985. 22 pp.

Sheffield, Raymond M.; Cost, Noel D.; Bechtold, William A.; McClure, Joe P. Pine growth reductions in the Southeast. Resour. Bull. SE-83. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station; **1985.** 112 pp.

Tedder, Phillip L. Simulating management intensification in national timber-supply projections. Journal of Forestry 81(9): 607-609; **1983.**

U.S. Department of Commerce, Bureau of the Census. 1982 Census of Manufacturers, Geographic Area Series, North Carolina. MC82-A-34. Washington, DC; **1985.** 73 pp.

Appendix

Procedure

The procedure used in the fifth statewide inventory and evaluation of North Carolina's forest resources included these basic steps:

1. Initial estimates of forest and nonforest acreages were developed from the classification of 91,765 sample clusters systematically spaced on the latest aerial photographs available. Field crews checked a subsample of 8,123 of these 16-point clusters on the ground. A linear regression was fitted to the data to develop the relationship between the photo and ground classification of the subsample. This procedure provided a means for adjusting the initial acreage estimates for change in land use since date of photography and for photo misclassifications.

2. Estimates of timber volume and forest classifications were determined from measurements recorded at 5,355 ground sample locations systematically distributed within timberland. The plot design at each location was based on a cluster of 10 points. In most cases, variable plots, delineated with basal-area factor of 37.5 square feet per acre, were systematically spaced within a single forest condition at 5 of the 10 cluster points. Trees less than 5.0 inches d.b.h. were tallied on fixed-radius plots around the point centers.

3. Seedlings, shrubs, vines, grasses, forbs, and other lesser vegetation occurring within a 35-foot radius of selected point centers were identified and recorded at each forest sample location. Each distinctive zone of lesser vegetation was classified based on its height, density, and species composition. When merged with the tree tally, this information provided a vegetative profile of each forest condition sampled. Additional nontimber attributes measured or classified included land use, terrain features, soils, erosion, litter, water, snags, tree cavities, livestock grazing, and recreational use.

4. Equations developed from detailed measurements of standing trees in North Carolina and throughout the Southeast were used to compute volumes of individual tally trees. A mirror caliper and sectional aluminum poles were used to obtain the additional measurements on standing trees required to construct the volume equations. Forest biomass estimates were made with equations developed by the Utilization of Southern Timber Research Work Unit of the Southeastern Forest Experiment Station in Athens, GA. In addition, felled trees were measured at 100 active cutting operations to provide utilization factors for the different timber products and species groups and to supplement the standing-tree volume study.

5. Growth, removals, and mortality were estimated from the remeasurement of 4,878 permanent sample plots established in the 1974 inventory. Periodic surveys of timber products output, conducted by the Division of Forestry, North Carolina Department of Natural Resources and Community Development, along with the annual pulpwood production study for the South, provided additional information for breakdowns of removals by product.

6. Ownership information was collected from public records and through correspondence and direct contacts in the field. In those counties where the samples missed a particular ownership class, temporary samples were added and measured to describe forest conditions within the ownership class.

7. All field data were sent to Asheville for editing and were entered into disk and magnetic-tape storage for processing. Final estimates were based on statistical summaries of the detailed data.

Reliability of the Data

Statistical analysis of the data indicates a sampling error of ±0.22 percent for the estimate of timberland, 1.07 percent for the total growing-stock volume, 1.05 percent for total growing-stock volume growth, and 3.46 percent for total growing-stock removals. As the totals are broken down by forest type, species, tree diameter, and other subdivisions, the sampling error increases. If homogeneity of variances is assumed, the order of this increase is suggested in the following tabulation showing the sampling errors in terms of one standard error, or two chances out of three.

Sampling errors for selected areas and volumes[a]

Sampling error[b] (percent)	Timberland	Volume of growing stock		
		Inventory	Net growth	Removals
	M acres	*Million cubic feet*		
1	893.0	—	—	—
2	223.2	8,286.6	310.8	—
3	99.2	3,682.9	138.1	—
4	55.8	2,071.6	77.7	558.0
5	35.7	1,325.8	49.7	357.1
10	8.9	331.5	12.4	89.3
15	4.0	147.3	5.5	39.7
20	2.2	82.9	3.1	22.3
25	1.4	53.0	2.0	14.3

[a] Sampling error of volume or area totals in question may be computed with the following formula:

$$E = (SE)\ \frac{\sqrt{\text{Specified volume or area}}}{\sqrt{\text{(Volume or area total in question)}}}$$

where: E = Sampling error of the volume or area total in question.

SE = Specified sampling error in table.

[b] By random-sampling formula.

Definitions of Terms

Allowable cut. The volume of timber that could be cut on timberland during a given period under specified management plans aimed at sustained production of timber products.

Basal area. The area in square feet of the cross section at breast height of a single tree or of all the trees in a stand, usually expressed as square feet of basal area per acre.

Biomass. The aboveground green weight of solid wood and bark in live trees 1.0 inch d.b.h. and larger from the ground to the tip of the tree. All foliage is excluded. The weight of wood and bark in lateral limbs, secondary limbs, and twigs under 0.5 inch in diameter at the point of occurrence on sapling-size trees is included but is excluded on poletimber and sawtimber-size trees.

Bole. That portion of a tree between a 1-foot stump and a 4-inch top diameter outside bark (d.o.b.) in trees 5.0 inches d.b.h. and larger.

Broad management class. A classification of timberland based on forest type and stand origin.

Pine plantation. Stands that have been artificially regenerated by planting or direct seeding and with a southern yellow pine, white pine-hemlock, or other softwood forest type.

Natural pine. Stands that have not been artificially regenerated and with a southern yellow pine, white pine-hemlock, or other softwood forest type.

Oak-pine. Stands with a forest type of oak-pine.

Upland hardwood. Stands with a forest type of oak-hickory, chestnut oak, southern scrub oak, or maple-beech-birch.

Lowland hardwood. Stands with a forest type of oak-gum-cypress, elm-ash-cottonwood, palm, or other tropical.

Bureau of Land Management lands. Federal lands administered by the Bureau of Land Management.

Census water. Streams, sloughs, estuaries, canals, and other moving bodies of water one-eighth of a statute mile in width and greater, and lakes, reservoirs, ponds, and other permanent bodies of water 40 acres in area and greater.

Commercial forest land. (see: Timberland).

Commercial species. Tree species conventionally regarded as being able to develop into trees suitable for the manufacture of industrial timber products. Species that typically exhibit small size, poor form, or inferior quality are excluded.

Cropland. Land under cultivation within the past 24 months, including orchards and land in soil-improving crops but excluding land cultivated in developing improved pasture. Also includes idle farmland.

D.b.h. Tree diameter (outside bark) at breast height (4.5 feet above the ground).

Diameter class. A classification of trees based on tree d.b.h. Two-inch diameter classes are commonly used by Forest Inventory and Analysis, with the even inch as the approximate midpoint for a class. For example, the 6-inch class includes trees 5.0 through 6.9 inches d.b.h., inclusive.

Farm. Land on which agricultural operations are being conducted and sale of agricultural products totaled $1,000 or more during the year.

Farm operator. A person who operates a farm, either doing the work himself or directly supervising the work.

Farmer-owned land (see: Other private land).

Forest industry land. Land owned by companies or individuals operating wood-using plants.

Forest industry leased land. Land leased or under management contracts to forest industry from other owners for periods of one forest rotation or longer. Land under cutting contracts is not included.

Forest land. Land at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use.

Forest type. A classification of forest land based on the species forming a plurality of live-tree stocking.

White pine-hemlock. Forests in which eastern white pine, red pine, or jack pine, singly or in combination, constitute a plurality of the stocking. (Common associates include hemlock, birch, and maple.)

Spruce-fir. Forests in which spruce or true firs, singly or in combination, constitute a plurality of the stocking. (Common associates include maple, birch, and hemlock.)

Longleaf-slash pine. Forests in which longleaf or slash pine, singly or in combination, constitute a plurality of the stocking. (Common associates include oak, hickory, and gum.)

Loblolly-shortleaf pine. Forests in which loblolly pine, shortleaf pine, or other southern yellow pines, except longleaf or slash pine, singly or in combination, constitute a plurality of the stocking. (Common associates include oak, hickory, and gum.)

Oak-pine. Forests in which hardwoods (usually upland oaks) constitute a plurality of the stocking but in which pines account for 25 to 50 percent of the stocking. (Common associates include gum, hickory, and yellow-poplar.)

Oak-hickory. Forests in which upland oaks or hickory, singly or in combination, constitute a plurality of the stocking, except where pines account for 25 to 50 percent, in which case the stand would be classified oak-pine. (Common associates include yellow-poplar, elm, maple, and black walnut.)

Oak-gum-cypress. Bottom-land forests in which tupelo, blackgum, sweetgum, oaks, or southern cypress, singly or in combination, constitute a plurality of the stocking, except where pines account for 25 to 50 percent, in which case the stand would be classified oak-pine. (Common associates include cottonwood, willow, ash, elm, hackberry, and maple.)

Elm-ash-cottonwood. Forests in which elm, ash, or cottonwood, singly or in combination, constitute a plurality of the stocking. (Common associates include willow, sycamore, beech, and maple.)

Maple-beech-birch. Forests in which maple, beech, or yellow birch, singly or in combination, constitute a plurality of the stocking. (Common associates include hemlock, elm, basswood, and white pine.)

Palm, other tropical. Forests in which palms and other tropicals constitute a plurality of the stocking.

Gross growth. Annual increase in merchantable volume of trees in the absence of cutting and mortality. (Gross growth includes survivor growth, ingrowth, growth on ingrowth, growth on removals prior to removal, and growth on mortality prior to death.)

Growing-stock trees. Live sawtimber-size trees of commercial species containing at least a 12-foot log, or two noncontiguous saw logs each 8 feet or longer, meeting minimum grade requirements (hardwoods must qualify as a log grade of either 3 or 4; softwoods must qualify as a log grade 3) with at least one-third of the gross board-foot volume (International 1/4-inch rule) between a 1-foot stump and the minimum saw-log top being sound, or a live tree below sawtimber size that will prospectively qualify under the above standards.

Desirable tree. A tree that qualifies as growing stock and has no serious defects in quality limiting present or prospective use; is of relatively high vigor (30 percent or more live crown ratio); is compatible with the site and physiographic class; has a total board-foot loss not to exceed 15 percent in softwoods or 25 percent in hardwoods as a result of severe sweep, crook, or lean; and has a relatively clear bole.

Acceptable tree. A tree that qualifies as growing stock but does not meet the minimum requirements to qualify as a desirable tree. Included are sawtimber-size trees that do not contain a 12-foot saw log because of excessive, natural taper in the butt log but have the potential to produce a 12-foot saw log as diameter increases.

Growing-stock volume. Volume (cubic feet) of solid wood in growing-stock trees 5.0 inches d.b.h. and larger, from a 1-foot stump to a minimum 4.0-inch top diameter, outside bark, on the central stem. Volume of solid wood in primary forks from the point of occurrence to a minimum 4.0-inch top diameter outside bark is included.

Hardwoods. Angiosperms; dicotyledonous trees (including all palm species which are monocotyledonous), usually broad-leaf and deciduous.

Soft hardwoods. Soft-textured hardwoods such as boxelder, red and silver maples, hackberry, loblolly-bay, sweetgum, yellow-poplar, magnolia, sweetbay, water tupelo, blackgum, sycamore, cottonwood, black cherry, willow, basswood, and elm.

Hard hardwoods. Hard-textured hardwoods such as sugar maple, birch, hickory, dogwood, persimmon (forest grown), black locust, beech, ash, honeylocust, holly, black walnut, mulberry, and all commercial oaks.

Idle farmland. Land including former cropland, orchard, improved pasture, and farm sites not tended within the past 2 years, and currently less than 16.7 percent stocked with live trees.

Improved pasture. Land currently improved for grazing by cultivation, seeding, irrigation, or clearing of trees or brush.

Indian land. All lands held in trust by the United States for individual Indians or tribes, or all lands, titles to which are held by individual Indians or tribes, subject to Federal restrictions against alienation.

Industrial wood. All roundwood products except fuelwood.

Ingrowth. The number or net volume of trees that grow large enough during a specified year to qualify as saplings, poletimber, or sawtimber.

Inhibiting vegetation. Cover sufficiently dense to prevent the establishment of tree seedlings.

Land area. The area of dry land and land temporarily or partly covered by water such as marshes, swamps, and river flood plains (omitting tidal flats below mean high tide), streams, sloughs, estuaries, and canals less than one-eighth of a statute mile in width, and lakes, reservoirs, and ponds less than 40 acres in area.

Live trees. All trees 1.0 inch d.b.h. and larger which are not dead at the time of inventory.

Live-tree volume. Volume (cubic feet) of wood above the ground line in live trees 1.0 inch d.b.h. and larger. The volume in twigs and lateral limbs smaller than 0.5 inch in diameter at the point of occurrence on sapling-size trees is included but is excluded on poletimber and sawtimber-size trees.

Log grade. A classification of logs based on external characteristics as indicators of quality or value.

Logging residues. The unused merchantable portion of growing-stock trees cut or destroyed during logging operations.

Logging slash. The unmerchantable portion of growing-stock trees (including saplings) plus all cull trees 1.0 inch d.b.h. and larger cut or destroyed during logging operations and not used.

Manageable stand. Timberland at least 60 percent stocked with growing-stock trees that can be featured together under a management scheme.

Merchantable portion. That portion of live trees 5.0 inches d.b.h. and larger between a 1-foot stump and a minimum 4.0-inch top diameter outside bark on the central stem. That portion of primary forks from the point of occurrence to a minimum 4.0-inch top diameter outside bark is included.

Merchantable volume. Solid-wood volume in merchantable portion of live trees.

Miscellaneous Federal land. Federal land other than national forests, land administered by the Bureau of Land Management, and land administered by the Bureau of Indian Affairs.

Miscellaneous private land. (see: Other private land).

Mortality. The merchantable volume in trees that have died from natural causes during a specified period.

National forest land. Federal land that has been legally designated as national forests or purchase units, and other land under the administration of the Forest Service, including experimental areas and Bankhead-Jones Title III land.

Net annual growth. The net change in merchantable volume for a specific year in the absence of cutting (gross growth minus mortality for that specified year.)

Net volume. Gross volume of wood less deductions for rot, sweep, or other defect affecting use for timber products.

Noncommercial species. Tree species of typically small size, poor form, or inferior quality which normally do not develop into trees suitable for industrial wood products.

Nonforest land. Land that has never supported forests and land formerly forested where timber production is precluded by development for other uses.

Nonindustrial private forest (NIPF) land. (see: Other private land).

Nonstocked forest land. Timberland less than 16.7 percent stocked with growing-stock trees.

Other private land. Privately owned land excluding forest industry land or forest industry leased land. Also referred to as nonindustrial private forest (NIPF) land.

Farmer-owned land. Owned by farm operators, excluding incorporated farm ownerships.

Other individual land. Owned by individuals other than farm operators.

Other corporate land. Owned by corporations, including incorporated farm ownerships.

Other removals. The growing-stock volume of trees removed from the inventory by cultural operations such as timber stand improvement, land clearing, and other changes in land use that result in the removal of the trees from the timberland.

Plant residues. Wood material generated in the production of timber products at primary manufacturing plants.

Coarse residues. Material, such as slabs, edgings, trim, veneer cores and ends, which is suitable for chipping.

Fine residues. Material, such as sawdust, shavings, and veneer chippings, which is not suitable for chipping.

Plant byproducts. Residues (coarse or fine) utilized in the further manufacture of industrial products or for consumer use, or utilized as fuel.

Unused plant residues. Residues (coarse or fine) that are not used for any product, including fuel.

Poletimber-size trees. Live trees at least 5.0 inches d.b.h. but smaller than sawtimber size.

Productive-reserved forest land. (see: Reserved timberland).

Quality class. A classification of sawtimber volume by log or tree grades.

Rangeland. Land on which the natural vegetation is predominantly native grasses, grasslike plants, forbs, or shrubs valuable for forage, not qualifying as timberland and not developed for another land use. Rangeland includes natural grassland and savannah.

Reserved timberland. Forest land sufficiently productive to qualify as timberland, but withdrawn from timber utilization through statute or adminstrative designation.

Rotten trees. Live trees of commercial species that do not contain at least one 12-foot saw log, or two noncontiguous saw logs, each 8 feet or longer, now or prospectively, primarily because of rot or missing sections, and with less than one-third of the gross board-foot tree volume in sound material.

Rough trees. Live trees of commercial species that do not contain at least one 12-foot saw log, or two noncontiguous saw logs, each 8 feet or longer, now or prospectively, primarily because of roughness, poor form, splits, and cracks, and with less than one-third of the gross board-foot tree volume in sound material; and live trees of noncommercial species.

Roundwood (roundwood logs). Logs, bolts, or other round sections cut from trees for industrial or consumer uses.

Roundwood chipped. Any timber cut primarily for pulpwood, delivered to nonpulpmills, chipped, and then sold to pulpmills as residues, including chipped tops, jump sections, whole trees, and pulpwood sticks.

Roundwood products. Any primary product such as lumber, poles, pilings, pulp, or fuelwood which is produced from roundwood.

Salvable dead trees. Standing or down dead trees considered utilizable by Forest Inventory and Analysis standards.

Saplings. Live trees 1.0 to 5.0 inches d.b.h.

Saw log. A log meeting minimum standards of diameter, length, and defect, including logs at least 8 feet long, sound and straight, and with a minimum diameter inside bark for softwoods of 6 inches (8 inches for hardwoods).

Saw-log portion. That part of the bole of sawtimber trees between a 1-foot stump and the saw-log top, including the portion of forks large enough to contain a saw log.

Saw-log top. The point on the bole of sawtimber trees above which a conventional saw log cannot be produced. The minimum saw-log top is 7.0 inches in diameter outside bark (d.o.b.) for softwoods and 9.0 inches (d.o.b.) for hardwoods.

Sawtimber-size trees. Softwoods 9.0 inches d.b.h. and larger and hardwoods 11.0 inches d.b.h. and larger.

Sawtimber volume. Growing-stock volume in the sawlog portion of sawtimber-size trees in board feet (International 1/4-inch rule).

Seedlings. Live trees of commercial species less than 1.0 inch d.b.h. that are expected to survive and develop.

Site class. A classification of forest land in terms of inherent capacity to grow crops of industrial wood based on fully stocked natural stands, by annual production capacity.

Class 1. 165 or more cubic feet per acre.

Class 2. 120 to 164 cubic feet per acre.

Class 3. 85 to 119 cubic feet per acre.

Class 4. 50 to 84 cubic feet per acre.

Class 5. 20 to 49 cubic feet per acre.

Softwoods. Gymnosperms; in the order Coniferales, usually evergreen (includes the genus *Taxodium* which is deciduous), having needles or scalelike leaves.

Pines. Yellow pine species which include loblolly, longleaf, slash, pond, shortleaf, pitch, Virginia, sand, spruce, and Table Mountain pines.

Other softwoods. Cypress, eastern redcedar, white cedar, eastern white pine, eastern hemlock, spruce, and fir.

Stand-size class. A classification of forest land based on the diameter class distribution of growing-stock trees in the stand.

Sawtimber stands. Stands at least 16.7 percent stocked with growing-stock trees, with half or more of total stocking in sawtimber and poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

Poletimber stands. Stands at least 16.7 percent stocked with growing-stock trees of which half or more of total stocking is in poletimber and sawtimber trees, and with poletimber stocking exceeding that of sawtimber.

Sapling-seedling stands. Stands at least 16.7 percent stocked with growing-stock trees of which more than half of total stocking is saplings and seedlings.

State, county, and municipal land. Land owned by States, counties, and local public agencies or municipalities, or land leased to these governmental units for 50 years or more.

Stocking. The degree of occupancy of land by trees, measured by basal area or the number of trees in a stand and spacing in the stand, compared with a minimum standard, depending on tree size, required to fully utilize the growth potential of the land.

Fully stocked. 100 percent or more stocking.

Medium stocked. 60 to 99 percent stocking.

Poorly stocked. Less than 60 percent stocking.

Survivor growth. The merchantable volume increment on trees 5.0 inches d.b.h. and larger in the inventory at the beginning of the year and surviving to its end.

Timberland. Land at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, not currently developed for nonforest use, capable of producing 20 cubic feet of industrial wood per acre per year and not withdrawn from timber utilization by legislative action.

Timber products. Roundwood products and byproducts.

Timber removals. The merchantable volume of trees removed from the inventory by harvesting, cultural operations such as stand improvement, land clearing, or changes in land use.

Top. The portion of the main stem and forks from a 4.0-inch diameter outside bark to the tips of the main stem and forks, plus all other limbs above the 4.0-inch top at least 0.5 inch in diameter at their point of occurrence.

Treatment opportunity. A classification of the management or treatment that would most improve for timber production the existing condition of the stand being sampled.

Unproductive forest land. (see: Woodland).

Upper-stem portion. That part of the main stem or fork of sawtimber trees above the saw-log top to minimum top diameter 4.0 inches outside bark or to the point where the main stem or fork breaks into limbs.

Urban and other areas. Areas developed for residential, industrial, or recreational purposes, school yards, cemeteries, roads, railroads, airports, beaches, powerlines and other rights-of-way, or other nonforest land not included in any other specified land use class.

Woodland. Forest land incapable of producing 20 cubic feet per acre per year of industrial wood under natural conditions, because of adverse site conditions.

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Stocking Standard

D.b.h. class	Minimum number of trees per acre for full stocking	Minimum basal area per acre for full stocking
Seedlings	600	—
2	560	—
4	460	—
6	340	67
8	240	84
10	155	85
12	115	90
14	90	96
16	72	101
18	60	106
20	51	111

Metric equivalents of units used in this report

1 acre = 4,046.86 square meters or 0.404686 hectare
1 cubic foot = 0.028317 cubic meter
1 inch = 2.54 centimeters or 0.0254 meter
Breast height = 1.4 meters above ground level
1 square foot = 929.03 square centimeters or 0.0929 square meter
1 square foot per acre basal area = 0.229568 square meter per hectare
1 pound = 0.454 kilogram
1 ton = 0.907 metric ton

Conversion factors

Cubic feet of wood per average cord (excluding bark)

D.b.h. class	All species	Pine	Other softwood	Hardwood
6	60.6	61.0	68.2	60.0
8	68.5	68.1	76.0	68.4
10	73.4	73.1	81.4	73.4
12	76.7	76.7	85.2	76.4
14	79.1	79.4	88.2	78.4
16	80.7	81.6	90.4	79.8
18	82.2	83.3	92.3	80.8
20	83.0	84.8	93.8	81.5
22	83.7	86.0	95.1	82.1
24+	85.0	87.8	98.0	83.1
Average	74.9	73.6	86.8	74.8

Rough cords per M cubic feet (without bark) =

$$a + b\left(\frac{1}{\text{d.b.h.}}\right) + c\left(\frac{1}{\text{d.b.h.}}\right)^2$$

Where	Pine	Other softwoods	Hardwoods
a =	10.01850	9.15960	11.68410
b =	34.42135	28.75973	3.74431
c =	22.73994	25.54418	157.39417

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Table 1.--Area, by land class, North Carolina, 1984

Land class	Area
	Acres
Forest land	
Timberland	18,450,269
Reserved timberland	459,778
Woodland	42,809
Total	18,952,856
Nonforest land	
Cropland	6,768,121
Pasture and range	1,680,331
Other[a]	3,826,912
Total	12,275,364
All land[b]	31,228,220

[a]Includes swampland, industrial, and urban areas, other nonforest land, and 269,572 acres classed as water by Forest Survey standards but defined by Bureau of Census as land.
[b]From the U.S. Bureau of Census, 1980.

Table 2.--Area of timberland, by ownership class, North Carolina, 1984

Ownership class	Area
	Acres
National Forest	1,116,828
Other Federal	
Bureau of Land Management	--
Indian	52,528
Miscellaneous Federal	340,147
Total	392,675
State	331,980
County and municipal	80,087
Forest industry	2,337,324
Forest industry-leased	163,794
Other private	
Farmer	5,510,029
Other individual	6,865,111
Other corporate	1,652,441
Total	14,027,581
All ownerships	18,450,269

Table 3.--Area of timberland, by stand-size and ownership classes, North Carolina, 1984

Stand-size class	All ownerships	National Forest	Other public	Forest industry	Forest industry-leased	Other private
			Acres			
Sawtimber	8,978,576	731,952	425,682	701,615	34,574	7,084,753
Poletimber	5,286,888	258,816	206,189	784,905	86,258	3,950,720
Sapling and seedling	3,856,610	115,963	154,961	778,483	36,375	2,770,828
Nonstocked	328,195	10,097	17,910	72,321	6,587	221,280
All classes	18,450,269	1,116,828	804,742	2,337,324	163,794	14,027,581

Table 4.--Area of timberland, by stand-volume and ownership classes, North Carolina, 1984

Stand volume class (board feet/acre[a])	All ownerships	National Forest	Other public	Forest industry	Forest industry-leased	Other private
			Acres			
Less than 2,000	6,875,044	235,613	315,581	1,343,197	94,511	4,886,142
2,000 - 3,999	3,059,704	197,782	154,794	273,594	38,929	2,394,605
4,000 - 5,999	2,374,550	186,629	111,668	215,260	20,932	1,840,061
6,000 - 7,999	1,982,835	120,294	101,705	154,235	6,890	1,599,711
8,000 - 9,999	1,363,561	186,497	53,352	93,405	649	1,029,658
10,000 or more	2,794,575	190,013	67,642	257,633	1,883	2,277,404
All classes	18,450,269	1,116,828	804,742	2,337,324	163,794	14,027,581

[a]International 1/4-inch rule.

Table 5.--Area of timberland, by stocking class of growing-stock trees and ownership class, North Carolina, 1984

Stocking class	All ownerships	National Forest	Other public	Forest industry	Forest industry-leased	Other private
			Acres			
Overstocked	1,307,540	23,369	42,567	209,958	29,880	1,001,766
Fully stocked	6,688,608	331,223	217,438	1,105,062	77,840	4,957,045
Moderately stocked	7,931,828	593,746	321,313	731,774	36,650	6,248,345
Poorly stocked	2,194,098	158,393	205,514	218,209	12,837	1,599,145
Nonstocked	328,195	10,097	17,910	72,321	6,587	221,280
All classes	18,450,269	1,116,828	804,742	2,337,324	163,794	14,027,581

Table 6.--Area of timberland, by site and ownership classes, North Carolina, 1984

Site class (ft^3/acre/year)	All ownerships	National Forest	Other public	Forest industry	Forest industry-leased	Other private
			Acres			
> 164	264,398	25,305	3,122	11,671	--	224,300
120-164	952,803	109,565	17,561	45,752	2,640	777,285
85-119	5,436,224	278,778	119,207	573,549	45,126	4,419,564
50-84	9,458,834	451,487	366,807	1,404,275	109,907	7,126,358
20-49	2,338,010	251,693	298,045	302,077	6,121	1,480,074
All classes	18,450,269	1,116,828	804,742	2,337,324	163,794	14,027,581

Table 7.--Area of timberland, by forest type and site index class, North Carolina, 1984

Forest type	All classes	Site index class[a]							
		< 50	50-59	60-69	70-79	80-89	90-99	100-109	110-119	> 119
	Acres									
Softwood types										
White pine-hemlock	204,710	--	4,909	36,879	58,947	33,803	21,526	31,042	17,604	--
Spruce fir	18,457	--	7,899	10,558	--	--	--	--	--	--
Longleaf pine	389,013	17,113	177,762	150,525	36,699	3,854	3,060	--	--	--
Slash pine	195,365	--	46,771	69,572	56,020	19,359	--	3,643	--	--
Loblolly pine	3,409,207	6,651	108,628	502,958	1,358,202	906,391	389,285	114,061	19,684	3,347
Shortleaf pine	502,901	7,485	62,281	167,665	177,348	77,476	10,646	--	--	--
Virginia pine	780,017	4,440	40,336	224,171	336,363	121,424	50,093	3,190	--	--
Sand pine	--	--	--	--	--	--	--	--	--	--
Eastern redcedar	30,430	--	10,093	3,608	16,729	--	--	--	--	--
Pond pine	742,850	102,886	304,832	185,761	119,124	24,126	6,121	--	--	--
Spruce pine	--	--	--	--	--	--	--	--	--	--
Pitch pine	61,155	17,530	8,829	22,954	5,576	1,091	5,175	--	--	--
Table Mountain pine	10,771	--	3,679	3,184	3,908	--	--	--	--	--
Total	6,344,876	156,105	776,019	1,377,835	2,168,916	1,187,524	485,906	151,936	37,288	3,347
Hardwood types										
Oak-pine	2,276,670	51,266	228,037	493,794	708,781	471,261	214,571	98,081	7,130	3,749
Oak-hickory	6,600,835	94,987	366,448	1,064,888	1,929,250	1,518,836	957,031	447,963	150,359	71,073
Chestnut oak	259,241	30,237	64,422	85,172	51,352	23,660	4,398	--	--	--
Southern scrub oak	107,141	15,105	62,798	19,843	9,395	--	--	--	--	--
Oak-gum-cypress	2,302,762	32,786	146,375	332,898	771,371	538,789	343,033	100,092	37,418	--
Elm-ash-cottonwood	401,107	--	6,472	36,044	98,830	135,796	91,054	20,850	12,061	--
Maple-beech-birch	157,637	--	15,000	18,901	53,259	41,969	13,666	5,176	9,666	--
Total	12,105,393	224,381	889,552	2,051,540	3,622,238	2,730,311	1,623,753	672,162	216,634	74,822
All types	18,450,269	380,486	1,665,571	3,429,375	5,791,154	3,917,835	2,109,659	824,098	253,922	78,169

[a] 50-year base.

Table 8.--Area of timberland, by forest type and ownership class, North Carolina, 1984

Forest type	All ownerships	National Forest	Other public	Forest industry	Forest industry-leased	Other private
			Acres			
Softwood types						
White pine-hemlock	204,710	24,539	248	11,845	132	167,946
Spruce-fir	18,457	7,899	--	--	--	10,558
Longleaf pine	389,013	16,437	124,942	43,263	1,558	202,813
Slash pine	195,365	--	8,933	125,789	23,178	37,465
Loblolly pine	3,409,207	43,302	127,114	1,044,115	103,562	2,091,114
Shortleaf pine	502,901	6,899	10,378	21,695	--	463,929
Virginia pine	780,017	6,800	12,199	18,712	4,338	737,968
Sand pine	--	--	--	--	--	--
Eastern redcedar	30,430	--	--	--	3,879	26,551
Pond pine	742,850	37,659	123,654	142,627	343	438,567
Spruce pine	--	--	--	--	--	--
Pitch pine	61,155	28,684	9,499	1,091	--	21,881
Table Mountain pine	10,771	7,587	--	--	--	3,184
Total	6,344,876	179,806	416,967	1,409,137	136,990	4,201,976
Hardwood types						
Oak-pine	2,276,670	137,167	84,216	200,572	4,747	1,849,968
Oak-hickory	6,600,835	636,314	147,129	219,926	10,906	5,586,560
Chestnut oak	259,241	91,493	10,571	22,668	--	134,509
Southern scrub oak	107,141	--	4,973	2,501	--	99,667
Oak-gum-cypress	2,302,762	14,707	124,087	431,748	11,151	1,721,069
Elm-ash-cottonwood	401,107	--	13,617	47,556	--	339,934
Maple-beech-birch	157,637	57,341	3,182	3,216	--	93,898
Total	12,105,393	937,022	387,775	928,187	26,804	9,825,605
All types	18,450,269	1,116,828	804,742	2,337,324	163,794	14,027,581

Table 9.--Area of timberland, by forest type and stand-size class, North Carolina, 1984

Forest type	All classes	Stand-size class			Nonstocked areas
		Sawtimber	Poletimber	Sapling-seedling	
	Acres				
Softwood types					
White pine-hemlock	204,710	148,006	45,869	10,835	--
Spruce-fir	18,457	3,982	10,558	3,917	--
Longleaf pine	389,013	211,014	66,022	98,612	13,365
Slash pine	195,365	11,496	117,548	66,321	--
Loblolly pine	3,409,207	1,363,414	1,019,056	970,265	56,472
Shortleaf pine	502,901	254,405	171,540	76,956	--
Virginia pine	780,017	278,020	345,928	156,069	--
Sand pine	--	--	--	--	--
Redcedar	30,430	--	7,540	19,011	3,879
Pond pine	742,850	259,014	243,442	208,967	31,427
Spruce pine	--	--	--	--	--
Pitch pine	61,155	42,857	18,298	--	--
Table Mountain pine	10,771	3,679	3,184	3,908	--
Total	6,344,876	2,575,887	2,048,985	1,614,861	105,143
Hardwood types					
Oak-pine	2,276,670	1,065,141	582,531	604,330	24,668
Oak-hickory	6,600,835	3,517,276	1,931,638	1,090,740	61,181
Chestnut oak	259,241	167,816	64,974	17,367	9,084
Southern scrub oak	107,141	32,477	9,498	11,972	53,194
Oak-gum-cypress	2,302,762	1,258,290	534,239	451,760	58,473
Elm-ash-cottonwood	401,107	251,620	79,841	53,194	16,452
Maple-beech-birch	157,637	110,069	35,182	12,386	--
Total	12,105,393	6,402,689	3,237,903	2,241,749	223,052
All types	18,450,269	8,978,576	5,286,888	3,856,610	328,195

Table 10.--Area of timberland, by stand-age and broad management classes, all ownerships, North Carolina, 1984

Stand-age class (years)	All classes	Broad management class				
		Pine plantation	Natural pine	Oak-pine	Upland hardwood	Lowland hardwood
			Acres			
00-10	2,187,357	618,720	303,725	344,936	724,388	195,588
11-20	1,950,942	648,924	596,132	208,084	342,171	155,631
21-30	1,757,578	308,115	782,169	156,180	365,263	145,851
31-40	2,050,965	20,012	923,180	259,424	671,824	176,525
41-50	2,382,080	3,982	745,297	317,303	952,415	363,083
51-60	2,168,887	--	466,747	275,620	1,066,526	359,994
61-70	1,571,811	--	275,072	222,704	802,263	271,772
71-80	925,339	--	78,848	108,533	563,713	174,245
81+	1,133,750	--	94,387	69,963	596,433	372,967
No manageable stand	2,321,560	14,049	465,517	313,923	1,039,858	488,213
All classes	18,450,269	1,613,802	4,731,074	2,276,670	7,124,854	2,703,869

Table 11.--Area of timberland, by stand-age and broad management classes, public ownerships, North Carolina, 1984

Stand-age class (years)	All classes	Broad management class				
		Pine plantation	Natural pine	Oak-pine	Upland hardwood	Lowland hardwood
			Acres			
00-10	99,966	33,477	23,354	9,166	32,308	1,661
11-20	135,358	48,978	43,920	12,397	17,151	12,912
21-30	77,005	13,173	26,980	6,298	24,532	6,022
31-40	120,605	5,684	45,141	9,651	57,841	2,288
41-50	216,229	3,982	87,275	26,065	75,157	23,750
51-60	244,743	--	47,120	25,891	135,369	36,363
61-70	289,222	--	60,422	41,746	148,607	38,447
71-80	138,905	--	5,225	11,097	118,559	4,024
81+	241,386	--	31,541	19,929	185,721	4,195
No manageable stand	358,151	2,885	117,616	59,143	155,758	22,749
All classes	1,921,570	108,179	488,594	221,383	951,003	152,411

Table 12.--Area of timberland, by stand-age and broad management classes, forest industry,[a] North Carolina, 1984

Stand-age class (years)	All classes	Broad management class				
		Pine plantation	Natural pine	Oak-pine	Upland hardwood	Lowland hardwood
	Acres					
00-10	470,965	349,793	21,257	33,429	31,328	35,158
11-20	664,177	488,194	86,705	36,318	29,739	23,221
21-30	308,825	188,486	81,718	13,618	7,632	17,371
31-40	181,766	3,187	105,489	35,312	7,923	29,855
41-50	176,756	--	50,391	24,336	40,155	61,874
51-60	133,524	--	41,411	15,903	27,444	48,766
61-70	111,099	--	17,836	20,617	35,343	37,303
71-80	101,286	--	20,948	2,702	19,857	57,779
81+	102,271	--	6,326	4,388	1,048	90,509
No manageable stand	250,449	7,299	77,087	18,696	58,748	88,619
All classes	2,501,118	1,036,959	509,168	205,319	259,217	490,455

[a]Includes 163,794 acres of other private land under long-term lease.

Table 13.--Area of timberland, by stand-age and broad management classes, other private ownerships,[a] North Carolina, 1984

Stand-age class (years)	All classes	Broad management class				
		Pine plantation	Natural pine	Oak-pine	Upland hardwood	Lowland hardwood
	Acres					
00-10	1,616,426	235,450	259,114	302,341	660,752	158,769
11-20	1,151,407	111,752	465,507	159,369	295,281	119,498
21-30	1,371,748	106,456	673,471	136,264	333,099	122,458
31-40	1,748,594	11,141	772,550	214,461	606,060	144,382
41-50	1,989,095	--	607,631	266,902	837,103	277,459
51-60	1,790,620	--	378,216	233,826	903,713	274,865
61-70	1,171,490	--	196,814	160,341	618,313	196,022
71-80	685,148	--	52,675	94,734	425,297	112,442
81+	790,093	--	56,520	45,646	409,664	278,263
No manageable stand	1,712,960	3,865	270,814	236,084	825,352	376,845
All classes	14,027,581	468,664	3,733,312	1,849,968	5,914,634	2,061,003

[a]Excludes 163,794 acres of other private land under long-term lease to forest industry.

Table 14.--Basal area per acre of live trees 5.0 inches d.b.h. and larger, by broad management class, species group, and ownership class, North Carolina, 1984

Broad management class and species group	All ownerships	National Forest	Other public	Forest industry	Forest industry-leased	Other private
	Square feet					
Pine plantation						
Softwood	47.2	37.5	46.0	46.7	72.3	42.5
Hardwood	2.4	15.0	1.7	1.9	2.5	2.7
Total	49.6	52.5	47.7	48.6	74.8	45.2
Natural pine						
Softwood	66.0	58.0	54.8	55.8	54.2	68.8
Hardwood	13.4	15.3	5.8	12.2	7.5	14.2
Total	79.4	73.3	60.6	68.0	61.7	83.0
Oak-pine						
Softwood	29.4	28.3	30.8	28.8	--	29.5
Hardwood	38.7	37.3	33.6	34.1	--	39.5
Total	68.1	65.6	64.4	62.9	--	69.0
Upland hardwood						
Softwood	5.2	4.3	5.8	4.8	3.8	5.3
Hardwood	71.8	89.0	80.8	51.2	41.2	70.7
Total	77.0	93.3	86.6	56.0	45.0	76.0
Lowland hardwood						
Softwood	10.8	20.0	15.2	13.2	1.5	10.0
Hardwood	90.5	77.5	78.7	96.3	76.5	90.2
Total	101.3	97.5	93.9	109.5	78.0	100.2
All classes						
Softwood	29.1	18.8	35.0	35.6	60.1	28.0
Hardwood	48.9	65.5	35.9	31.4	12.2	52.0
Total	78.0	84.3	70.9	67.0	72.3	80.0

Table 15.--Area of reserved timberland and woodland, by forest-type group, North Carolina, 1984

Forest-type group	All areas	Reserved timberland	Woodland
		Acres	
Spruce-fir	9,525	9,525	--
White pine-hemlock	18,713	18,713	--
Longleaf-slash pine	--	--	--
Loblolly-shortleaf pine	62,185	54,293	7,892
Oak-pine	3,209	3,209	--
Oak-hickory	327,691	313,819	13,872
Oak-gum-cypress	43,837	22,792	21,045
Elm-ash-cottonwood	--	--	--
Maple-beech-birch	37,427	37,427	--
All types	502,587	459,778	42,809

Table 16.--Number of live trees on timberland, by species and diameter class, North Carolina, 1984

Species	All classes	Diameter class (inches at breast height)											
		1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Thousand trees												
Softwood													
Longleaf pine	84,952	27,605	16,360	12,345	9,434	8,186	5,468	3,326	1,417	592	158	61	--
Slash pine	73,740	12,341	25,527	24,116	9,368	1,878	437	73	--	--	--	--	--
Shortleaf pine	271,272	65,734	61,534	48,257	43,968	28,673	14,583	5,947	1,958	420	153	45	--
Loblolly pine	1,391,126	483,512	337,671	243,656	146,540	75,247	44,673	28,404	16,245	8,677	3,877	2,570	54
Pond pine	282,576	109,282	67,772	40,643	29,618	18,656	9,909	4,251	1,486	609	253	97	--
Virginia pine	450,505	159,636	119,173	72,895	54,259	28,905	10,730	4,026	683	169	29	--	--
Pitch pine	34,058	6,494	8,949	6,193	4,437	3,734	2,118	1,204	537	233	83	76	--
Table Mountain pine	5,829	1,678	2,254	367	528	318	332	260	74	--	18	--	--
Spruce pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Eastern white pine	140,971	76,803	24,930	13,030	8,925	5,330	3,514	2,679	2,134	1,582	898	1,026	120
Eastern hemlock	73,521	44,658	12,640	8,191	2,832	1,194	1,253	791	775	468	244	424	51
Spruce and fir	9,083	4,630	1,630	1,143	773	294	355	172	55	24	--	--	7
Baldcypress	22,753	6,413	3,214	2,079	1,677	2,263	1,743	1,716	1,054	746	663	955	230
Pondcypress	12,221	6,357	633	781	1,730	790	570	537	272	242	119	149	41
Cedars	204,283	136,223	42,923	14,390	6,189	2,585	1,220	302	199	157	59	16	20
Total softwoods	3,056,890	1,141,366	725,210	488,086	320,278	178,053	96,905	53,688	26,889	13,919	6,554	5,419	523
Hardwood													
Select white oaks[a]	420,559	196,493	84,490	50,146	29,797	19,532	16,079	9,741	6,123	3,694	1,861	2,265	338
Select red oaks[b]	123,660	48,759	27,043	12,506	8,047	7,666	5,860	4,496	3,142	2,279	1,394	2,111	357
Chestnut oak	173,283	55,311	34,027	23,797	20,839	12,789	9,045	6,355	4,377	2,899	1,547	2,007	290
Other white oaks	126,075	65,154	25,004	13,082	9,068	5,607	3,835	2,102	1,088	582	149	351	53
Other red oaks	810,517	462,388	137,548	76,262	47,691	31,864	22,445	13,221	8,518	5,191	2,360	2,666	363
Hickory	353,915	214,949	57,664	31,284	17,769	12,681	7,752	5,503	2,704	1,812	832	932	33
Yellow birch	15,549	6,208	3,517	2,541	1,326	630	274	369	370	86	47	157	24
Hard maple	63,177	41,726	10,978	4,210	2,274	1,398	791	611	569	262	202	117	39
Soft maple	2,170,082	1,576,518	338,714	118,082	61,393	31,139	20,118	10,637	6,501	3,290	1,676	1,888	126
Beech	100,560	63,427	15,691	6,641	4,657	3,183	1,904	1,872	1,431	724	447	530	53
Sweetgum	1,409,227	965,189	243,783	95,256	43,239	25,820	15,554	9,314	5,418	2,863	1,510	1,210	71
Tupelo and blackgum	937,987	627,894	140,081	62,653	35,714	24,880	18,266	11,021	6,944	4,285	2,678	2,892	679
Ash	307,210	205,877	52,012	22,301	11,234	6,187	3,898	2,161	1,581	1,044	403	485	27
Cottonwood	9,601	4,344	2,815	1,024	573	350	132	172	90	48	19	34	--
Basswood	22,383	12,924	2,938	966	1,649	1,369	1,009	518	583	186	137	96	8
Yellow-poplar	517,375	267,244	80,919	46,844	36,544	24,579	21,507	16,035	10,698	5,662	3,758	3,344	241
Bay and magnolia	446,710	364,724	53,580	16,067	8,039	1,963	1,279	587	232	136	29	74	--
Black cherry	144,664	108,557	22,273	7,012	3,678	2,227	368	243	102	130	18	56	--
Black walnut	8,565	1,843	1,714	1,736	1,288	739	725	232	187	49	--	47	5
Sycamore	13,066	5,148	3,036	1,337	916	611	578	569	351	167	98	208	47
Black locust	50,488	18,460	8,150	5,735	6,137	5,094	3,251	1,672	1,044	512	189	239	5
Elm	134,886	90,480	22,901	8,802	4,974	3,154	2,205	1,138	513	297	218	191	13
Other eastern hardwoods	3,179,011	2,347,116	579,517	162,788	52,486	19,402	8,932	4,551	2,049	946	502	694	28
Total hardwoods	11,538,550	7,750,733	1,948,395	771,072	409,332	242,864	165,807	103,120	64,615	37,144	20,074	22,594	2,800
All species	14,595,440	8,892,099	2,673,605	1,259,158	729,610	420,917	262,712	156,808	91,504	51,063	26,628	28,013	3,323

[a] Includes white, swamp white, swamp chestnut, and chinkapin oaks.

[b] Includes cherrybark, northern red, and Shumard oaks.

Table 17.--*Number* of growing-stock trees on timberland, by species and diameter class, North Carolina, 1984

Species	All classes	Diameter class (inches at breast height)											
		1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Thousand trees												
Softwood													
Longleaf pine	82,348	25,595	16,071	12,345	9,191	8,186	5,441	3,299	1,417	592	158	53	--
Slash pine	73,005	12,000	25,133	24,116	9,368	1,878	437	73	--	--	--	--	--
Shortleaf pine	260,240	57,793	59,598	47,534	43,632	28,610	14,550	5,947	1,958	420	153	45	--
Loblolly pine	1,341,421	446,369	328,300	241,690	146,035	74,904	44,423	28,321	16,224	8,677	3,864	2,560	54
Pond pine	227,567	67,528	57,867	38,395	28,760	18,613	9,818	4,231	1,396	609	253	97	--
Virginia pine	429,779	148,230	111,898	71,416	53,748	28,866	10,730	4,010	683	169	29	--	--
Pitch pine	29,703	4,773	6,957	5,659	4,437	3,672	2,072	1,204	537	233	83	76	--
Table Mountain pine	5,811	1,678	2,254	367	528	318	332	260	74	--	--	--	--
Spruce pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Eastern white pine	132,806	70,299	23,781	12,708	8,925	5,253	3,464	2,641	2,134	1,582	879	1,026	114
Eastern hemlock	67,647	40,008	12,059	7,773	2,832	1,118	1,201	791	750	444	244	381	46
Spruce *and fir*	8,931	4,630	1,630	1,143	645	294	355	172	55	--	--	--	7
Baldcypress	20,886	5,101	3,214	1,966	1,608	2,203	1,719	1,648	1,011	712	639	905	160
Pondcypress	11,741	5,982	633	781	1,730	790	570	537	218	242	108	136	14
Cedars	175,368	112,676	39,276	13,501	5,811	2,349	1,151	233	167	129	59	16	--
Total softwoods	2,867,253	1,002,662	688,671	479,394	317,250	177,054	96,263	53,367	26,624	13,809	6,469	5,295	395
Hardwood													
Select white oaks[a]	346,469	140,509	73,830	46,245	28,279	18,895	15,577	9,465	6,019	3,567	1,752	2,060	271
Select red oaks[b]	104,283	35,699	23,360	11,397	7,610	7,134	5,716	4,422	3,040	2,243	1,377	2,003	282
Chestnut oak	129,620	27,879	26,354	20,460	19,244	11,708	8,307	5,797	4,097	2,605	1,370	1,585	214
Other white oaks	89,396	37,085	19,854	11,228	8,491	5,294	3,508	1,984	927	504	149	324	48
Other red oaks	641,128	327,985	116,851	70,288	44,222	29,796	21,408	12,789	7,938	4,940	2,211	2,435	265
Hickory	257,280	131,745	50,736	27,592	16,236	12,506	7,368	5,212	2,619	1,665	774	802	25
Yellow birch	11,623	3,969	2,953	2,075	1,162	551	189	271	241	65	47	100	--
Hard maple	43,896	25,368	8,951	3,982	1,779	1,348	739	611	548	262	202	81	25
Soft maple	1,236,569	786,386	247,241	91,989	49,614	25,448	16,449	8,805	5,281	2,760	1,300	1,243	53
Beech	70,220	38,935	12,262	5,832	4,147	2,850	1,612	1,740	1,319	643	430	418	32
Sweetgum	1,059,227	667,459	204,972	87,146	40,420	24,589	15,204	9,040	5,120	2,751	1,365	1,099	62
Tupelo and blackgum	504,274	259,142	101,430	50,989	30,139	21,786	16,670	10,061	5,963	3,697	2,108	1,968	321
Ash	153,502	79,902	34,518	16,146	9,342	5,118	3,485	1,726	1,480	1,005	357	410	13
Cottonwood	8,164	2,907	2,815	1,024	573	350	132	172	90	48	19	34	--
Basswood	14,146	5,183	2,625	966	1,537	1,369	968	518	583	186	137	66	8
Yellow-poplar	460,958	223,305	72,491	45,035	35,479	24,213	21,245	15,826	10,660	5,588	3,680	3,242	194
Bay and *magnolia*	212,873	162,397	30,495	10,545	6,330	1,473	907	400	177	80	17	52	--
Black cherry	73,909	50,229	13,586	4,789	2,704	1,779	368	155	102	130	18	49	--
Black walnut	7,397	1,465	1,495	1,736	906	739	585	232	187	13	--	34	5
Sycamore	10,815	3,464	3,036	1,106	731	611	578	527	296	153	86	182	45
Black locust	31,662	8,268	5,542	3,649	4,778	3,786	2,749	1,268	869	422	189	137	5
Elm	81,571	43,836	18,340	7,695	4,487	2,985	2,011	1,072	491	271	209	169	5
Other eastern hardwoods	321,108	190,306	64,219	30,217	16,566	8,061	5,022	3,259	1,628	873	410	534	13
Total hardwoods	5,870,090	3,253,423	1,137,956	552,131	334,776	212,389	150,797	95,352	59,675	34,471	18,207	19,027	1,886
All species	8,737,343	4,256,085	1,826,627	1,031,525	652,026	389,443	247,060	148,719	86,299	48,280	24,676	24,322	2,281

[a]Includes white, swamp white, swamp chestnut, and chinkapin oaks.

[b]Includes northern red, southern red, Shumard oaks

Table 18.--Merchantable volume of live trees on timberland, by species and diameter class, North Carolina, 1984

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Thousand cubic feet										
Softwood											
Longleaf pine	444,861	29,594	58,998	94,448	95,939	82,364	47,358	24,748	7,385	4,027	--
Slash pine	129,459	53,366	49,065	18,850	6,408	1,770	--	--	--	--	--
Shortleaf pine	1,340,652	131,244	282,516	344,760	285,713	176,270	80,929	22,711	12,089	4,420	--
Loblolly pine	5,667,615	590,015	870,615	867,751	865,839	831,443	658,094	463,892	261,848	248,393	9,725
Pond pine	827,742	93,826	168,401	196,228	166,576	103,065	50,147	27,571	14,185	7,743	--
Virginia pine	1,311,615	239,217	381,742	346,344	199,637	109,948	25,085	8,162	1,480	--	--
Pitch pine	189,586	15,237	24,060	40,100	36,071	32,208	18,880	10,243	5,938	6,849	--
Table Mountain pine	22,574	1,344	3,504	3,004	5,735	5,938	2,361	--	688	--	--
Spruce pine	--	--	--	--	--	--	--	--	--	--	--
Sand pine	--	--	--	--	--	--	--	--	--	--	--
Eastern white pine	595,906	34,500	53,626	57,848	60,365	69,137	73,640	73,201	55,641	94,089	23,859
Eastern hemlock	190,873	16,288	12,695	9,455	19,449	18,933	28,157	20,343	15,514	37,177	12,862
Spruce and fir	18,941	2,671	3,084	2,140	4,939	3,200	1,441	292	--	--	1,174
Baldcypress	348,457	6,990	12,457	28,796	32,466	43,198	38,104	32,962	38,224	82,323	32,937
Pondcypress	92,290	2,300	11,886	8,660	10,364	14,681	8,197	10,980	6,087	11,546	7,589
Cedars	146,126	37,927	37,408	25,962	19,714	6,534	5,809	6,355	3,117	892	2,408
Total softwoods	11,326,697	1,254,519	1,970,057	2,044,346	1,809,215	1,498,689	1,038,202	701,460	422,196	497,459	90,554
Hardwood											
Select white oaks[a]	1,820,932	128,526	179,307	216,915	292,442	255,642	223,112	174,443	107,668	186,183	56,694
Select red oaks[b]	935,654	36,753	50,119	84,484	107,251	118,361	109,453	105,177	79,424	184,649	59,983
Chestnut oak	1,101,234	56,187	115,982	129,411	148,338	146,470	141,203	113,983	72,185	138,656	38,819
Other white oaks	344,917	31,045	45,186	55,878	60,134	49,268	33,708	23,742	7,923	27,179	10,854
Other red oaks	2,429,649	189,986	266,309	332,161	376,603	331,330	288,809	231,329	132,118	220,805	60,199
Hickory	910,756	66,638	101,686	137,471	138,546	145,663	100,180	87,788	49,139	79,045	4,600
Yellow birch	57,733	6,408	7,336	5,391	3,597	6,815	10,407	2,784	2,567	9,498	2,930
Hard maple	133,264	12,140	13,100	15,525	13,982	16,774	20,648	12,089	11,503	8,903	8,600
Soft maple	2,133,683	321,663	355,311	326,736	331,569	246,360	200,211	129,435	85,129	123,336	13,933
Beech	316,633	18,639	27,205	34,611	31,842	48,490	48,477	32,481	23,401	44,153	7,334
Sweetgum	1,898,679	209,715	256,851	301,896	297,994	262,665	209,865	148,053	92,668	106,320	12,652
Tupelo and blackgum	1,991,978	158,669	205,004	260,315	308,865	269,221	224,267	169,380	128,890	187,895	79,472
Ash	484,324	52,124	67,818	69,238	67,437	53,247	57,367	51,085	22,935	39,963	3,110
Cottonwood	26,456	2,722	2,879	4,073	2,471	4,639	3,496	2,114	1,006	3,056	--
Basswood	118,658	2,561	11,055	18,322	21,654	15,267	23,359	8,977	9,032	7,779	652
Yellow-poplar	2,795,531	140,003	232,299	291,888	415,133	459,180	416,044	277,228	229,221	296,397	38,138
Bay and magnolia	144,718	38,570	43,273	17,837	17,014	11,373	6,341	4,252	712	5,346	--
Black cherry	90,038	16,318	19,669	23,017	7,687	6,284	3,918	6,646	1,328	5,171	--
Black walnut	48,273	4,062	6,936	8,655	11,235	6,109	5,941	1,592	--	3,111	632
Sycamore	89,272	5,412	6,301	7,051	9,389	15,777	10,858	7,532	4,766	14,912	7,274
Black locust	252,231	12,679	29,660	47,852	51,452	34,986	29,962	19,389	9,335	15,910	1,006
Elm	215,780	19,375	28,801	35,281	40,472	28,394	18,422	14,300	13,116	15,810	1,809
Other eastern hardwoods	1,187,732	353,587	248,825	175,018	131,707	98,933	62,739	40,247	25,584	47,501	3,591
Total hardwoods	19,528,125	1,883,782	2,320,912	2,599,026	2,886,814	2,631,248	2,248,787	1,664,046	1,109,650	1,771,578	412,282
All species	30,854,822	3,138,301	4,290,969	4,643,372	4,696,029	4,129,937	3,286,989	2,365,506	1,531,846	2,269,037	502,836

[a] Includes white, swamp white, swamp chestnut, and chinkapin oaks.

[b] Includes cherrybark, northern red, and Shumard oaks.

Table 19.--Volume of growing stock on timberland, by species and diameter class, North Carolina, 1984

Species	All classes	Diameter class (inches at breast height) 5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Thousand cubic feet										
Softwood											
Longleaf pine	442,605	29,594	58,031	94,448	95,475	81,941	47,358	24,748	7,385	3,625	--
Slash pine	129,459	53,366	49,065	18,850	6,408	1,770	--	--	--	--	--
Shortleaf pine	1,336,686	130,021	280,663	344,352	285,231	176,270	80,929	22,711	12,089	4,420	--
Loblolly pine	5,650,852	586,124	868,430	864,502	862,118	829,465	657,680	463,892	261,167	247,749	9,725
Pond pine	815,973	90,239	164,353	195,717	165,561	102,834	47,770	27,571	14,185	7,743	--
Virginia pine	1,304,112	235,236	378,962	345,953	199,637	109,597	25,085	8,162	1,480	--	--
Pitch pine	186,734	14,156	24,060	39,448	34,952	32,208	18,880	10,243	5,938	6,849	--
Table Mountain pine	21,886	1,344	3,504	3,004	5,735	5,938	2,361	--	--	--	--
Spruce pine	--	--	--	--	--	--	--	--	--	--	--
Sand pine	--	--	--	--	--	--	--	--	--	--	--
Eastern white pine	591,837	33,717	53,626	57,529	59,664	68,301	73,640	73,201	54,836	94,089	23,234
Eastern hemlock	184,395	15,770	12,695	9,203	19,069	18,933	27,438	19,835	15,514	34,632	11,306
Spruce and fir	18,370	2,671	2,805	2,140	4,939	3,200	1,441	--	--	--	1,174
Baldcypress	335,864	6,641	12,283	28,642	32,076	42,075	37,093	32,490	37,531	79,810	27,223
Pondcypress	86,411	2,300	11,886	8,660	10,364	14,681	7,311	10,980	5,687	10,703	3,839
Cedars	135,298	36,106	35,871	23,993	18,852	5,499	5,280	5,688	3,117	892	--
Total softwoods	11,240,482	1,237,285	1,956,234	2,036,441	1,800,081	1,492,712	1,032,266	699,521	418,929	490,512	76,501
Hardwood											
Select white oaks[a]	1,762,535	120,988	172,286	211,927	286,042	250,805	220,429	170,518	103,968	175,330	50,242
Select red oaks[b]	905,280	33,975	48,120	79,949	105,647	117,017	106,846	104,111	78,969	177,942	52,704
Chestnut oak	1,018,429	50,275	109,172	121,105	139,178	136,619	134,369	106,521	68,055	120,666	32,469
Other white oaks	322,245	26,936	42,007	53,550	56,693	47,492	30,032	21,593	7,923	26,120	9,899
Other red oaks	2,323,225	177,784	252,942	316,804	365,309	324,472	277,208	224,251	126,380	208,947	49,128
Hickory	871,766	60,630	95,345	136,064	134,056	140,310	98,329	82,924	46,968	73,271	3,869
Yellow birch	44,729	5,828	6,622	5,145	2,749	4,794	7,041	2,326	2,567	7,657	--
Hard maple	123,351	11,493	10,279	15,100	13,221	16,774	20,041	12,089	11,503	7,110	5,741
Soft maple	1,808,738	260,127	302,892	279,764	284,839	216,187	174,415	115,215	71,843	95,504	7,952
Beech	286,579	16,269	24,939	30,993	27,109	46,278	45,400	30,176	22,979	36,930	5,506
Sweetgum	1,827,069	195,525	243,182	291,068	294,492	257,460	202,818	144,565	86,905	99,964	11,090
Tupelo and blackgum	1,766,583	134,467	180,825	235,153	289,679	254,891	201,500	155,873	113,602	149,276	51,317
Ash	431,581	39,910	58,088	59,862	63,473	45,998	55,558	49,941	21,004	35,400	2,347
Cottonwood	26,456	2,722	2,879	4,073	2,471	4,639	3,496	2,114	1,006	3,056	--
Basswood	116,096	2,561	10,151	18,322	21,148	15,267	23,359	8,977	9,032	6,627	652
Yellow-poplar	2,762,952	136,608	227,558	289,632	411,528	455,897	415,475	275,038	226,336	290,536	34,344
Bay and magnolia	111,154	26,346	35,046	14,219	14,166	8,753	5,511	2,614	695	3,804	--
Black cherry	74,577	11,654	14,837	19,128	7,687	4,636	3,918	6,646	1,328	4,743	--
Black walnut	42,972	4,062	5,088	8,655	9,714	6,109	5,941	492	--	2,279	632
Sycamore	83,872	4,731	5,321	7,051	9,389	15,162	9,778	7,134	4,498	13,698	7,110
Black locust	213,731	8,689	25,622	37,581	46,808	29,446	26,495	17,686	9,335	11,063	1,006
Elm	201,090	17,287	26,394	33,485	37,759	26,975	18,000	13,391	12,488	14,580	731
Other eastern hardwoods	585,701	81,320	97,602	87,592	83,764	78,316	53,821	38,387	22,807	40,155	1,937
Total hardwoods	17,710,711	1,430,187	1,997,197	2,356,222	2,706,921	2,504,297	2,139,780	1,592,582	1,050,191	1,604,658	328,676
All species	28,951,193	2,667,472	3,953,431	4,392,663	4,507,002	3,997,009	3,172,046	2,292,103	1,469,120	2,095,170	405,177

[a] Includes white, swamp white, swamp chestnut, and chinkapin oaks.

[b] [illegible] and Shumard oaks.

Table 20.--Volume of sawtimber on timberland, by species and diameter class, North Carolina, 1984

Species	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Thousand board feet								
Softwood									
Longleaf pine	1,776,008	380,746	460,566	439,893	273,287	150,443	46,753	24,320	--
Slash pine	106,803	69,181	28,522	9,100	--	--	--	--	--
Shortleaf pine	4,166,903	1,277,947	1,292,366	906,151	451,189	135,047	75,607	28,596	--
Loblolly pine	21,063,301	3,083,392	3,869,507	4,260,684	3,694,726	2,782,692	1,645,038	1,656,222	71,040
Pond pine	2,579,763	738,622	755,514	523,975	264,154	161,382	86,492	49,624	--
Virginia pine	2,769,319	1,245,510	839,468	509,258	124,290	42,756	8,037	--	--
Pitch pine	678,686	130,965	146,598	157,647	102,719	59,701	36,722	44,334	--
Table Mountain pine	82,742	11,936	27,391	30,401	13,014	--	--	--	--
Spruce pine	--	--	--	--	--	--	--	--	--
Sand pine	--	--	--	--	--	--	--	--	--
Eastern white pine	2,627,722	207,822	258,569	330,700	384,713	403,844	315,747	573,581	152,746
Eastern hemlock	820,337	30,936	78,794	88,822	139,933	107,474	88,294	209,982	76,102
Spruce and fir	60,284	7,786	21,458	15,838	7,555	--	--	--	7,647
Baldcypress	1,576,878	86,793	121,755	184,670	178,056	166,470	203,215	463,364	172,555
Pondcypress	345,807	28,075	40,754	65,949	35,394	57,162	31,028	61,981	25,464
Cedars	294,688	93,085	87,348	27,831	29,079	32,985	18,846	5,514	--
Total softwoods	38,949,241	7,392,796	8,028,610	7,550,919	5,698,109	4,099,956	2,555,779	3,117,518	505,554
Hardwood									
Select white oaks[a]	5,541,200	--	977,575	994,947	973,774	809,808	522,777	956,197	306,122
Select red oaks[b]	3,308,116	--	351,704	450,719	449,205	469,473	373,939	907,232	305,844
Chestnut oak	3,153,623	--	457,397	519,807	567,596	482,705	324,546	618,743	182,829
Other white oaks	901,244	--	207,436	200,501	140,216	107,355	41,122	144,457	60,157
Other red oaks	7,093,372	--	1,291,743	1,328,757	1,256,666	1,093,212	651,403	1,164,273	307,318
Hickory	2,544,677	--	459,321	566,341	442,565	404,665	241,498	406,956	23,331
Yellow birch	121,617	--	9,542	18,813	30,340	10,734	12,492	39,696	--
Hard maple	379,371	--	48,857	68,738	86,850	54,532	54,100	35,153	31,141
Soft maple	3,883,039	--	921,824	822,763	736,069	522,997	344,443	489,938	45,005
Beech	842,539	--	98,908	176,043	177,111	120,302	93,013	153,673	23,489
Sweetgum	5,052,057	--	1,050,886	1,101,225	978,087	761,315	484,608	601,840	74,096
Tupelo and blackgum	5,260,507	--	926,757	987,994	876,039	740,101	574,935	828,374	326,307
Ash	1,164,694	--	203,958	177,654	241,233	233,905	104,348	189,557	14,039
Cottonwood	76,775	--	8,632	19,088	16,068	10,425	5,270	17,292	--
Basswood	354,123	--	73,487	59,702	99,607	41,213	43,192	33,355	3,567
Yellow-poplar	10,249,726	--	1,470,727	1,969,001	2,032,767	1,463,651	1,285,617	1,791,468	236,495
Bay and magnolia	138,124	--	46,831	33,037	23,670	11,700	3,255	19,631	--
Black cherry	127,488	--	28,424	19,352	17,372	31,166	6,510	24,664	--
Black walnut	91,693	--	32,468	22,133	22,683	1,926	--	9,673	2,810
Sycamore	300,858	--	30,072	58,855	41,246	33,311	22,431	72,408	42,535
Black locust	519,835	--	164,886	106,935	98,283	66,739	35,741	43,190	4,061
Elm	509,382	--	130,080	104,395	76,639	61,169	59,423	73,718	3,958
Other eastern hardwoods	1,316,061	--	286,084	307,320	231,757	173,643	107,623	199,823	9,811
Total hardwoods	52,930,121	--	9,277,599	10,114,120	9,615,843	7,706,047	5,392,286	8,821,311	2,002,915
All species	91,879,362	7,392,796	17,306,209	17,665,039	15,313,952	11,806,003	7,948,065	11,938,829	2,508,469

[a]Includes white, swamp white, swamp chestnut, and chinkapin oaks.

[b]Includes cherrybark, northern red, and Shumard oaks.

Table 21.--Volume of sawtimber on timberland, by species, size class, and log grade, North Carolina, 1984

Species	All size classes					Trees 15.0 inches d.b.h. and larger				
	All grades	Log grade				All grades	Log grade			
		1	2	3	4		1	2	3	4
	Thousand board feet									
Softwood										
Yellow pines[a]	33,223,525	7,725,184	4,200,465	21,297,876	(b)	12,028,185	3,807,098	1,559,240	6,661,847	(b)
Eastern white pine[c]	2,627,722	195,418	184,707	1,304,129	943,468	1,830,631	195,418	123,681	716,631	794,901
Spruce and fir[c]	60,284	--	2,568	34,630	23,086	15,202	--	1,216	5,777	8,209
Cypress[c]	1,922,685	395,793	993,421	533,471	--	1,394,689	390,513	655,504	348,672	--
Other eastern softwoods[c]	1,115,025	49,452	93,133	559,592	412,848	708,209	41,629	72,541	255,589	338,450
Total	38,949,241	8,365,847	5,474,294	23,729,698	1,379,402	15,976,916	4,434,658	2,412,182	7,988,516	1,141,560
Hardwood[d]										
Select white and red oaks	8,849,316	1,829,082	2,094,567	3,646,620	1,279,047	6,074,371	1,829,082	1,650,485	1,971,137	623,667
Other white and red oaks	11,148,239	1,765,661	2,685,368	4,633,461	2,063,749	7,142,598	1,765,661	2,075,357	2,237,255	1,064,325
Hickory	2,544,677	397,909	519,780	1,129,429	497,559	1,519,015	397,909	358,279	538,619	224,208
Yellow birch	121,617	19,585	35,231	45,723	21,078	93,262	19,585	29,844	29,844	13,989
Hard maple	379,371	54,973	90,934	156,453	77,011	261,776	54,973	83,768	83,768	39,267
Sweetgum	5,052,057	879,290	1,127,897	2,507,285	537,585	2,899,946	879,290	711,920	1,014,087	294,649
Ash, walnut, and black cherry	1,383,875	247,222	427,050	609,959	99,644	899,886	242,435	301,488	281,786	74,177
Yellow-poplar	10,249,726	2,325,828	2,089,815	4,123,262	1,710,821	6,809,998	2,325,828	1,342,012	2,165,446	976,712
Other eastern hardwoods	13,201,243	2,114,780	3,417,614	5,789,368	1,879,481	7,837,550	2,114,780	2,296,697	2,447,572	978,501
Total	52,930,121	9,634,330	12,488,256	22,641,560	8,165,975	33,538,402	9,629,543	8,849,850	10,769,514	4,289,495
All species	91,879,362	18,000,177	17,962,550	46,371,258	9,545,377	49,515,318	14,064,201	11,262,032	18,758,030	5,431,055

[a]Based on "Southern Pine Log Grades for Yard and Structural Lumber," Research Paper SE-39, published by the Southeastern Forest Experiment Station, Asheville, NC, 1968.

[b]Not applicable.

[c]Based on "Sawlog Grades for Eastern White Pine," Research Paper NE-205, published by the Northeastern Forest Experiment Station, Broomall, PA, 1971.

[d]Based on "A Guide to Hardwood Log Grading (revised)," General Technical Report NE-1, published by the Northeastern Forest Experiment Station, Broomall, PA, 1973.

Table 22.--Volume of live timber and associated green weight of forest biomass on timberland, by class of material, softwood, and hardwood, North Carolina, 1984

Class of material	Volume[a]			Associated green weight[b]		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Thousand cubic feet			Hundred thousand pounds		
Sawtimber trees						
Saw-log portion	15,803,441	6,958,694	8,844,747	12,342,925	5,089,352	7,253,573
Upper stem	4,170,627	1,088,269	3,082,358	3,323,763	795,923	2,527,840
Total[c]	19,974,068	8,046,963	11,927,105	15,666,688	5,885,275	9,781,413
Poletimber trees[c]	8,977,125	3,193,519	5,783,606	6,453,175	2,278,976	4,174,199
All growing stock[c]	28,951,193	11,240,482	17,710,711	22,119,863	8,164,251	13,955,612
Rough trees[c]	1,517,390	60,154	1,457,236	1,154,024	45,678	1,108,346
Rotten trees[c]	386,239	26,061	360,178	293,735	19,790	273,945
Saplings[d]	5,458,614	1,096,757	4,361,857	3,945,336	703,788	3,241,548
Stumps, tops, and limbs[e]	6,977,076	2,137,092	4,839,984	5,254,631	1,535,910	3,718,721
Total, all classes	43,290,512	14,560,546	28,729,966	32,767,589	10,469,417	22,298,172

[a]Excludes bark.
[b]Includes bark.
[c]Bole portion of trees 5.0 inches d.b.h. and larger.
[d]Includes entire tree above ground.
[e]Of live trees 5.0 inches d.b.h. and larger.

Table 23.—Total volume of live trees on timberland, by species and diameter class, North Carolina, 1984

Species	All classes	Diameter class (inches at breast height) 1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Thousand cubic feet												
Softwood													
Longleaf pine	541,539	6,678	17,306	41,622	71,051	109,359	109,101	92,863	53,127	27,673	8,252	4,507	--
Slash pine	194,912	3,603	25,867	74,792	59,545	21,810	7,297	1,998	--	--	--	--	--
Shortleaf pine	1,668,145	15,284	68,984	178,402	340,887	401,161	327,348	200,302	91,577	25,620	13,610	4,970	--
Loblolly pine	7,165,774	109,403	357,807	835,003	1,064,547	1,013,821	992,528	944,118	743,227	522,072	294,075	278,306	10,867
Pond pine	1,071,400	21,333	64,865	126,688	203,845	229,877	192,550	118,392	57,407	31,463	16,159	8,821	--
Virginia pine	1,800,626	40,471	179,716	316,704	459,728	406,041	231,409	126,697	28,813	9,354	1,693	--	--
Pitch pine	235,443	1,583	9,624	19,510	28,972	47,309	42,223	37,548	21,946	11,894	6,899	7,935	--
Table Mountain pine	28,356	446	1,822	1,706	4,110	3,462	6,552	6,766	2,682	--	810	--	--
Spruce pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Eastern white pine	747,511	18,504	29,133	46,490	64,723	68,203	70,409	80,222	85,237	84,526	64,168	108,344	27,552
Eastern hemlock	253,884	10,367	16,793	23,531	15,649	11,204	22,727	21,920	32,510	23,432	17,825	43,071	14,855
Spruce and fir	25,933	930	1,805	3,820	3,832	2,570	5,829	3,740	1,678	364	--	--	1,365
Baldcypress	433,283	1,926	4,519	10,525	16,085	35,735	39,694	52,542	46,098	39,789	46,048	99,032	41,290
Pondcypress	122,364	1,350	751	3,714	16,379	11,341	13,297	18,618	10,477	13,772	7,673	14,563	10,429
Cedars	271,376	30,066	55,821	54,467	46,580	31,489	23,380	7,725	6,914	7,398	3,626	1,034	2,876
Total softwoods	14,560,546	261,944	834,813	1,736,974	2,395,933	2,393,382	2,084,344	1,713,451	1,181,693	797,357	480,838	570,583	109,234
Hardwood													
Select white oaks[a]	2,474,085	47,877	115,969	189,868	234,989	275,014	365,805	317,617	276,030	215,556	133,051	231,189	71,120
Select red oaks[b]	1,234,889	14,464	40,722	51,670	64,948	107,009	134,672	147,966	136,677	131,059	98,990	230,492	76,220
Chestnut oak	1,433,995	12,159	44,158	80,891	149,416	161,911	183,573	180,332	173,099	139,755	88,861	171,469	48,371
Other white oaks	495,885	14,898	32,249	46,757	60,771	72,184	76,780	62,235	42,626	29,934	9,899	33,816	13,736
Other red oaks	3,410,615	105,666	188,764	291,828	355,518	424,360	473,125	412,604	359,007	286,128	163,466	274,004	76,145
Hickory	1,261,882	42,893	68,449	103,789	134,160	173,153	171,197	178,327	121,899	106,676	59,502	96,204	5,633
Yellow birch	80,506	1,728	5,144	9,591	9,467	6,791	4,424	8,363	12,765	3,453	3,102	11,833	3,845
Hard maple	190,206	9,919	14,850	17,073	16,805	19,278	17,105	20,356	24,981	14,596	13,896	10,930	10,417
Soft maple	3,591,258	363,782	536,450	467,535	453,317	402,234	402,553	297,615	241,605	155,862	102,486	150,320	17,499
Beech	443,728	19,349	23,823	28,346	36,047	43,833	39,719	60,000	59,845	40,094	28,844	54,686	9,142
Sweetgum	2,789,530	204,784	297,961	310,419	319,107	357,890	346,287	302,315	240,394	168,905	105,803	121,113	14,552
Tupelo and blackgum	2,877,727	147,758	192,622	235,870	265,740	326,509	382,440	332,382	277,272	209,699	161,478	239,340	106,617
Ash	702,453	52,211	68,054	76,209	83,658	81,886	78,605	61,511	65,850	58,416	26,254	46,058	3,741
Cottonwood	37,029	1,394	3,607	3,868	3,629	4,899	2,916	5,438	4,079	2,470	1,187	3,542	--
Basswood	144,985	3,078	4,280	3,337	13,217	21,291	25,025	17,540	26,794	10,301	10,331	9,047	744
Yellow-poplar	3,398,256	63,136	112,788	186,986	277,937	338,648	475,091	522,190	471,382	313,381	258,769	334,535	43,413
Bay and magnolia	342,473	83,185	71,294	56,825	55,096	21,847	20,652	13,705	7,574	5,088	889	6,318	--
Black cherry	180,505	35,361	33,282	23,603	24,623	27,507	9,001	7,423	4,546	7,680	1,530	5,949	--
Black walnut	62,261	502	2,169	5,813	8,755	10,538	13,588	7,316	7,079	1,945	--	3,809	747
Sycamore	111,359	1,477	4,211	7,103	7,683	8,380	11,068	18,485	12,714	8,769	5,574	17,413	8,482
Black locust	344,598	3,750	11,608	18,708	40,018	62,096	66,150	44,922	38,425	24,940	11,895	20,773	1,313
Elm	311,916	18,290	29,756	28,326	36,268	42,720	48,244	33,619	21,670	16,784	15,332	18,589	2,318
Other eastern hardwoods	2,809,825	532,921	679,065	538,888	329,560	223,028	164,453	121,840	76,426	48,939	31,385	58,596	4,724
Total hardwoods	28,729,966	1,780,582	2,581,275	2,783,303	2,980,729	3,213,006	3,512,473	3,174,101	2,702,739	2,000,430	1,332,524	2,150,025	518,779
All species	43,290,512	2,042,526	3,416,088	4,520,277	5,376,662	5,606,388	5,596,817	4,887,552	3,884,432	2,797,787	1,813,362	2,720,608	628,013

[a] Includes white, swamp white, swamp chestnut, and chinkapin oaks.

Table 24.--Green weight of forest biomass on timberland, by species and diameter class, North Carolina, 1984

Species	All classes	Diameter class (inches at breast height)											
		1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Hundred thousand pounds												
Softwood													
Longleaf pine	427,669	5,554	14,822	28,308	56,221	87,645	87,702	74,130	41,760	21,487	6,458	3,582	--
Slash pine	154,093	2,835	24,005	54,146	47,734	17,960	5,852	1,561	--	--	--	--	--
Shortleaf pine	1,149,692	8,691	41,728	104,893	234,021	288,152	234,516	142,405	64,679	17,873	9,347	3,387	--
Loblolly pine	5,140,685	56,657	211,932	576,488	780,710	762,090	738,406	691,200	537,791	374,204	208,710	195,026	7,471
Pond pine	757,057	11,217	37,183	85,671	148,282	168,759	140,407	85,335	40,873	22,094	11,156	6,080	--
Virginia pine	1,366,686	34,762	143,967	237,011	346,810	310,902	172,644	92,206	20,604	6,560	1,220	--	--
Pitch pine	163,287	1,282	8,841	13,172	19,851	31,197	28,639	25,791	15,442	8,552	4,939	5,581	--
Table Mountain pine	18,377	370	1,687	876	2,567	2,189	4,151	4,241	1,663	--	633	--	--
Spruce pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Eastern white pine	470,286	7,722	14,012	29,309	44,881	47,229	48,028	52,977	55,328	53,107	39,391	63,211	15,091
Eastern hemlock	192,901	6,431	10,551	19,975	13,683	9,892	18,526	17,069	24,301	17,569	12,898	32,003	10,003
Spruce and fir	19,210	566	1,152	2,463	2,948	1,987	4,437	2,956	1,296	475	--	--	930
Baldcypress	324,773	1,020	2,833	4,200	9,246	24,529	28,619	39,485	34,688	30,281	35,160	76,183	38,529
Pondcypress	91,605	590	477	1,690	9,409	7,338	9,221	13,546	8,267	10,547	6,155	12,065	12,300
Cedars	193,096	18,994	33,907	38,330	34,539	24,374	18,267	6,440	5,806	6,537	3,231	929	1,742
Total softwoods	10,469,417	156,691	547,097	1,196,532	1,750,902	1,784,243	1,539,415	1,249,342	852,498	569,286	339,298	398,047	86,066
Hardwood													
Select white oaks[a]	2,055,223	37,993	84,077	130,667	184,161	226,521	316,420	273,459	235,261	183,454	114,105	203,630	65,475
Select red oaks[b]	1,041,865	10,542	28,555	37,005	51,873	89,751	112,546	125,215	116,413	111,024	84,834	200,078	74,029
Chestnut oak	1,175,892	11,157	34,750	55,286	112,290	126,593	153,164	151,542	143,427	117,408	76,385	150,247	43,643
Other white oaks	417,610	10,830	22,258	33,949	47,741	59,093	66,020	54,614	39,544	28,198	9,261	31,815	14,287
Other red oaks	2,910,889	88,800	141,673	208,544	289,488	362,019	419,190	365,167	318,975	254,087	143,945	244,537	74,464
Hickory	1,051,858	38,143	59,531	74,625	101,649	136,730	137,619	149,238	104,988	95,391	54,005	93,970	5,969
Yellow birch	78,188	1,502	4,241	6,927	8,014	6,137	4,321	8,461	12,839	3,718	2,940	13,568	5,520
Hard maple	164,453	8,465	12,426	12,276	13,338	15,708	15,210	18,296	22,209	13,008	12,648	10,941	9,928
Soft maple	2,720,948	280,546	373,201	306,756	340,376	309,421	324,560	242,102	196,379	124,947	81,327	125,083	16,250
Beech	364,424	12,074	15,238	16,809	26,844	35,450	35,035	52,259	52,530	35,119	25,480	49,215	8,371
Sweetgum	2,026,116	135,097	199,565	200,572	225,317	264,176	263,588	230,789	185,436	129,781	83,337	95,894	12,564
Tupelo and blackgum	2,079,378	103,520	128,390	116,358	158,588	209,495	276,837	247,148	212,009	165,197	133,250	214,878	113,708
Ash	450,774	32,482	43,426	51,636	57,807	54,458	52,689	39,820	40,215	33,496	15,212	26,884	2,649
Cottonwood	25,731	965	2,478	2,125	2,312	3,259	2,107	3,996	2,981	1,903	980	2,625	--
Basswood	98,456	2,053	2,928	1,870	8,164	14,268	17,033	11,920	18,351	7,249	7,098	6,959	563
Yellow-poplar	2,417,242	45,815	76,635	110,791	186,280	239,036	340,427	376,621	341,350	228,178	189,162	247,875	35,072
Bay and magnolia	212,138	50,856	42,969	29,673	34,027	14,583	15,848	10,188	5,380	3,697	816	4,101	--
Black cherry	110,129	16,497	21,287	13,473	15,889	18,207	5,668	5,395	3,119	5,241	1,038	4,315	--
Black walnut	58,771	428	1,818	4,655	7,583	9,146	13,528	7,080	7,086	2,244	--	4,430	773
Sycamore	80,189	1,023	2,865	3,404	4,699	5,746	8,419	13,767	9,715	6,533	4,329	13,292	6,397
Black locust	350,428	3,118	9,691	15,704	37,942	60,881	71,015	48,814	40,888	26,343	12,041	22,604	1,387
Elm	208,480	13,253	20,807	16,276	22,689	28,081	32,530	22,927	14,608	11,400	10,334	13,113	2,462
Other eastern hardwoods	2,198,990	446,436	561,144	341,721	238,936	169,710	143,987	105,456	64,059	40,562	27,249	53,897	5,833
Total hardwoods	22,298,172	1,351,595	1,889,953	1,791,102	2,176,007	2,458,469	2,827,761	2,564,274	2,187,762	1,628,178	1,089,776	1,833,951	499,344
All species	32,767,589	1,508,286	2,437,050	2,987,634	3,926,909	4,242,712	4,367,176	3,813,616	3,040,260	2,197,464	1,429,074	2,231,998	585,410

[a] Includes white, swamp white, swamp chestnut, and chinkapin oaks.

[b] Includes cherrybark, northern red, and Shumard oaks.

Table 25.--Volume of growing stock on timberland, by species and forest-type group, North Carolina, 1984

Species	All types	Forest-type group								
		White pine-hemlock	Spruce-fir	Longleaf-slash	Loblolly-shortleaf	Oak-pine	Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Maple-beech-birch
	Thousand cubic feet									
Softwood										
Longleaf pine	442,605	--	--	322,512	73,414	32,684	13,613	382	--	--
Slash pine	129,459	--	--	123,769	3,869	1,821	--	--	--	--
Shortleaf pine	1,336,686	5,981	--	492	948,291	209,631	168,893	1,269	2,129	--
Loblolly pine	5,650,852	--	--	29,279	4,361,407	787,008	301,517	161,463	10,178	--
Pond pine	815,973	--	--	11,427	668,876	94,068	3,458	38,144	--	--
Virginia pine	1,304,112	17,122	--	--	1,009,826	183,647	91,863	629	1,025	--
Pitch pine	186,734	15,898	--	--	83,983	50,995	35,858	--	--	--
Table Mountain pine	21,886	4,574	--	--	9,458	2,663	5,191	--	--	--
Spruce pine	--	--	--	--	--	--	--	--	--	--
Sand pine	--	--	--	--	--	--	--	--	--	--
Eastern white pine	591,837	296,867	--	--	41,234	150,094	103,642	--	--	--
Eastern hemlock	184,395	48,157	438	--	1,359	55,724	55,800	--	--	22,917
Spruce and fir	18,370	--	16,534	--	--	--	1,174	--	--	662
Baldcypress	335,864	--	--	--	4,473	7,855	--	314,582	8,954	--
Pondcypress	86,411	--	--	--	1,510	5,176	--	78,980	745	--
Cedars	135,298	--	--	--	26,793	16,738	25,756	64,790	1,221	--
Total softwoods	11,240,482	388,599	16,972	487,479	7,234,493	1,598,104	806,765	660,239	24,252	23,579
Hardwood										
Select white oaks[a]	1,762,535	11,617	--	387	88,724	203,883	1,359,488	84,068	14,368	--
Select red oaks[b]	905,280	1,387	--	--	18,514	50,519	778,956	18,002	11,388	26,514
Chestnut oak	1,018,429	12,686	--	--	4,857	61,025	934,538	--	--	5,323
Other white oaks	322,245	--	--	--	39,522	52,885	200,218	23,435	6,185	--
Other red oaks	2,323,225	15,772	--	2,799	161,218	325,767	1,514,558	286,025	15,796	1,290
Hickory	871,766	2,787	--	--	30,006	62,275	729,382	23,901	17,412	6,003
Yellow birch	44,729	6,033	6,171	--	--	--	11,628	--	--	20,897
Hard maple	123,351	--	--	--	388	418	63,424	486	963	57,672
Soft maple	1,808,738	10,927	--	1,631	108,963	138,495	817,528	617,854	91,596	21,744
Beech	286,579	2,313	--	--	2,219	21,184	184,263	18,442	1,882	56,276
Sweetgum	1,827,069	--	--	186	221,539	219,592	601,528	702,891	81,333	--
Tupelo and blackgum	1,766,583	1,765	--	899	55,010	84,255	158,091	1,442,172	24,391	--
Ash	431,581	--	--	--	2,072	7,361	119,370	173,155	113,913	15,710
Cottonwood	26,456	--	--	--	--	--	354	17,467	8,635	--
Basswood	116,096	970	--	--	289	2,554	79,458	--	--	32,825
Yellow-poplar	2,762,952	12,378	--	1,051	197,513	297,025	1,856,444	332,734	51,051	14,756
Bay and magnolia	111,154	--	--	--	8,748	11,839	25,813	57,965	--	6,789
Black cherry	74,577	--	--	--	5,674	3,754	51,199	6,072	2,269	5,609
Black walnut	42,972	549	--	--	318	376	37,521	1,654	2,554	--
Sycamore	83,872	--	--	--	4,178	1,009	19,374	15,454	43,857	--
Black locust	213,731	--	--	--	1,686	4,842	197,540	--	1,588	8,075
Elm	201,090	--	--	907	9,940	9,266	56,649	70,099	53,562	667
Other eastern hardwoods	585,701	9,080	--	--	9,334	26,777	337,523	69,955	89,756	43,276
Total hardwoods	17,710,711	88,264	6,171	7,860	970,712	1,585,101	10,134,847	3,961,831	632,499	323,426
All species	28,951,193	476,863	23,143	495,339	8,205,205	3,183,205	10,941,612	4,622,070	656,751	347,005

[a] Includes white, swamp white, swamp chestnut, and chinkapin oaks.

[b] ... northern red, and Shumard oaks.

Table 26.--Volume of growing stock on timberland, by ownership class, species group, and diameter class, North Carolina, 1984

Ownership class and species group	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Thousand cubic feet										
National Forest											
Softwood	478,286	32,389	51,236	63,429	73,293	70,220	51,656	38,470	18,921	50,765	27,907
Hardwood	1,727,084	118,712	163,080	190,007	218,827	228,096	225,975	169,674	119,718	233,001	59,994
Total	2,205,370	151,101	214,316	253,436	292,120	298,316	277,631	208,144	138,639	283,766	87,901
Other public											
Softwood	530,317	52,168	94,801	103,482	97,044	68,658	49,367	27,006	15,115	20,226	2,450
Hardwood	514,361	44,393	56,637	75,852	80,987	64,896	57,100	52,198	37,388	42,517	2,393
Total	1,044,678	96,561	151,438	179,334	178,031	133,554	106,467	79,204	52,503	62,743	4,843
Forest industry											
Softwood	1,506,075	297,372	360,664	255,937	196,503	134,826	95,851	58,006	37,231	60,051	9,634
Hardwood	1,379,208	134,046	163,026	164,830	200,786	156,833	155,530	134,644	84,533	140,881	44,099
Total	2,885,283	431,418	523,690	420,767	397,289	291,659	251,381	192,650	121,764	200,932	53,733
Forest industry-leased											
Softwood	156,035	38,896	67,056	31,834	11,900	5,158	--	1,191	--	--	--
Hardwood	25,463	4,985	5,593	2,426	3,610	2,634	2,430	2,082	278	1,425	--
Total	181,498	43,881	72,649	34,260	15,510	7,792	2,430	3,273	278	1,425	--
Other private											
Softwood	8,569,769	816,460	1,382,477	1,581,759	1,421,341	1,213,850	835,392	574,848	347,662	359,470	36,510
Hardwood	14,064,595	1,128,051	1,608,861	1,923,107	2,202,711	2,051,838	1,698,745	1,233,984	808,274	1,186,834	222,190
Total	22,634,364	1,944,511	2,991,338	3,504,866	3,624,052	3,265,688	2,534,137	1,808,832	1,155,936	1,546,304	258,700
All ownerships											
Softwood	11,240,482	1,237,285	1,956,234	2,036,441	1,800,081	1,492,712	1,032,266	699,521	418,929	490,512	76,501
Hardwood	17,710,711	1,430,187	1,997,197	2,356,222	2,706,921	2,504,297	2,139,780	1,592,582	1,050,191	1,604,658	328,676
Total	28,951,193	2,667,472	3,953,431	4,392,663	4,507,002	3,997,009	3,172,046	2,292,103	1,469,120	2,095,170	405,177

Table 27.--Volume of sawtimber on timberland, by ownership class, species group, and diameter class, North Carolina, 1984

Ownership class and species group	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Thousand board feet								
National Forest									
Softwood	2,022,230	228,060	324,316	349,937	279,563	221,594	113,619	320,199	184,942
Hardwood	5,596,367	--	750,115	908,028	982,472	791,014	595,812	1,230,483	338,443
Total	7,618,597	228,060	1,074,431	1,257,965	1,262,035	1,012,608	709,431	1,550,682	523,385
Other public									
Softwood	1,870,217	386,104	443,473	356,570	276,251	161,553	94,332	133,882	18,052
Hardwood	1,477,873	--	277,728	258,009	254,455	251,015	190,823	230,167	15,676
Total	3,348,090	386,104	721,201	614,579	530,706	412,568	285,155	364,049	33,728
Forest industry									
Softwood	3,993,338	921,732	871,382	674,372	523,814	336,977	222,404	380,654	62,003
Hardwood	4,143,133	--	673,003	628,335	694,836	648,783	434,987	782,992	280,197
Total	8,136,471	921,732	1,544,385	1,302,707	1,218,650	985,760	657,391	1,163,646	342,200
Forest industry-leased									
Softwood	197,761	111,667	53,120	25,844	--	7,130	--	--	--
Hardwood	52,129	--	12,503	10,314	10,782	9,627	1,321	7,582	--
Total	249,890	111,667	65,623	36,158	10,782	16,757	1,321	7,582	--
Other private									
Softwood	30,865,695	5,745,233	6,336,319	6,144,196	4,618,481	3,372,702	2,125,424	2,282,783	240,557
Hardwood	41,660,619	--	7,564,250	8,309,434	7,673,298	6,005,608	4,169,343	6,570,087	1,368,599
Total	72,526,314	5,745,233	13,900,569	14,453,630	12,291,779	9,378,310	6,294,767	8,852,870	1,609,156
All ownerships									
Softwood	38,949,241	7,392,796	8,028,610	7,550,919	5,698,109	4,099,956	2,555,779	3,117,518	505,554
Hardwood	52,930,121	--	9,277,599	10,114,120	9,615,843	7,706,047	5,392,286	8,821,311	2,002,915
Total	91,879,362	7,392,796	17,306,209	17,665,039	15,313,952	11,806,003	7,948,065	11,938,829	2,508,469

Table 28.--Volume of growing stock on timberland, by broad management class, species group, and stand-age class, North Carolina, 1984

Broad management class and species group	All classes	No manageable stand	Stand-age class (years)								
			0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81+
	Thousand cubic feet										
Pine plantation											
Softwood	1,188,284	4,152	21,372	561,111	555,307	32,948	13,394	--	--	--	--
Hardwood	59,775	--	6,259	23,014	24,330	1,691	4,481	--	--	--	--
Total	1,248,059	4,152	27,631	584,125	579,637	34,639	17,875	--	--	--	--
Natural pine											
Softwood	6,939,259	130,760	53,201	391,270	1,070,316	1,763,111	1,483,333	1,015,793	629,726	193,401	208,348
Hardwood	1,013,232	6,528	13,335	42,915	134,531	205,130	209,970	173,560	131,053	38,398	57,812
Total	7,952,491	137,288	66,536	434,185	1,204,847	1,968,241	1,693,303	1,189,353	760,779	231,799	266,160
Oak-pine											
Softwood	1,598,104	99,844	46,785	76,610	101,730	226,588	300,098	298,556	224,109	136,643	87,141
Hardwood	1,585,101	45,244	47,003	52,929	72,752	224,542	325,822	320,021	253,916	144,612	98,260
Total	3,183,205	145,088	93,788	129,539	174,482	451,130	625,920	618,577	478,025	281,255	185,401
Upland hardwood											
Softwood	830,344	72,031	27,455	35,022	38,728	83,209	140,909	163,183	125,202	83,731	60,874
Hardwood	10,458,273	482,548	209,826	201,352	377,907	1,023,975	1,653,371	2,119,382	1,807,497	1,253,184	1,329,231
Total	11,288,617	554,579	237,281	236,374	416,635	1,107,184	1,794,280	2,282,565	1,932,699	1,336,915	1,390,105
Lowland hardwood											
Softwood	684,491	44,773	6,529	16,624	30,248	23,343	72,211	88,631	83,426	91,841	226,865
Hardwood	4,594,330	208,102	39,471	73,009	143,051	312,730	805,924	853,486	680,599	416,275	1,061,683
Total	5,278,821	252,875	46,000	89,633	173,299	336,073	878,135	942,117	764,025	508,116	1,288,548
All classes											
Softwood	11,240,482	351,560	155,342	1,080,637	1,796,329	2,129,199	2,009,945	1,566,163	1,062,463	505,616	583,228
Hardwood	17,710,711	742,422	315,894	393,219	752,571	1,768,068	2,999,568	3,466,449	2,873,065	1,852,469	2,546,986
Total	28,951,193	1,093,982	471,236	1,473,856	2,548,900	3,897,267	5,009,513	5,032,612	3,935,528	2,358,085	3,130,214

Table 29.--Net annual growth and removals of live timber and growing stock on timberland, by species, North Carolina, 1983

Species	Live timber[a]		Growing stock	
	Net annual growth	Annual timber removals	Net annual growth	Annual timber removals
	Thousand cubic feet			
Softwood				
Yellow pines	459,642	406,454	458,613	403,902
Eastern white pine	20,933	18,294	20,932	18,294
Spruce and fir	572	--	572	--
Cypress	10,813	2,679	10,711	2,566
Other eastern softwoods	10,142	6,174	10,065	5,965
Total softwoods	502,102	433,601	500,893	430,727
Hardwood				
Select white and red oaks	86,602	54,090	86,138	51,230
Other white and red oaks	120,333	77,228	119,058	69,980
Hickory	20,640	14,244	20,466	13,399
Yellow birch	1,203	--	1,202	--
Hard maple	3,761	243	3,736	243
Sweetgum	75,802	44,935	74,629	42,040
Ash, walnut, and black cherry	19,802	9,154	18,955	7,331
Yellow-poplar	130,690	60,570	130,308	59,801
Tupelo and blackgum	37,203	27,010	35,976	22,726
Bay and magnolia	6,410	2,325	5,802	1,501
Other eastern hardwoods	140,776	66,355	130,447	46,797
Total hardwoods	643,222	356,154	626,717	315,048
All species	1,145,324	789,755	1,127,610	745,775

[a]Merchantable portion only.

Table 30.--Net annual growth and removals of growing stock on timberland, by ownership class, softwood, and hardwood, North Carolina, 1983

Ownership class	Net annual growth			Annual timber removals		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Thousand cubic feet					
National Forest	61,640	13,437	48,203	9,668	5,673	3,995
Other public	38,687	21,556	17,131	20,390	9,281	11,109
Forest industry	154,416	105,141	49,275	89,449	63,459	25,990
Forest industry-leased	16,199	15,077	1,122	9,228	6,148	3,080
Other private	856,668	345,682	510,986	617,040	346,166	270,874
All ownerships	1,127,610	500,893	626,717	745,775	430,727	315,048

Table 31.--Net annual growth and removals of sawtimber on timberland, by species, North Carolina, 1983

Species	Net annual growth	Annual timber removals
	Thousand board feet	
Softwood		
Yellow pines	1,888,723	1,605,457
Eastern white pine	126,642	100,793
Spruce and fir	2,336	--
Cypress	59,127	13,129
Other eastern softwoods	39,526	20,160
Total softwoods	2,116,354	1,739,539
Hardwood		
Select white and red oaks	376,128	181,638
Other white and red oaks	500,609	230,130
Hickory	77,060	43,202
Yellow birch	2,370	--
Hard maple	12,652	715
Sweetgum	265,282	120,986
Ash, walnut, and black cherry	70,903	24,855
Yellow-poplar	661,523	252,571
Tupelo and blackgum	148,534	79,243
Bay and magnolia	9,643	1,464
Other eastern hardwoods	399,073	121,985
Total hardwoods	2,523,777	1,056,789
All species	4,640,131	2,796,328

Table 32.--Net annual growth and removals of sawtimber on timberland, by ownership class, softwood, and hardwood, North Carolina, 1983

Ownership class	Net annual growth			Annual timber removals		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Thousand board feet					
National Forest	275,604	72,818	202,786	32,014	17,748	14,266
Other public	162,377	96,199	66,178	76,662	43,591	33,071
Forest industry	472,502	297,949	174,553	297,743	227,659	70,084
Forest industry-leased	46,718	44,683	2,035	27,997	17,273	10,724
Other private	3,682,930	1,604,705	2,078,225	2,361,912	1,433,268	928,644
All ownerships	4,640,131	2,116,354	2,523,777	2,796,328	1,739,539	1,056,789

Table 33.--Mortality of live timber, growing stock, and sawtimber on timberland, by species, North Carolina, 1983

Species	Live timber[a]	Growing stock	Sawtimber
	Thousand cubic feet		Thousand board feet
Softwood			
Yellow pines	110,656	108,053	222,097
Eastern white pine	4,024	4,024	10,163
Spruce and fir	619	619	3,160
Cypress	1,240	1,187	3,355
Other eastern softwoods	2,386	2,223	5,262
Total softwoods	118,925	116,106	244,037
Hardwood			
Select white and red oaks	10,682	6,919	19,231
Other white and red oaks	33,120	25,443	74,793
Hickory	6,137	4,796	14,686
Yellow birch	317	211	--
Hard maple	1,072	902	2,689
Sweetgum	7,323	5,853	17,576
Ash, walnut, and black cherry	4,259	2,449	6,020
Yellow-poplar	5,804	4,957	12,930
Tupelo and blackgum	7,265	3,494	11,203
Bay and magnolia	1,893	862	1,630
Other eastern hardwoods	43,753	19,266	47,819
Total hardwoods	121,625	75,152	208,577
All species	240,550	191,258	452,614

[a]Merchantable portion only.

Table 34.--Mortality of growing stock and sawtimber on timberland, by ownership class, softwood, and hardwood, North Carolina, 1983

Ownership class	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	- - - Thousand cubic feet - -			- - - Thousand board feet - - -		
National Forest	17,104	9,287	7,817	46,308	23,092	23,216
Other public	6,376	3,976	2,400	12,565	7,935	4,630
Forest industry	14,303	8,957	5,346	36,469	19,018	17,451
Forest industry-leased	475	196	279	--	--	--
Other private	153,000	93,690	59,310	357,272	193,992	163,280
All ownerships	191,258	116,106	75,152	452,614	244,037	208,577

Table 35.--Mortality of growing stock and sawtimber on timberland, by cause of death, softwood, and hardwood, North Carolina, 1983

Cause of death	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	- - - Thousand cubic feet - -			- - - Thousand board feet - - -		
Fire	2,709	2,015	694	7,526	5,217	2,309
Insects	58,355	56,479	1,876	170,294	165,227	5,067
Disease	46,703	13,301	33,402	112,551	17,998	94,553
Weather	20,264	9,491	10,773	68,326	28,102	40,224
Suppression	38,824	27,252	11,572	14,711	7,782	6,929
Animals	1,293	624	669	5,592	2,172	3,420
Undetermined	23,110	6,944	16,166	73,614	17,539	56,075
All causes	191,258	116,106	75,152	452,614	244,037	208,577

Table 36.--Output of timber products, by product, species group, and type of material, North Carolina, 1983

Product and species group	Standard units	Total output		Roundwood products		Plant byproducts	
		Number of units	Thousand cubic feet	Number of units	Thousand cubic feet	Number of units	Thousand cubic feet
Saw logs							
Softwood	M fbm[a]	1,123,807	192,118	1,089,224	186,206	34,583	5,912
Hardwood	M fbm[a]	441,136	74,510	440,716	74,439	420	71
Total	M fbm[a]	1,564,943	266,628	1,529,940	260,645	35,003	5,983
Veneer logs and bolts							
Softwood	M fbm[a]	220,197	36,533	220,197	36,533	--	--
Hardwood	M fbm[a]	52,064	8,615	52,064	8,615	--	--
Total	M fbm[a]	272,261	45,148	272,261	45,148	--	--
Pulpwood[b]							
Softwood	Cords[c]	2,865,009	219,746	2,055,918	157,689	809,091	62,057
Hardwood	Cords[c]	1,915,916	146,376	1,329,712	101,590	586,204	44,786
Total	Cords[c]	4,780,925	366,122	3,385,630	259,279	1,395,295	106,843
Poles and piling							
Softwood	M pieces	20	236	20	236	--	--
Hardwood	M pieces	--	--	--	--	--	--
Total	M pieces	20	236	20	236	--	--
Posts (round and split)							
Softwood	M pieces	879	292	879	292	--	--
Hardwood	M pieces	1,107	704	1,107	704	--	--
Total	M pieces	1,986	996	1,986	996	--	--
Other[d]							
Softwood	M ft^3	13,288	13,288	147	147	13,141	13,141
Hardwood	M ft^3	9,921	9,921	3,510	3,510	6,411	6,411
Total	M ft^3	23,209	23,209	3,657	3,657	19,552	19,552
Total industrial products							
Softwood		--	462,213	--	381,103	--	81,110
Hardwood		--	240,126	--	188,858	--	51,268
Total		--	702,339	--	569,961	--	132,378
Fuelwood[e]							
Softwood	Cords	270,499	20,747	243,468	18,674	27,031	2,073
Hardwood	Cords	1,488,717	113,738	1,455,366	111,190	33,351	2,548
Total	Cords	1,759,216	134,485	1,698,834	129,864	60,382	4,621
All products[f]							
Softwood		--	482,960	--	399,777	--	83,183
Hardwood		--	353,864	--	300,048	--	53,816
Total		--	836,824	--	699,825	--	136,999

[a]International 1/4-inch rule.

[b]Roundwood figures include an estimated 29,180 thousand cubic feet of roundwood chipped at other primary wood-using plants.

[c]Rough-wood basis (includes chips converted to equivalent standard cords).

[d]Includes particleboard, charcoal, and specialty products.

[e]Excludes approximately 32,590 thousand cubic feet of plant byproducts used for industrial fuel.

[f]Excludes 12,415 thousand cubic feet of plant byproducts used for litter and mulch.

Table 37.--Output of roundwood products, by product, species group, and source of material, North Carolina, 1983

Product and species group	All sources	Growing-stock trees[a]			Cull trees[a]	Salvable dead trees[a]	Other sources[b]
		Total	Sawtimber	Poletimber			
	Thousand cubic feet						
Saw logs							
Softwood	186,206	181,592	177,155	4,437	107	--	4,507
Hardwood	74,439	70,646	65,238	5,408	2,288	200	1,305
Total	260,645	252,238	242,393	9,845	2,395	200	5,812
Veneer logs and bolts							
Softwood	36,533	35,721	35,721	--	--	--	812
Hardwood	8,615	8,424	8,258	166	67	--	124
Total	45,148	44,145	43,979	166	67	--	936
Pulpwood							
Softwood	157,689	142,232	71,517	70,715	1,097	--	14,360
Hardwood	101,590	88,886	35,466	53,420	7,428	--	5,276
Total	259,279	231,118	106,983	124,135	8,825	--	19,636
Poles and piling							
Softwood	236	231	231	--	--	--	5
Hardwood	--	--	--	--	--	--	--
Total	236	231	231	--	--	--	5
Posts (round and split)							
Softwood	292	219	219	--	68	--	5
Hardwood	704	678	328	350	--	--	26
Total	996	897	547	350	68	--	31
Other							
Softwood	147	136	47	89	--	--	11
Hardwood	3,510	3,462	3,462	--	--	--	48
Total	3,657	3,598	3,509	89	--	--	59
Total industrial products							
Softwood	381,103	360,131	284,890	75,241	1,272	--	19,700
Hardwood	188,858	172,096	112,752	59,344	9,783	200	6,779
Total	569,961	532,227	397,642	134,585	11,055	200	26,479
Fuelwood							
Softwood	18,674	11,954	9,058	2,896	--	--	6,720
Hardwood	111,190	66,678	49,242	17,436	6,278	1,736	36,498
Total	129,864	78,632	58,300	20,332	6,278	1,736	43,218
All products							
Softwood	399,777	372,085	293,948	78,137	1,272	--	26,420
Hardwood	300,048	238,774	161,994	76,780	16,061	1,936	43,277
Total	699,825	610,859	455,942	154,917	17,333	1,936	69,697

[a]On timberland.

[b]Includes trees less than 5.0 inches in diameter, tree tops and limbs from timberland, or material from other forest land or nonforest land such as fence rows or suburban areas.

Table 38.--Annual timber removals from growing stock on timberland, by item, softwood, and hardwood, North Carolina, 1983

Item	All species	Softwood	Hardwood
	- - - Thousand cubic feet - - -		
Roundwood products			
Saw logs	252,238	181,592	70,646
Veneer logs and bolts	44,145	35,721	8,424
Pulpwood	231,118	142,232	88,886
Poles and piling	231	231	--
Posts	897	219	678
Other	3,598	136	3,462
Fuelwood	78,632	11,954	66,678
All products	610,859	372,085	238,774
Logging residues	60,719	23,068	37,651
Other removals	74,197	35,574	38,623
Total removals	745,775	430,727	315,048

Table 39.--Annual timber removals from live sawtimber on timberland, by item, softwood, and hardwood, North Carolina, 1983

Item	All species	Softwood	Hardwood
	- - - - Thousand board feet - - - -		
Roundwood products			
Saw logs	1,489,111	1,067,600	421,511
Veneer logs and bolts	276,274	221,810	54,464
Pulpwood	427,872	278,695	149,177
Poles and piling	1,598	1,598	--
Posts	2,318	1,053	1,265
Other	18,055	229	17,826
Fuelwood	289,103	40,999	248,104
All products	2,504,331	1,611,984	892,347
Logging residues	50,772	17,078	33,694
Other removals	241,225	110,477	130,748
Total removals	2,796,328	1,739,539	1,056,789

Table 40.--Volume of unused residues at primary manufacturing plants, by species group, type of residue, and industry, North Carolina, 1983

Species group and type of residue	All industries	Lumber	Veneer and plywood	Other
	- - - - Thousand cubic feet - - - -			
Softwood				
Coarse[a]	1,520	1,520	--	--
Fine[b]	5,034	5,019	15	--
Total	6,554	6,539	15	--
Hardwood				
Coarse[a]	1,265	1,106	159	--
Fine[b]	4,008	3,800	208	--
Total	5,273	4,906	367	--
All species				
Coarse[a]	2,785	2,626	159	--
Fine[b]	9,042	8,819	223	--
Total	11,827	11,445	382	--

[a]Material such as slabs and edgings.
[b]Material such as sawdust and shavings.

Table 41.--Area of timberland and associated inventory, net annual growth, and annual removals of growing stock, by species group, North Carolina, 1984, with projections[a] to 2014

Component and species group	Unit of measure	Inventory year	Projected to--		
		1984	1994	2004	2014
Area	M acres	18,450	17,714	17,360	17,288
Inventory	M ft^3				
Softwood		11,240,482	11,584,000	11,366,000	11,345,000
Hardwood		17,710,711	19,521,000	20,379,000	19,857,000
Total		28,951,193	31,105,000	31,745,000	31,202,000
Net annual growth[b]	M ft^3				
Softwood		500,893	492,000	509,000	549,000
Hardwood		626,717	516,000	575,000	641,000
Total		1,127,610	1,008,000	1,084,000	1,190,000
Annual removals[b]	M ft^3				
Softwood		430,727	532,000	554,000	580,000
Hardwood		315,048	442,000	634,000	820,000
Total		745,775	974,000	1,188,000	1,400,000

[a]Projection assumptions:

1. Area of timberland will decline by 1.2 million acres by 2014, and 60 percent of this decline will occur by 1994.
2. Area of pine plantations will increase from 1.6 to 2.8 million acres by 2014. Or approximately 50 percent of the pine plantations, yields will average 10 percent higher than current yields.
3. Cut, starting at the 1983 level, will almost double by 2013.

[b]Growth and removals are for the year prior to the inventory year.

Table 42.--Land area, by class, major forest type, and survey completion date, North Carolina

Land use class	Survey completion date			Change 1974-1984
	1964	1974	1984	
	Acres			
Forest land				
Timberland:				
Pine and oak-pine types	10,671,457	9,388,453	8,621,546	-766,907
Hardwood types	9,304,463	10,156,382	9,828,723	-327,659
Total	19,975,920	19,544,835	18,450,269	-1,094,566
Reserved timberland	372,002	433,792	459,778	+25,986
Woodland	48,767	46,230	42,809	-3,421
Total forest land	20,396,689	20,024,857	18,952,856	-1,072,001
Nonforest land				
Cropland	7,072,817	6,402,053	6,768,121	+366,068
Pasture and range	1,723,634	1,808,363	1,680,331	-128,032
Other	1,941,220	2,819,840	3,557,340	+737,500
Total	10,737,671	11,030,256	12,005,792	+975,536
All land[a]	31,134,360	31,055,113	30,958,648	-96,465

[a]Excludes all water areas.

Table 43.--Volume[a] of sawtimber, growing stock, and live timber on timberland, by species group, survey completion date, and diameter class, North Carolina

Species group and year	All classes	Diameter class (inches at breast height)								
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0 and larger
					SAWTIMBER (in thousand board feet)					
Softwood										
1964	30,469,796	--	--	6,307,809	7,024,819	6,129,632	4,426,398	2,909,092	1,513,367	2,158,679
1974	35,285,634	--	--	7,291,844	7,672,989	7,096,528	5,293,057	3,375,431	1,955,659	2,600,126
1984	38,949,241	--	--	7,392,796	8,028,610	7,550,919	5,698,109	4,099,956	2,555,779	3,623,072
Hardwood										
1964	34,973,347	--	--	--	6,670,303	7,014,733	6,156,615	4,929,247	3,280,378	6,922,071
1974	42,931,181	--	--	--	8,219,139	8,775,026	7,609,257	6,027,284	3,955,435	8,345,040
1984	52,930,121	--	--	--	9,277,599	10,114,120	9,615,843	7,706,047	5,392,286	10,824,226
					GROWING STOCK (in thousand cubic feet)					
Softwood										
1964	9,162,949	1,156,736	1,610,347	1,737,558	1,572,548	1,208,323	798,999	493,994	247,461	336,983
1974	10,535,330	1,286,881	1,861,168	2,009,223	1,718,364	1,401,272	957,163	574,369	320,466	406,424
1984	11,240,482	1,237,285	1,956,234	2,036,441	1,800,081	1,492,712	1,032,266	699,521	418,929	567,013
Hardwood										
1964	12,792,176	1,250,825	1,690,940	1,911,935	1,946,791	1,735,849	1,368,531	1,015,654	638,268	1,233,383
1974	15,569,655	1,474,727	2,001,238	2,323,229	2,398,461	2,172,486	1,691,674	1,244,286	770,417	1,493,137
1984	17,710,711	1,430,187	1,997,197	2,356,222	2,706,921	2,504,297	2,139,780	1,592,582	1,050,191	1,933,334
					LIVE TIMBER[b] (in thousand cubic feet)					
Softwood										
1964	9,231,820	1,174,048	1,620,917	1,744,452	1,581,045	1,213,632	803,845	495,258	248,827	349,796
1974	10,613,778	1,305,924	1,873,227	2,017,142	1,727,026	1,407,064	962,755	575,845	322,749	422,046
1984	11,326,697	1,254,519	1,970,057	2,044,346	1,809,215	1,498,689	1,038,202	701,460	422,196	588,013
Hardwood										
1964	14,200,182	1,648,286	1,964,168	2,107,578	2,077,437	1,825,313	1,441,877	1,062,485	675,529	1,397,509
1974	17,243,389	1,942,511	2,323,506	2,561,026	2,556,596	2,282,747	1,777,985	1,300,228	814,056	1,684,734
1984	19,528,125	1,883,782	2,320,912	2,599,026	2,886,814	2,631,248	2,248,787	1,664,046	1,109,650	2,183,860

[a]To provide a basis for valid comparisons, adjustments have been made to allow for differences in volume tables and sawtimber specifications used in previous surveys.

[b]Merchantable volume.

Table 44.--Merchantable volume of live timber, by species group and Survey Unit, North Carolina, 1964, 1974, and 1984

Species group and Survey Unit	1964	1974	Change 1964-1974	1984	Change 1974-1984
	Thousand cubic feet	Thousand cubic feet	Percent	Thousand cubic feet	Percent
Softwood					
Southern Coastal Plain	2,716,514	3,066,790	+12.9	3,528,915	+15.1
Northern Coastal Plain	2,864,271	2,785,649	-2.7	2,784,596	0.0
Piedmont	2,669,923	3,447,248	+29.1	3,476,483	+0.8
Mountains	981,112	1,314,091	33.9	1,536,703	+16.9
All units	9,231,820	10,613,778	+15.0	11,326,697	+6.7
Hardwood					
Southern Coastal Plain	2,662,124	2,971,856	+11.6	3,510,096	+18.1
Northern Coastal Plain	3,473,155	3,717,849	+7.0	4,038,412	+8.6
Piedmont	3,975,198	5,214,329	+31.2	5,702,456	+9.4
Mountains	4,089,705	5,339,355	+30.6	6,277,161	+17.6
All units	14,200,182	17,243,389	+21.4	19,528,125	+13.2

Table 45.--Land area and total forest, by county, North Carolina, 1984

County	All land[a]	Total forest[b]	
	Acres	Acres	Percent
Alamance	277,210	122,128	44.1
Alexander	165,530	106,855	64.6
Alleghany	150,093	77,141	51.4
Anson	341,210	225,612	66.1
Ashe	272,742	156,214	57.3
Avery	158,125	116,771	73.8
Beaufort	528,704	301,822	57.1
Bertie	448,595	318,227	70.9
Bladen	562,509	426,304	75.8
Brunswick	550,714	414,849	75.3
Buncombe	421,971	271,878	64.4
Burke	322,848	246,949	76.5
Cabarrus	233,011	98,733	42.4
Caldwell	301,549	228,343	75.7
Camden	153,914	92,016	59.8
Carteret	336,365	192,836	57.3
Caswell	273,606	166,954	61.0
Catawba	253,222	102,277	40.4
Chatham	439,090	301,224	68.6
Cherokee	289,171	248,954	86.1
Chowan	116,192	52,326	45.0
Clay	136,902	112,935	82.5
Cleveland	299,642	132,555	44.2
Columbus	600,602	416,274	69.3
Craven	448,941	317,305	70.7
Cumberland	420,646	234,844	55.8
Currituck	163,578	67,774	41.4
Dare	250,106	166,905	66.7
Davidson	350,899	165,755	47.2
Davie	170,618	71,063	41.7
Duplin	524,301	295,238	56.3
Durham	186,538	97,821	52.4
Edgecombe	323,642	158,528	49.0
Forsyth	263,987	88,882	33.7
Franklin	316,403	178,596	56.4
Gaston	228,666	109,854	48.0
Gates	216,480	154,927	71.6
Graham	184,762	175,961	95.2
Granville	339,745	210,675	62.0
Greene	170,477	78,751	46.2
Guilford	416,493	156,589	37.6
Halifax	463,162	259,292	56.0
Harnett	384,710	212,208	55.2
Haywood	355,104	262,683	74.0
Henderson	239,610	145,810	60.9
Hertford	227,898	149,132	65.4
Hoke	250,342	160,786	64.2
Hyde	399,501	222,582	55.7
Iredell	367,437	159,319	43.4
Jackson	313,933	268,602	85.6
Johnston	509,062	253,935	49.9
Jones	300,806	227,776	75.7

Continued

Table 45.--Land area and total forest, by county, North Carolina, 1984--Continued

County	All land[a]	Total forest[b]	
	Acres	Acres	Percent
Lee	165,939	105,490	63.6
Lenoir	257,485	122,035	47.4
Lincoln	190,886	91,957	48.2
McDowell	279,930	231,381	82.7
Macon	330,611	280,709	84.9
Madison	288,838	214,618	74.3
Martin	294,886	183,261	62.1
Mecklenburg	337,773	144,474	42.8
Mitchell	142,080	103,362	72.7
Montgomery	313,312	250,377	79.9
Moore	448,800	335,699	74.8
Nash	345,344	177,326	51.3
New Hanover	118,106	64,605	54.7
Northampton	344,525	203,939	59.2
Onslow	488,070	342,703	70.2
Orange	256,172	144,310	56.3
Pamlico	218,067	121,704	55.8
Pasquotank	145,920	52,259	35.8
Pender	559,885	459,146	82.0
Perquimans	157,696	74,582	47.3
Person	252,533	138,329	54.8
Pitt	420,173	195,439	46.5
Polk	152,512	113,960	74.7
Randolph	504,851	305,134	60.4
Richmond	305,402	225,609	73.9
Robeson	607,482	278,383	45.8
Rockingham	363,930	193,770	53.2
Rowan	332,173	142,508	42.9
Rutherford	363,277	256,952	70.7
Sampson	605,984	344,807	56.9
Scotland	204,371	118,151	57.8
Stanly	253,299	105,131	41.5
Stokes	289,305	170,352	58.9
Surry	345,178	174,605	50.6
Swain	336,627	322,202	95.7
Transylvania	242,099	210,215	86.8
Tyrrell	260,365	159,230	61.2
Union	409,139	171,757	42.0
Vance	159,226	88,658	55.7
Wake	537,133	283,076	52.7
Warren	273,344	189,773	69.4
Washington	212,243	98,486	46.4
Watauga	200,992	118,750	59.1
Wayne	354,368	154,740	43.7
Wilkes	481,414	354,454	73.6
Wilson	239,533	101,078	42.2
Yadkin	214,874	86,915	40.4
Yancey	200,704	164,685	82.1
Total	31,228,220	18,952,856	60.7

[a]Excludes inland water.

[b]Includes timberland, reserved timberland, and woodland.

Table 46.--Area of timberland, by county and ownership class, North Carolina, 1984

County	All ownerships	National Forest	Other public	Forest industry[a]	Other private
			Acres		
Alamance	122,128	--	1,472	1,914	118,742
Alexander	106,848	--	7	6,509	100,332
Alleghany	70,821	--	61	168	70,592
Anson	225,612	--	6,492	55,413	163,707
Ashe	154,383	327	175	1,407	152,474
Avery	114,830	26,095	638	279	87,818
Beaufort	301,822	--	4,425	168,415	128,982
Bertie	318,227	--	155	108,374	209,698
Bladen	424,374	--	36,264	101,049	287,061
Brunswick	414,849	--	8,647	224,229	181,973
Buncombe	265,106	29,988	22,470	285	212,363
Burke	229,317	36,798	7,717	11,010	173,792
Cabarrus	98,733	--	1,305	10	97,418
Caldwell	228,173	49,269	1,391	20,418	157,095
Camden	77,531	--	9,203	20,099	48,229
Carteret	187,888	55,937	6,067	52,448	73,436
Caswell	166,954	--	13,632	5,730	147,592
Catawba	102,277	--	921	918	100,438
Chatham	301,223	--	12,857	40,058	248,308
Cherokee	248,945	92,145	6,345	5,367	145,088
Chowan	52,326	--	220	10,808	41,298
Clay	106,432	57,303	2	751	48,376
Cleveland	132,555	--	635	5,997	125,923
Columbus	416,274	--	169	201,612	214,493
Craven	316,989	55,879	5,530	115,236	140,344
Cumberland	234,844	--	30,844	11,422	192,578
Currituck	66,469	--	10,437	7,364	48,668
Dare	147,165	--	40,666	550	105,949
Davidson	165,658	959	859	4,804	159,036
Davie	71,063	--	16	178	70,869
Duplin	295,238	--	7,765	37,774	249,699
Durham	97,577	--	15,640	1,001	80,936
Edgecombe	158,528	--	396	7,391	150,741
Forsyth	88,882	--	722	220	87,940
Franklin	178,596	--	119	13,607	164,870
Gaston	108,254	--	657	160	107,437
Gates	145,523	--	15,328	50,322	79,873
Graham	162,332	98,337	2,206	434	61,355
Granville	210,425	--	12,630	8,790	189,005
Greene	78,751	--	21	327	78,403
Guilford	156,449	--	5,119	--	151,330
Halifax	256,952	--	1,109	47,284	208,559
Harnett	209,633	--	169	15,139	194,325
Haywood	173,726	39,818	8,946	6,433	118,529
Henderson	145,615	17,138	1,320	2,412	124,745
Hertford	149,132	--	295	38,784	110,053
Hoke	160,736	--	86,739	4,622	69,375
Hyde	221,910	--	21,478	34,113	166,319
Iredell	158,219	--	178	1,448	156,593
Jackson	262,094	64,553	19,660	4,026	173,855
Johnston	253,935	--	407	4,662	248,866
Jones	227,776	37,261	31,625	60,592	98,298

Continued

Table 46.--Area of timberland, by county and ownership class, North Carolina, 1984--Continued

County	All ownerships	National Forest	Other public	Forest industry[a]	Other private
			Acres		
Lee	105,490	--	208	15,124	90,158
Lenoir	122,035	--	655	10,947	110,433
Lincoln	91,949	--	132	680	91,137
McDowell	229,681	66,436	943	13,533	148,769
Macon	271,589	141,864	28	1,091	128,606
Madison	214,566	50,186	1,443	1,366	161,571
Martin	183,261	--	40	62,313	120,908
Mecklenburg	144,474	--	2,327	--	142,147
Mitchell	102,445	17,084	2,849	850	81,662
Montgomery	250,377	36,154	318	27,080	186,825
Moore	335,074	--	5,234	48,209	281,631
Nash	177,326	--	180	7,341	169,805
New Hanover	64,605	--	4,815	5,875	53,915
Northampton	203,939	--	1,525	27,639	174,775
Onslow	341,875	--	109,945	113,341	118,589
Orange	142,897	--	4,379	2,851	135,667
Pamlico	120,348	--	1,041	52,748	66,559
Pasquotank	52,259	--	4,413	5,860	41,986
Pender	459,089	--	63,058	149,181	246,850
Perquimans	74,582	--	661	20,996	52,925
Person	138,329	--	734	8,136	129,459
Pitt	195,439	--	703	29,942	164,794
Polk	113,960	--	4,922	13,171	95,867
Randolph	299,210	4,050	758	6,110	288,292
Richmond	225,609	--	32,143	48,067	145,399
Robeson	278,383	--	225	33,343	244,815
Rockingham	193,770	--	1,357	1,638	190,775
Rowan	142,508	--	1,141	2,334	139,033
Rutherford	256,952	--	403	26,735	229,814
Sampson	344,807	--	307	48,950	295,550
Scotland	118,151	--	23,175	10,815	84,161
Stanly	100,888	--	375	2,108	98,405
Stokes	164,189	--	339	1,184	162,666
Surry	169,717	--	890	90	168,737
Swain	110,777	20,855	29,461	--	60,461
Transylvania	206,641	82,744	411	8,946	114,540
Tyrrell	159,053	--	36	45,761	113,256
Union	171,757	--	966	2,702	168,089
Vance	88,658	--	9,253	3,707	75,698
Wake	277,069	--	15,821	4,443	256,805
Warren	189,773	--	991	33,001	155,781
Washington	93,590	--	1,365	40,284	51,941
Watauga	110,055	393	432	3,043	106,187
Wayne	154,165	--	1,360	3,915	148,890
Wilkes	339,601	--	9,668	26,082	303,851
Wilson	101,078	--	1,015	2,123	97,940
Yadkin	86,915	--	86	175	86,654
Yancey	161,265	35,255	60	4,925	121,025
Total	18,450,269	1,116,828	804,742	2,501,118	14,027,581

[a]Includes 163,794 acres of other private land under long-term lease.

Table 47.--Area of timberland, by county and broad management class, North Carolina, 1984

County	All classes	Pine plantation	Natural pine	Oak-pine	Upland hardwood	Lowland hardwood
			Acres			
Alamance	122,128	3,124	38,772	5,039	56,444	18,749
Alexander	106,848	--	43,836	13,680	49,332	--
Alleghany	70,821	8,824	8,824	--	53,173	--
Anson	225,612	39,013	84,979	23,134	75,850	2,636
Ashe	154,383	--	4,485	17,937	131,961	--
Avery	114,830	--	--	11,590	103,240	--
Beaufort	301,822	123,553	51,681	31,207	41,949	53,432
Bertie	318,227	42,935	60,964	44,093	80,120	90,115
Bladen	424,374	83,178	153,484	55,975	14,001	117,736
Brunswick	414,849	134,070	139,253	39,584	27,795	74,147
Buncombe	265,106	200	14,815	12,436	237,655	--
Burke	229,317	980	69,868	45,797	112,672	--
Cabarrus	98,733	8,522	28,865	--	57,738	3,608
Caldwell	228,173	--	50,628	34,929	142,616	--
Camden	77,531	--	6,290	2,097	12,582	56,562
Carteret	187,888	22,034	92,941	34,747	12,777	25,389
Caswell	166,954	6,526	55,238	34,602	54,545	16,043
Catawba	102,277	11,160	22,753	18,600	42,324	7,440
Chatham	301,223	30,489	82,281	50,314	120,887	17,252
Cherokee	248,945	6,909	51,255	42,548	148,233	--
Chowan	52,326	2,702	10,666	20,770	13,026	5,162
Clay	106,432	4,408	17,591	8,804	75,629	--
Cleveland	132,555	3,498	42,224	13,992	72,841	--
Columbus	416,274	104,987	99,387	29,585	36,981	145,334
Craven	316,989	64,595	78,400	55,220	45,117	73,657
Cumberland	234,844	4,453	104,779	47,913	21,397	56,302
Currituck	66,469	--	18,837	11,445	12,977	23,210
Dare	147,165	--	56,017	22,703	--	68,445
Davidson	165,658	4,910	25,445	29,585	96,175	9,543
Davie	71,063	5,240	15,186	2,531	35,451	12,655
Duplin	295,238	16,960	93,053	56,414	42,631	86,180
Durham	97,577	2,619	35,562	11,037	28,382	19,977
Edgecombe	158,528	9,384	29,293	19,909	48,572	51,370
Forsyth	88,882	--	17,809	12,563	50,972	7,538
Franklin	178,596	27,346	44,699	27,478	68,694	10,379
Gaston	108,254	160	37,591	20,142	47,004	3,357
Gates	145,523	24,009	28,945	9,659	24,155	58,755
Graham	162,332	--	18,965	--	143,367	--
Granville	210,425	9,610	63,250	19,221	95,895	22,449
Greene	78,751	--	21,403	3,565	28,838	24,945
Guilford	156,449	5,734	50,445	5,310	74,337	20,623
Halifax	256,952	30,216	55,954	35,609	90,378	44,795
Harnett	209,633	31,884	46,905	20,103	90,625	20,116
Haywood	173,726	7,199	3,982	19,252	143,293	--
Henderson	145,615	--	24,948	17,479	103,188	--
Hertford	149,132	37,623	16,508	18,629	48,858	27,514
Hoke	160,736	15,525	79,264	21,822	14,865	29,260
Hyde	221,910	19,022	105,519	27,373	14,367	55,629
Iredell	158,219	9,912	33,858	12,697	93,286	8,466
Jackson	262,094	--	4,829	21,395	235,870	--
Johnston	253,935	10,979	67,286	62,214	40,257	73,199
Jones	227,776	66,338	76,426	11,997	14,480	58,535

Continued

Table 47.--Area of timberland, by county and broad management class, North Carolina, 1984--Continued

County	All classes	Pine plantation	Natural pine	Oak-pine	Upland hardwood	Lowland hardwood
			Acres			
Lee	105,490	4,752	13,621	30,429	45,869	10,819
Lenoir	122,035	6,280	23,050	12,710	20,081	59,914
Lincoln	91,949	7,190	22,785	6,510	48,955	6,509
McDowell	229,681	--	36,610	27,903	160,369	4,799
Macon	271,589	--	9,958	17,294	244,337	--
Madison	214,566	14	26,360	18,465	169,727	--
Martin	183,261	30,878	33,103	27,610	30,759	60,911
Mecklenburg	144,474	3,842	51,594	7,682	77,515	3,841
Mitchell	102,445	--	5,104	5,696	91,645	--
Montgomery	250,377	26,534	50,091	48,696	114,066	10,990
Moore	335,074	54,435	89,298	45,088	116,590	29,663
Nash	177,326	8,480	50,401	26,203	73,373	18,869
New Hanover	64,605	--	41,039	3,594	9,189	10,783
Northampton	203,939	9,554	47,417	23,304	70,427	53,237
Onslow	341,875	72,399	142,461	43,339	12,552	71,124
Orange	142,897	6,518	30,889	20,815	69,667	15,008
Pamlico	120,348	12,064	53,267	4,160	12,480	38,377
Pasquotank	52,259	958	15,892	--	11,328	24,081
Pender	459,089	56,343	224,343	34,977	28,960	114,466
Perquimans	74,582	20,298	5,203	9,204	23,770	16,107
Person	138,329	5,424	29,590	14,796	72,989	15,530
Pitt	195,439	26,894	51,631	19,227	38,450	59,237
Polk	113,960	3,365	26,843	33,381	50,371	--
Randolph	299,210	2,579	43,297	24,075	225,415	3,844
Richmond	225,609	41,391	76,619	37,321	48,782	21,496
Robeson	278,383	9,254	71,965	30,602	12,391	154,171
Rockingham	193,770	4,065	81,121	14,236	80,111	14,237
Rowan	142,508	7,682	41,333	18,788	70,947	3,758
Rutherford	256,952	15,931	68,036	60,280	100,609	12,096
Sampson	344,807	23,847	98,501	75,429	62,576	84,454
Scotland	118,151	17,593	53,771	20,666	20,316	5,805
Stanly	100,888	526	31,104	6,560	59,417	3,281
Stokes	164,189	1,426	44,652	15,947	98,974	3,190
Surry	169,717	3,274	35,712	25,471	102,076	3,184
Swain	110,777	--	21,851	4,031	84,895	--
Transylvania	206,641	6,363	6,363	22,072	171,843	--
Tyrrell	159,053	16,343	49,097	20,414	--	73,199
Union	171,757	2,702	31,516	21,011	102,521	14,007
Vance	88,658	7,968	28,624	14,203	33,624	4,239
Wake	277,069	1,844	101,062	21,847	112,416	39,900
Warren	189,773	19,077	51,016	26,254	74,806	18,620
Washington	93,590	11,850	8,563	14,901	9,933	48,343
Watauga	110,055	--	10,114	834	99,107	--
Wayne	154,165	9,970	55,376	13,802	39,753	35,264
Wilkes	339,601	4,468	82,843	64,578	187,712	--
Wilson	101,078	4,921	25,185	2,799	39,179	28,994
Yadkin	86,915	3,642	27,729	10,398	38,128	7,018
Yancey	161,265	34	18,836	14,343	128,052	--
Total	18,450,269	1,613,802	4,731,074	2,276,670	7,124,854	2,703,869

Table 48.--Merchantable volume of live timber 5.0 inches d.b.h. and larger on timberland, by county and species group, North Carolina, 1984

County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
	Thousand cubic feet				
Alamance	222,496	68,199	815	65,461	88,021
Alexander	169,482	67,062	3,895	40,933	57,592
Alleghany	117,005	1,433	23,968	32,094	59,510
Anson	348,266	223,095	2,110	65,410	57,651
Ashe	290,501	6,933	19,683	86,572	177,313
Avery	256,309	984	15,804	94,907	144,614
Beaufort	482,216	223,562	11,715	173,690	73,249
Bertie	628,874	183,968	25,882	278,337	140,687
Bladen	446,192	224,713	14,500	138,060	68,919
Brunswick	434,892	240,536	49,188	96,312	48,856
Buncombe	478,991	14,906	10,665	128,733	324,687
Burke	330,679	82,979	83,049	67,358	97,293
Cabarrus	139,104	48,308	3,476	33,212	54,108
Caldwell	434,584	42,919	81,365	98,039	212,261
Camden	174,401	32,603	7,750	112,928	21,120
Carteret	242,519	167,146	545	57,067	17,761
Caswell	291,416	135,864	1,465	79,924	74,163
Catawba	136,410	50,428	8,164	17,686	60,132
Chatham	573,852	257,477	7,463	146,604	162,308
Cherokee	451,037	99,949	57,460	68,042	225,586
Chowan	89,559	31,230	1,294	43,383	13,652
Clay	178,572	59,668	2,383	18,389	98,132
Cleveland	191,460	51,237	1,568	51,641	87,014
Columbus	748,556	311,080	38,871	289,569	109,036
Craven	503,486	235,381	9,764	195,027	63,314
Cumberland	289,243	162,109	10,538	76,011	40,585
Currituck	143,442	61,847	6,736	61,033	13,826
Dare	248,569	93,151	27,161	106,685	21,572
Davidson	222,955	40,134	1,727	78,299	102,795
Davie	114,614	21,119	1,744	43,722	48,029
Duplin	429,115	172,350	4,542	161,497	90,726
Durham	220,332	104,000	1,315	61,979	53,038
Edgecombe	321,911	84,612	11,204	133,159	92,936
Forsyth	165,407	41,729	1,205	57,975	64,498
Franklin	274,048	133,856	379	69,465	70,348
Gaston	219,235	82,361	1,698	61,983	73,193
Gates	295,284	102,728	17,114	145,672	29,770
Graham	349,348	29,237	46,014	106,518	167,579
Granville	392,389	143,404	1,783	131,024	116,178
Greene	124,456	36,284	7,783	46,446	33,943
Guilford	321,104	109,040	416	134,753	76,895
Halifax	519,518	184,642	4,494	201,403	128,979
Harnett	259,246	104,450	425	66,480	87,891
Haywood	412,153	15,495	55,635	117,739	223,284
Henderson	321,076	34,895	36,468	65,796	183,917
Hertford	255,930	67,626	9,131	117,706	61,467
Hoke	135,554	82,807	1,431	35,502	15,814
Hyde	307,121	177,647	10,684	103,866	14,924
Iredell	220,776	75,001	4,317	71,985	69,473
Jackson	458,571	7,144	28,071	109,753	313,603
Johnston	468,289	178,660	--	159,783	129,846
Jones	276,160	131,345	17,094	72,861	54,860

Contined

Table 48.--Merchantable volume of live timber 5.0 inches d.b.h. and larger on timberland, by county and species group, North Carolina, 1984--Continued

County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
	Thousand cubic feet				
Lee	167,948	59,755	432	58,970	48,791
Lenoir	190,759	47,910	20,743	63,646	58,460
Lincoln	180,542	67,519	288	46,507	66,228
McDowell	455,644	54,911	26,159	94,788	279,786
Macon	548,572	26,102	25,558	138,267	358,645
Madison	458,795	35,515	51,484	142,729	229,067
Martin	392,652	121,698	23,308	203,735	43,911
Mecklenburg	237,270	79,896	6,959	82,463	67,952
Mitchell	261,977	3,394	14,027	102,447	142,109
Montgomery	375,457	139,713	1,441	88,920	145,383
Moore	455,225	256,830	11,354	82,714	104,327
Nash	368,692	149,445	4,033	126,583	88,631
New Hanover	44,095	21,080	931	11,969	10,115
Northampton	356,876	103,700	8,027	129,335	115,814
Onslow	424,158	231,728	5,867	124,029	62,534
Orange	326,497	109,559	1,410	120,523	95,005
Pamlico	203,387	111,679	2,902	74,030	14,776
Pasquotank	134,315	31,963	6,686	83,759	11,907
Pender	567,875	300,192	34,727	133,134	99,822
Perquimans	116,593	27,301	4,907	52,048	32,337
Person	194,762	58,741	5,187	57,243	73,591
Pitt	380,982	128,747	24,858	172,036	55,341
Polk	162,789	45,703	1,687	34,807	80,592
Randolph	418,952	67,497	3,870	118,995	228,590
Richmond	248,235	148,584	428	67,263	31,960
Robeson	535,657	152,534	29,185	278,580	75,358
Rockingham	311,748	139,042	--	73,400	99,306
Rowan	243,019	90,570	2,871	69,044	80,534
Rutherford	374,924	144,896	3,341	54,233	172,454
Sampson	388,113	170,928	11,205	133,401	72,579
Scotland	139,664	90,613	6,233	33,265	9,553
Stanly	158,997	71,036	453	34,887	52,621
Stokes	275,803	93,326	842	79,388	102,247
Surry	243,144	56,637	13,819	55,028	117,660
Swain	214,444	32,422	513	63,592	117,917
Transylvania	425,769	11,406	31,409	106,622	276,332
Tyrrell	297,294	111,881	28,880	138,175	18,358
Union	251,043	79,784	2,826	47,238	121,195
Vance	163,363	74,935	374	48,470	39,584
Wake	559,491	226,731	219	188,717	143,824
Warren	333,234	132,934	--	120,040	80,260
Washington	153,434	27,641	11,641	92,631	21,521
Watauga	235,992	--	14,406	94,943	126,643
Wayne	265,579	138,950	--	73,096	53,533
Wilkes	759,104	194,182	109,806	199,479	255,637
Wilson	205,953	63,591	2,091	79,451	60,820
Yadkin	144,558	55,139	1,384	31,329	56,706
Yancey	374,741	6,431	41,871	97,897	228,542
Total	30,854,822	9,934,104	1,392,593	9,682,319	9,845,806

Table 49.--Volume of growing stock on timberland, by county and species group, North Carolina, 1984

County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
	Thousand cubic feet				
Alamance	209,047	67,835	815	61,689	78,708
Alexander	160,634	66,339	3,586	40,933	49,776
Alleghany	109,051	1,433	23,968	28,262	55,388
Anson	328,474	221,359	1,267	55,879	49,969
Ashe	268,936	6,933	19,683	80,779	161,541
Avery	232,651	984	14,999	91,297	125,371
Beaufort	448,054	220,753	10,700	152,355	64,246
Bertie	582,838	182,684	24,793	248,275	127,086
Bladen	419,892	222,756	11,950	126,199	58,987
Brunswick	410,669	238,212	49,188	83,116	40,153
Buncombe	439,190	14,906	10,665	123,256	290,363
Burke	307,987	82,979	82,575	57,482	84,951
Cabarrus	135,663	48,308	3,476	32,233	51,646
Caldwell	407,470	42,199	78,463	96,084	190,724
Camden	164,177	32,603	7,184	105,944	18,446
Carteret	232,952	166,788	--	53,053	13,111
Caswell	278,804	135,497	1,465	72,888	68,954
Catawba	127,865	50,428	8,164	14,390	54,883
Chatham	554,968	257,477	7,463	140,378	149,650
Cherokee	407,677	96,763	57,460	62,164	191,290
Chowan	84,176	31,230	1,294	40,765	10,887
Clay	162,927	59,668	2,383	17,566	83,310
Cleveland	175,614	51,237	1,164	47,594	75,619
Columbus	711,201	310,201	38,064	265,425	97,511
Craven	462,110	234,350	8,147	167,401	52,212
Cumberland	279,072	162,109	10,160	72,520	34,283
Currituck	136,264	61,074	6,144	57,026	12,020
Dare	220,070	92,033	25,484	99,046	3,507
Davidson	211,976	40,134	1,599	73,086	97,157
Davie	111,400	21,119	1,744	41,743	46,794
Duplin	401,051	171,923	4,542	147,593	76,993
Durham	213,761	104,000	1,315	59,034	49,412
Edgecombe	303,351	84,612	11,204	123,979	83,556
Forsyth	160,184	41,378	1,205	55,701	61,900
Franklin	268,908	133,856	379	67,382	67,291
Gaston	211,396	82,361	1,698	58,866	68,471
Gates	277,641	102,090	15,594	132,568	27,389
Graham	313,077	29,237	44,886	98,055	140,899
Granville	384,855	143,404	1,783	127,107	112,561
Greene	112,533	36,284	7,261	40,323	28,665
Guilford	310,680	108,649	416	128,454	73,161
Halifax	503,515	184,642	4,494	191,467	122,912
Harnett	248,859	104,048	425	64,117	80,269
Haywood	363,073	14,692	54,245	109,227	184,909
Henderson	296,371	33,776	36,468	61,606	164,521
Hertford	227,749	67,254	7,775	99,141	53,579
Hoke	128,385	82,376	1,431	31,828	12,750
Hyde	294,262	176,781	10,684	95,657	11,140
Iredell	209,692	74,359	4,317	66,977	64,039
Jackson	421,129	7,144	27,752	105,487	280,746
Johnston	441,403	177,732	--	148,434	115,237
Jones	259,236	130,102	17,094	67,097	44,943

Continued

Table 49.--Volume of growing stock on timberland, by county and species group, North Carolina, 1984--Continued

County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
	Thousand cubic feet				
Lee	161,966	59,755	432	56,017	45,762
Lenoir	181,946	47,399	20,743	59,831	53,973
Lincoln	174,497	67,035	288	45,802	61,372
McDowell	423,253	54,514	26,159	89,387	253,193
Macon	503,881	26,102	25,558	134,628	317,593
Madison	424,124	35,515	51,484	135,791	201,334
Martin	372,609	121,698	22,602	189,640	38,669
Mecklenburg	219,480	78,359	4,434	75,535	61,152
Mitchell	250,079	3,394	14,027	100,516	132,142
Montgomery	347,294	139,222	1,441	78,820	127,811
Moore	428,771	256,601	10,248	75,565	86,357
Nash	349,094	149,445	4,033	113,651	81,965
New Hanover	39,104	20,863	--	10,135	8,106
Northampton	342,561	103,498	8,027	122,106	108,930
Onslow	400,457	229,940	5,144	115,501	49,872
Orange	311,782	109,559	1,410	113,044	87,769
Pamlico	194,421	111,248	2,902	68,433	11,838
Pasquotank	127,791	31,963	6,686	78,919	10,223
Pender	543,880	299,950	33,711	123,890	86,329
Perquimans	109,967	27,301	4,907	49,337	28,422
Person	179,502	58,741	2,779	51,353	66,629
Pitt	361,155	128,151	23,333	159,431	50,240
Polk	150,753	45,703	1,687	31,172	72,191
Randolph	404,653	67,497	3,489	115,924	217,743
Richmond	233,177	147,569	428	61,349	23,831
Robeson	472,550	150,438	28,794	228,584	64,734
Rockingham	291,487	139,042	--	64,895	87,550
Rowan	234,580	90,570	2,871	65,037	76,102
Rutherford	355,504	144,411	3,341	49,393	158,359
Sampson	367,269	170,220	11,205	125,105	60,739
Scotland	133,794	89,981	6,065	31,588	6,160
Stanly	145,887	71,036	453	27,429	46,969
Stokes	260,685	92,937	842	74,565	92,341
Surry	221,237	56,387	13,819	49,373	101,658
Swain	192,062	31,527	513	61,299	98,723
Transylvania	391,076	11,406	30,037	102,366	247,267
Tyrrell	260,687	110,496	27,288	114,348	8,555
Union	230,919	79,167	2,826	37,810	111,116
Vance	160,872	74,935	374	47,271	38,292
Wake	536,409	226,731	--	175,251	134,427
Warren	322,571	132,585	--	117,913	72,073
Washington	133,905	27,281	11,641	77,552	17,431
Watauga	216,973	--	14,406	89,375	113,192
Wayne	256,548	138,950	--	67,267	50,331
Wilkes	721,124	193,395	109,806	192,698	225,225
Wilson	191,839	63,129	2,091	71,676	54,943
Yadkin	136,684	55,139	1,384	28,952	51,209
Yancey	347,414	6,431	39,452	93,116	208,415
Total	28,951,193	9,888,307	1,352,175	8,937,568	8,773,143

Table 50.--Volume of sawtimber on timberland, by county and species group, North Carolina, 1984

County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
	Thousand board feet				
Alamance	617,591	192,601	--	168,686	256,304
Alexander	396,146	153,735	16,798	92,403	133,210
Alleghany	329,201	3,329	84,664	71,209	169,999
Anson	1,027,730	763,309	1,898	141,485	121,038
Ashe	832,582	8,452	92,941	245,745	485,444
Avery	712,848	--	78,429	239,624	394,795
Beaufort	1,238,454	583,901	47,709	401,605	205,239
Bertie	2,030,788	698,846	115,371	816,687	399,884
Bladen	1,269,484	720,631	57,503	315,478	175,872
Brunswick	1,093,199	633,079	151,352	195,159	113,609
Buncombe	1,527,083	37,625	48,670	446,852	993,936
Burke	954,808	231,281	371,406	142,798	209,323
Cabarrus	364,092	109,612	5,760	86,883	161,837
Caldwell	1,410,133	153,364	364,523	303,707	588,539
Camden	573,711	164,316	27,567	322,950	58,878
Carteret	773,531	630,049	--	112,969	30,513
Caswell	772,851	381,043	3,508	203,843	184,457
Catawba	308,848	74,234	30,333	32,208	172,073
Chatham	1,654,372	770,320	11,545	408,772	463,735
Cherokee	1,209,018	293,929	263,954	137,847	513,288
Chowan	342,085	162,152	6,325	137,161	36,447
Clay	488,371	170,257	10,597	51,307	256,210
Cleveland	525,290	146,326	1,492	142,361	235,111
Columbus	2,236,417	931,704	175,026	816,730	312,957
Craven	1,529,798	803,588	38,145	506,282	181,783
Cumberland	961,584	726,095	37,421	125,579	72,489
Currituck	498,187	303,002	26,171	136,319	32,695
Dare	615,603	303,563	102,214	194,829	14,997
Davidson	602,857	78,314	--	204,651	319,892
Davie	355,502	49,489	1,548	163,056	141,409
Duplin	1,376,685	648,480	21,101	484,761	222,343
Durham	670,178	345,538	4,405	175,355	144,880
Edgecombe	1,081,286	364,007	56,309	407,900	253,070
Forsyth	472,319	110,808	3,397	162,860	195,254
Franklin	763,198	401,228	--	186,330	175,640
Gaston	744,536	314,741	--	193,750	236,045
Gates	887,196	418,557	68,702	340,873	59,064
Graham	1,078,074	125,492	236,020	262,013	454,549
Granville	1,071,592	398,091	2,020	375,006	296,475
Greene	400,744	150,534	38,369	145,305	66,536
Guilford	988,717	282,892	--	475,093	230,732
Halifax	1,871,493	793,969	25,816	663,275	388,433
Harnett	832,588	418,030	2,286	198,139	214,133
Haywood	1,196,924	51,778	194,750	418,941	531,455
Henderson	997,929	82,335	162,709	198,636	554,249
Hertford	797,948	281,043	36,875	306,893	173,137
Hoke	452,359	339,356	5,385	78,468	29,150
Hyde	892,371	574,215	46,197	222,738	49,221
Iredell	651,595	237,866	13,540	197,108	203,081
Jackson	1,308,356	30,444	123,961	321,872	832,079
Johnston	1,664,776	781,360	--	525,807	357,609
Jones	868,603	447,463	79,378	222,206	119,556

Continued

Table 50.--Volume of sawtimber on timberland, by county and species group, North Carolina, 1984--Continued

County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
	Thousand board feet				
Lee	484,896	254,467	--	115,515	114,914
Lenoir	643,752	199,981	107,096	168,378	168,297
Lincoln	603,169	215,362	--	161,373	226,434
McDowell	1,360,269	134,510	121,378	242,026	862,355
Macon	1,628,122	107,082	128,038	434,674	958,328
Madison	1,459,806	103,821	215,553	480,813	659,619
Martin	1,252,556	466,643	111,504	561,480	112,929
Mecklenburg	669,937	218,955	9,817	227,433	213,732
Mitchell	783,382	6,469	58,111	336,093	382,709
Montgomery	1,005,950	462,159	--	194,446	349,345
Moore	1,317,059	908,262	45,455	182,966	180,376
Nash	1,354,865	678,906	19,144	378,648	278,167
New Hanover	112,727	68,993	--	20,519	23,215
Northampton	1,218,034	391,246	37,605	400,659	388,524
Onslow	1,245,283	764,220	19,806	286,159	175,098
Orange	1,036,101	422,811	--	355,703	257,587
Pamlico	655,933	432,569	14,803	176,430	32,131
Pasquotank	478,144	156,460	26,348	251,199	44,137
Pender	1,585,888	862,871	138,277	323,290	261,450
Perquimans	283,766	53,253	20,147	116,996	93,370
Person	488,896	168,389	8,475	124,012	188,020
Pitt	1,278,581	454,692	122,182	548,499	153,208
Polk	404,350	77,917	9,289	100,814	216,330
Randolph	1,135,934	126,916	13,001	365,018	630,999
Richmond	621,593	427,340	--	143,467	50,786
Robeson	1,659,600	614,871	116,475	723,143	205,111
Rockingham	624,114	225,085	--	165,880	233,149
Rowan	693,608	309,148	4,192	181,470	198,798
Rutherford	935,492	378,000	7,173	117,001	433,318
Sampson	1,149,497	618,012	44,864	355,772	130,849
Scotland	485,696	349,560	24,395	94,742	16,999
Stanly	451,842	207,348	--	94,730	149,764
Stokes	669,768	234,358	2,747	184,998	247,665
Surry	509,761	123,719	40,862	99,838	245,342
Swain	595,112	69,469	--	206,438	319,205
Transylvania	1,275,932	44,001	109,928	292,568	829,435
Tyrrell	762,335	419,834	65,247	249,103	28,151
Union	659,240	275,383	3,602	95,587	284,668
Vance	517,017	276,780	--	139,208	101,029
Wake	1,836,745	812,454	--	604,685	419,606
Warren	959,188	422,680	--	328,142	208,366
Washington	412,676	123,759	41,427	200,785	46,705
Watauga	642,288	--	54,696	251,671	335,921
Wayne	1,046,660	689,898	--	218,557	138,205
Wilkes	2,223,462	531,422	498,447	534,644	658,949
Wilson	701,109	290,106	9,941	252,754	148,308
Yadkin	401,886	151,466	--	74,962	175,458
Yancey	1,235,710	15,505	181,601	321,890	716,714
Total	91,879,362	33,223,525	5,725,716	26,413,692	26,516,429

Table 51.--Net annual change[a] of growing stock on timberland, by county and species group, North Carolina, 1983

County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
			Thousand cubic feet		
Alamance	+3,934	+1,455	+62	+1,346	+1,071
Alexander	+3,115	+864	+121	+1,464	+666
Alleghany	+675	+25	+343	+722	-415
Anson	+7,581	+3,558	+37	+2,565	+1,421
Ashe	+7,835	+254	+828	+3,134	+3,619
Avery	+5,209	+19	+401	+2,959	+1,830
Beaufort	+8,954	+4,719	+48	+3,177	+1,010
Bertie	+10,444	+1,188	+498	+6,129	+2,629
Bladen	-2,558	-3,061	+238	+891	-626
Brunswick	+10,790	+7,614	+1,328	+408	+1,440
Buncombe	+7,246	-1,954	+442	+4,000	+4,758
Burke	+309	-2,519	+2,431	+1,302	-905
Cabarrus	+1,363	+1,100	-64	+914	-587
Caldwell	+3,882	-125	+1,421	+2,191	+395
Camden	-1,846	-3,350	-912	+2,262	+154
Carteret	+318	-1,737	--	+1,470	+585
Caswell	+8,420	+4,240	+33	+2,512	+1,635
Catawba	-2,060	-1,385	+414	-2,062	+973
Chatham	+4,131	+3,291	+344	+3	+493
Cherokee	+9,943	+1,022	+1,686	+3,144	+4,091
Chowan	-1,672	-1,991	+16	+873	-570
Clay	+2,603	-125	+88	+706	+1,934
Cleveland	+2,950	-63	+43	+1,920	+1,050
Columbus	+24,131	+13,908	+816	+6,145	+3,262
Craven	+9,595	+4,277	+184	+3,770	+1,364
Cumberland	+1,599	+792	+527	+971	-691
Currituck	+1,236	-229	+225	+641	+599
Dare	+1,354	-36	-1,383	+2,701	+72
Davidson	+702	-1,345	+111	+1,994	-58
Davie	+2,865	+528	+84	+381	+1,872
Duplin	+3,901	-633	+173	+2,134	+2,227
Durham	+4,834	+4,562	+19	+1,286	-1,033
Edgecombe	-1,747	-4,236	+283	+1,167	+1,039
Forsyth	+4,402	+1,149	+19	+2,078	+1,156
Franklin	-6,787	-5,243	+7	-348	-1,203
Gaston	+4,644	+968	+38	+1,812	+1,826
Gates	+4,405	+300	+433	+2,913	+759
Graham	+5,956	-64	+927	+2,930	+2,163
Granville	+5,799	+693	+37	+2,764	+2,305
Greene	+1,362	+265	+205	+516	+376
Guilford	+6,002	+1,173	+54	+4,562	+213
Halifax	+8,843	+3,601	+69	+4,342	+831
Harnett	+6,557	+3,225	+4	+1,534	+1,794
Haywood	+6,548	-97	+675	+2,396	+3,574
Henderson	+3,904	+791	-846	+1,377	+2,582
Hertford	+2,247	-372	+199	+2,765	-345
Hoke	+1,120	+872	+40	-230	+438
Hyde	+5,005	+2,119	+12	+2,537	+337
Iredell	-6,429	-2,126	+134	-2,290	-2,147
Jackson	+8,605	+106	+819	+2,168	+5,512
Johnston	+4,415	+344	--	+1,942	+2,129
Jones	+4,417	+2,563	+363	+708	+783

Continued

Table 51.--Net annual change[a] of growing stock on timberland, by county and species group, North Carolina, 1983--Continued

County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
	Thousand cubic feet				
Lee	+3,993	+1,101	+16	+1,784	+1,092
Lenoir	+414	-3,067	+553	+1,541	+1,387
Lincoln	+1,856	-1,103	+20	+1,851	+1,088
McDowell	+9,974	+1,775	+470	+3,097	+4,632
Macon	+12,751	+35	+516	+4,895	+7,305
Madison	+1,008	+259	-5,246	+4,753	+1,242
Martin	+6,831	-458	+928	+6,289	+72
Mecklenburg	-1,498	-2,882	+183	+2,586	-1,385
Mitchell	+4,801	+82	-83	+3,585	+1,217
Montgomery	+2,551	-1,327	-23	+2,345	+1,556
Moore	+7,202	+5,762	+238	-285	+1,487
Nash	+2,533	+321	+68	+1,440	+704
New Hanover	-520	-1,104	+29	+311	+244
Northampton	+3,928	+3,417	+136	+250	+125
Onslow	+9,128	+3,772	+230	+3,764	+1,362
Orange	+6,232	+277	+56	+4,317	+1,582
Pamlico	-2,628	-1,223	+74	+127	-1,606
Pasquotank	-2,785	-1,009	-901	-298	-577
Pender	+16,848	+10,375	+610	+3,383	+2,480
Perquimans	-463	-455	-296	+578	-290
Person	-1,485	-4,211	+122	+1,243	+1,361
Pitt	+1,738	+1,178	+198	-313	+675
Polk	+3,461	+502	+48	+1,036	+1,875
Randolph	+4,423	-717	+175	+3,669	+1,296
Richmond	+4,450	+4,293	+15	+617	-475
Robeson	+7,375	+2,643	+641	+2,575	+1,516
Rockingham	+5,223	+4,955	--	+47	+221
Rowan	+691	-2,392	+198	+358	+2,527
Rutherford	+3,798	-501	+57	+826	+3,416
Sampson	-2,429	-4,036	+4	+750	+853
Scotland	+2,502	+1,133	+82	+1,019	+268
Stanly	-962	-832	-90	+815	-855
Stokes	+5,112	+1,299	+26	+1,862	+1,925
Surry	+1,632	-2,078	+669	+1,585	+1,456
Swain	+4,376	+602	+27	+1,829	+1,918
Transylvania	+10,629	+232	+1,259	+3,505	+5,633
Tyrrell	-355	-2,209	+478	+1,541	-165
Union	+2,708	-965	+116	+1,693	+1,864
Vance	-1,920	-3,540	+7	+682	+931
Wake	+4,280	+1,463	+10	+1,818	+989
Warren	+11,462	+4,397	--	+5,133	+1,932
Washington	-759	-2,584	+533	+703	+589
Watauga	+4,846	--	-650	+3,442	+2,054
Wayne	+1,747	-817	--	+1,388	+1,176
Wilkes	+9,408	+3,021	-612	+4,481	+2,518
Wilson	+957	-2,150	+55	+2,205	+847
Yadkin	+2,862	+481	+45	+1,613	+723
Yancey	+2,858	+102	+390	+2,042	+324
Total	+381,835	+54,711	+15,455	+192,173	+119,496

[a]Net annual growth minus timber removals.

Table 52.--Net annual change[a] of sawtimber on timberland, by county and species group, North Carolina, 1983

County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
	Thousand board feet				
Alamance	+16,455	+7,318	--	+3,868	+5,269
Alexander	+9,562	+383	+836	+5,882	+2,461
Alleghany	+5,726	+117	+1,322	+5,421	-1,134
Anson	+36,408	+23,779	+59	+7,790	+4,780
Ashe	+31,735	+1,746	+3,820	+12,897	+13,272
Avery	+30,595	--	+2,293	+17,970	+10,332
Beaufort	+21,035	+7,151	+439	+9,948	+3,497
Bertie	+43,314	-710	+2,668	+27,200	+14,156
Bladen	-18,132	-22,013	+1,534	+4,004	-1,657
Brunswick	+27,096	+16,472	+6,229	+1,046	+3,349
Buncombe	+35,386	-7,241	+1,792	+18,714	+22,121
Burke	+16,509	-4,894	+14,945	+6,515	-57
Cabarrus	+8,951	+6,852	-659	+3,982	-1,224
Caldwell	+25,543	+120	+9,056	+12,152	+4,215
Camden	-9,569	-17,625	-4,303	+11,550	+809
Carteret	+15,516	+8,597	--	+5,145	+1,774
Caswell	+38,487	+19,712	+226	+13,117	+5,432
Catawba	-11,659	-4,566	+1,833	-12,322	+3,396
Chatham	+35,480	+18,958	+773	+4,859	+10,890
Cherokee	+42,689	+7,282	+10,127	+8,517	+16,763
Chowan	-6,027	-11,053	+95	+4,428	+503
Clay	+20,583	+10,311	+549	+3,029	+6,694
Cleveland	+17,466	+2,729	+34	+9,075	+5,628
Columbus	+108,981	+64,376	+4,860	+28,013	+11,732
Craven	+27,958	+4,435	+1,227	+17,172	+5,124
Cumberland	+6,983	+6,722	+1,215	+2,343	-3,297
Currituck	+6,389	+2,571	+610	+457	+2,751
Dare	+15,457	+5,005	+1,518	+8,510	+424
Davidson	+12,930	-5,515	+271	+15,219	+2,955
Davie	+12,260	+1,812	+216	+3,566	+6,666
Duplin	+12,489	-7,000	+926	+9,965	+8,598
Durham	+15,987	+14,990	+87	+4,087	-3,177
Edgecombe	-5,790	-19,600	+1,741	+6,721	+5,348
Forsyth	+22,716	+4,901	+62	+11,401	+6,352
Franklin	-46,183	-35,983	--	-4,462	-5,738
Gaston	+22,085	+6,798	+104	+7,281	+7,902
Gates	+11,143	-7,518	+2,391	+13,573	+2,697
Graham	+25,739	+830	+7,243	+11,602	+6,064
Granville	+36,055	+10,984	+38	+11,017	+14,016
Greene	+6,937	+2,987	+1,239	-513	+3,224
Guilford	+36,602	+9,448	+202	+22,882	+4,070
Halifax	+49,401	+23,474	+390	+16,291	+9,246
Harnett	+25,845	+9,967	+26	+10,218	+5,634
Haywood	+39,744	-265	+7,106	+16,062	+16,841
Henderson	+20,780	+3,339	-4,211	+7,098	+14,554
Hertford	+6,007	-5,712	+1,127	+9,537	+1,055
Hoke	+7,245	+3,188	+230	-221	+4,048
Hyde	+22,263	+12,419	+399	+7,179	+2,266
Iredell	-19,549	-5,259	+641	-7,452	-7,479
Jackson	+40,451	+447	+5,117	+10,182	+24,705
Johnston	+21,487	+2,412	--	+11,342	+7,733
Jones	+15,438	+4,767	+2,058	+5,298	+3,315

Continued

Table 52.--Net annual change[a] of sawtimber on timberland, by county and species group, North Carolina, 1983--Continued

County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
			Thousand board feet		
Lee	+14,946	+2,803	--	+9,175	+2,968
Lenoir	+1,219	-14,379	+3,319	+6,463	+5,816
Lincoln	+10,450	-2,138	--	+7,818	+4,770
McDowell	+39,241	+922	+2,879	+14,407	+21,033
Macon	+64,137	+1,056	+3,326	+23,718	+36,037
Madison	+14,681	+2,805	-27,444	+24,808	+14,512
Martin	+22,458	-8,976	+3,346	+25,882	+2,206
Mecklenburg	-15,104	-14,325	+438	+9,613	-10,830
Mitchell	+32,864	+297	+341	+21,215	+11,011
Montgomery	+13,308	-1,315	--	+5,945	+8,678
Moore	+30,333	+26,587	+717	-2,149	+5,178
Nash	+10,172	-244	+405	+4,494	+5,517
New Hanover	+35	-2,588	--	+1,667	+956
Northampton	+18,440	+12,995	+871	+1,701	+2,873
Onslow	+41,399	+22,216	+498	+12,817	+5,868
Orange	+38,423	+4,720	--	+19,229	+14,474
Pamlico	-4,859	-969	+460	+683	-5,033
Pasquotank	-4,290	-3,192	-4,200	+4,436	-1,334
Pender	+47,763	+19,506	+3,651	+12,555	+12,051
Perquimans	-3,383	-6,210	-1,356	+5,466	-1,283
Person	-975	-16,202	+197	+7,879	+7,151
Pitt	+7,416	-2,457	+1,649	+6,912	+1,312
Polk	+12,280	+136	+330	+4,387	+7,427
Randolph	+18,592	-2,939	+302	+15,169	+6,060
Richmond	+13,897	+15,716	--	-55	-1,764
Robeson	+33,100	+15,134	+3,712	+11,311	+2,943
Rockingham	+29,808	+23,839	--	+2,894	+3,075
Rowan	+3,290	-5,197	+231	+715	+7,541
Rutherford	+22,801	+5,583	-141	+986	+16,373
Sampson	-7,984	-13,051	+144	+3,272	+1,651
Scotland	+9,910	+4,514	+516	+3,917	+963
Stanly	-2,456	-679	-395	+3,283	-4,665
Stokes	+25,559	+6,073	+217	+12,291	+6,978
Surry	+13,416	-5,244	+2,405	+7,044	+9,211
Swain	+23,523	+3,558	--	+13,752	+6,213
Transylvania	+45,356	+809	+5,566	+15,181	+23,800
Tyrrell	+1,286	-4,300	+768	+5,092	-274
Union	+22,018	+4,333	+865	+5,908	+10,912
Vance	+851	-8,289	--	+4,609	+4,531
Wake	+37,416	+20,291	--	+7,210	+9,915
Warren	+51,165	+22,713	--	+17,938	+10,514
Washington	-8,102	-13,104	+1,515	+2,226	+1,261
Watauga	+20,658	--	-4,165	+16,333	+8,490
Wayne	+14,985	+6,472	--	+6,213	+2,300
Wilkes	+61,265	+22,170	-1,287	+23,257	+17,125
Wilson	+3,878	-13,438	+331	+11,555	+5,430
Yadkin	+15,136	+4,454	+142	+5,265	+5,275
Yancey	+12,482	+355	+2,895	+9,642	-410
Total	+1,843,803	+283,266	+93,549	+873,284	+593,704

[a]Net annual growth minus timber removals.

Table 53.--Green weight of forest biomass on timberland, by county and species group, North Carolina, 1984

County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
	Hundred thousand pounds				
Alamance	233,112	63,984	1,957	62,830	104,341
Alexander	198,650	73,989	3,180	38,195	83,286
Alleghany	127,647	1,431	21,288	31,894	73,034
Anson	360,803	204,423	2,509	74,867	79,004
Ashe	318,302	7,928	16,503	83,337	210,534
Avery	266,487	741	12,781	89,000	163,965
Beaufort	513,874	212,951	10,839	195,570	94,514
Bertie	671,235	168,102	23,948	308,279	170,906
Bladen	487,249	215,749	15,719	165,503	90,278
Brunswick	491,052	244,180	44,386	126,765	75,721
Buncombe	530,487	18,239	10,364	119,982	381,902
Burke	354,520	77,061	70,845	76,790	129,824
Cabarrus	150,082	43,510	5,462	36,125	64,985
Caldwell	452,241	38,781	68,379	96,656	248,425
Camden	174,684	27,646	7,570	115,791	23,677
Carteret	245,126	149,257	805	69,292	25,772
Caswell	311,473	129,750	2,982	85,187	93,554
Catawba	151,548	52,848	7,363	19,586	71,751
Chatham	593,156	228,101	11,369	151,428	202,258
Cherokee	508,044	89,587	46,266	76,809	295,382
Chowan	91,573	26,221	1,210	45,668	18,474
Clay	199,285	52,039	1,853	21,542	123,851
Cleveland	206,622	51,341	2,345	47,930	105,006
Columbus	776,800	289,329	35,875	313,828	137,768
Craven	525,220	219,812	10,007	220,182	75,219
Cumberland	304,338	145,381	11,300	84,041	63,616
Currituck	144,562	51,047	6,611	68,347	18,557
Dare	260,974	84,106	29,560	111,003	36,305
Davidson	244,326	39,217	3,249	80,387	121,473
Davie	125,165	19,594	3,041	42,206	60,324
Duplin	459,928	155,273	4,369	173,960	126,326
Durham	228,478	97,599	1,518	65,783	63,578
Edgecombe	325,367	74,794	9,914	131,815	108,844
Forsyth	176,467	39,887	1,544	58,247	76,789
Franklin	286,504	121,166	1,062	74,906	89,370
Gaston	219,804	70,845	2,287	61,856	84,816
Gates	312,798	93,427	17,462	160,111	41,798
Graham	369,082	24,155	37,377	104,370	203,180
Granville	410,393	132,427	3,011	134,682	140,273
Greene	134,595	32,114	7,375	50,934	44,172
Guilford	320,082	99,216	1,805	126,421	92,640
Halifax	534,906	162,696	4,463	210,834	156,913
Harnett	292,550	97,863	440	65,887	128,360
Haywood	425,351	13,524	46,914	103,669	261,244
Henderson	335,892	30,676	29,552	61,886	213,778
Hertford	289,599	62,269	9,380	142,282	75,668
Hoke	147,304	79,093	1,289	38,268	28,654
Hyde	311,869	159,187	9,946	119,757	22,979
Iredell	244,558	76,128	4,088	71,142	93,200
Jackson	513,536	6,612	23,312	106,589	377,023
Johnston	481,762	156,666	11	156,950	168,135
Jones	284,712	123,932	15,404	81,363	64,013

Continued

Table 53.--Green weight of forest biomass on timberland, by county and species group, North Carolina, 1984--Continued

County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
	Hundred thousand pounds				
Lee	176,837	52,519	618	62,260	61,440
Lenoir	199,990	42,116	18,926	71,606	67,342
Lincoln	184,260	60,340	1,074	44,685	78,161
McDowell	506,676	57,140	23,013	97,268	329,255
Macon	598,049	21,715	21,432	132,375	422,527
Madison	473,885	31,146	43,301	132,758	266,680
Martin	411,210	107,826	22,454	221,843	59,087
Mecklenburg	247,888	75,646	11,619	80,960	79,663
Mitchell	266,962	3,431	13,410	88,578	161,543
Montgomery	409,130	126,407	2,207	101,141	179,375
Moore	493,653	234,032	12,946	89,393	157,282
Nash	372,818	129,507	3,719	129,271	110,321
New Hanover	50,779	21,500	1,139	14,133	14,007
Northampton	380,151	97,241	7,346	136,220	139,344
Onslow	438,229	215,675	6,749	135,245	80,560
Orange	333,348	97,300	3,603	116,140	116,305
Pamlico	202,170	96,332	2,634	81,587	21,617
Pasquotank	127,552	26,439	5,972	79,590	15,551
Pender	610,298	289,103	33,495	162,159	125,541
Perquimans	125,679	27,502	4,307	53,099	40,771
Person	221,106	58,413	5,935	65,684	91,074
Pitt	398,473	120,533	25,248	183,638	69,054
Polk	194,153	54,263	1,386	35,047	103,457
Randolph	472,243	64,169	7,437	124,357	276,280
Richmond	273,474	144,442	498	74,403	54,131
Robeson	537,694	135,432	26,687	278,500	97,075
Rockingham	343,693	143,349	208	77,374	122,762
Rowan	252,494	77,909	4,774	71,990	97,821
Rutherford	412,623	141,503	4,240	59,497	207,383
Sampson	425,940	162,013	9,979	145,525	108,423
Scotland	147,215	83,371	6,155	33,220	24,469
Stanly	169,609	62,951	1,002	39,070	66,586
Stokes	315,807	96,560	848	88,375	130,024
Surry	280,266	57,973	12,161	61,734	148,398
Swain	231,306	28,906	1,094	59,347	141,959
Transylvania	461,166	9,946	27,585	106,945	316,690
Tyrrell	314,139	97,027	30,350	158,897	27,865
Union	281,529	69,727	4,260	58,947	148,595
Vance	167,431	66,632	551	51,595	48,653
Wake	562,965	200,693	800	189,696	171,776
Warren	356,356	124,250	581	125,193	106,332
Washington	168,274	24,347	11,881	103,670	28,376
Watauga	250,847	--	15,205	86,770	148,872
Wayne	268,694	118,449	--	78,843	71,402
Wilkes	764,114	173,530	86,847	190,665	313,072
Wilson	207,858	54,951	1,850	78,558	72,499
Yadkin	160,796	51,732	1,930	34,747	72,387
Yancey	393,586	5,664	40,326	92,005	255,591
Total	32,767,589	9,177,546	1,291,871	10,145,335	12,152,837

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Keywords: Timberland, forest ownership, timber volume, timber growth, timber removals.

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