

# SOUTH CAROLINA'S <sup>40</sup> #25 FORESTS



U.S. Department of Agriculture  
Forest Service Resource Bulletin SE-51

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Photos courtesy of South Carolina State Commission of Forestry.

**December 1979**  
**Southeastern Forest Experiment Station**  
**Asheville, North Carolina**

## FOREWORD

In accordance with the Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974, the fifth inventory of South Carolina's forests was expanded to accommodate both timber and nontimber evaluations. This report presents the principal findings of the timber evaluation. The nontimber evaluations will be separate analyses and are beyond the scope of this report.

The field inventory was started in April 1977 and completed in August 1978. Four previous Statewide inventories, completed in 1936, 1947, 1958, and 1968, provide reference points for measuring changes and trends over the past 42 years. This analysis focuses mainly on changes and trends since 1968.

For inventory purposes and analyses, South Carolina is divided into three separate areas called Survey Units. A report highlighting the inventory findings and containing additional breakdowns of the data has already been issued for each of these Survey Units. Copies of these reports can be obtained from the Southeastern Forest Experiment Station. A Forest Information Retrieval (FIR) service is also available at the Southeastern Station; forest statistics are compiled at cost for any geographic area within the Station territory.

RPA and the Forest and Rangeland Renewable Resources Research Act of 1978 authorize these forest inventories and evaluations. The Southeastern Forest Experiment Station, headquartered in Asheville, North Carolina, administers these forest evaluations in Florida, Georgia, North Carolina, South Carolina, and Virginia. 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 South Carolina's forest resources. Appreciation is expressed to all Work Unit and Station personnel who participated in the the field and office work. The Southeastern Station gratefully acknowledges the cooperation and assistance provided by the South Carolina State Commission of Forestry. 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.



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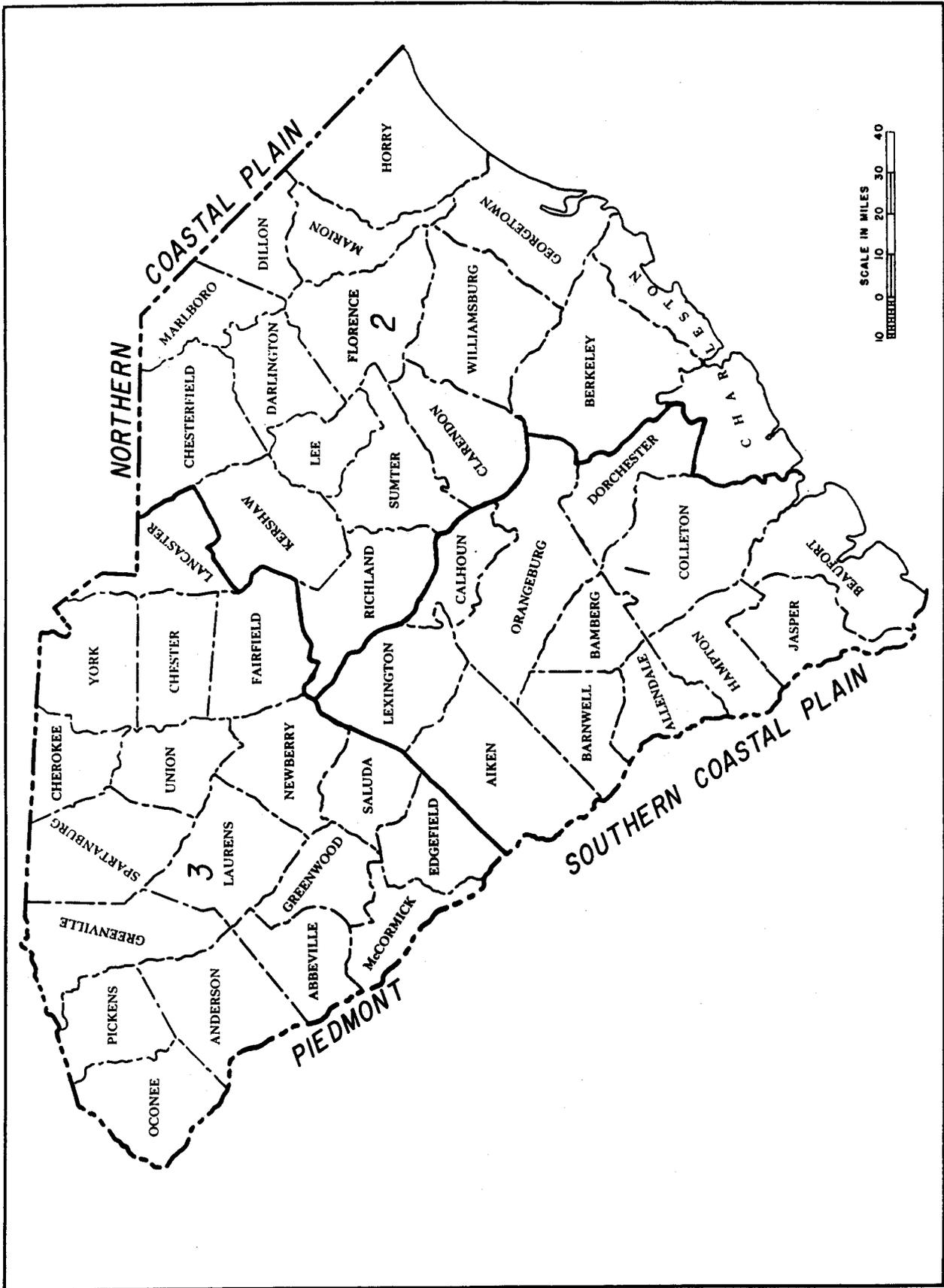


Figure 1.—Forest Survey Units in South Carolina.

# SOUTH CAROLINA'S FORESTS

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## HIGHLIGHTS

*Since the fourth inventory of South Carolina's forest resources was completed in 1968—*

*—area classified as commercial timberland increased from 12.4 to 12.5 million acres, or less than 1 percent. This small net increase masked land-use changes on almost 0.7 million acres. Some 0.3 million acres of timberland were either diverted to nonforest or reclassified as noncommercial forest. The addition of almost 0.4 million acres of timberland more than offset these losses except in the Southern Coastal Plain. Overall, trends in land use indicate forest acreage has peaked in South Carolina.*

*—ownership of more than 1.1 million acres of timberland changed from private individuals to corporate holdings. Land acquisitions by companies with primary wood-using plants accounted for only about 0.2 million acres. Most of the change involved land acquisitions by utility, railroad, and oil companies; realty and development firms; banks and trust companies; and hunting clubs. Less than 9 percent of the timberland is publicly owned, about the same as in 1968.*

*—acreage in loblolly pine forest type increased from 2.9 to 3.4 million acres, or by 17 percent. In contrast with the increase in loblolly pine type, acreage in the other major softwood types and oak-pine type decreased. A significant number of older slash pine stands established in the Coastal Plain have been highly susceptible to fusiform rust and ice damage and are being liquidated and replanted to loblolly pine. Acreage in the hardwood types, excluding oak-pine, increased from 5.1 to 5.2 million acres. Hardwoods replaced pines, at least temporarily, on more than 42 percent of the pine acreage harvested and retained in commercial forest.*

*—acreage occupied by sawtimber stands increased from 4.9 to nearly 5.5 million acres, or by 11 percent. Acreage occupied by poletimber stands increased from less than 3.5 to almost 3.6 million acres, or by 3 percent. There are more poletimber and sawtimber stands in South Caro-*

*lina than at any time since the initial forest inventory in 1936. Acreage in sapling and seedling stands decreased from more than 3.6 to 3.2 million acres, or by 12 percent. Fewer than 0.3 million acres were classified as nonstocked compared to 0.4 million acres in 1968.*

*—volume of growing stock on commercial forest increased from 13.3 to 17.2 billion cubic feet, or by 29 percent. Softwoods accounted for 57 percent of the increase as a preponderance of pine stands established between 1940 and the early 1960's developed into poletimber and sawtimber. By Survey Unit, the increase in timber volume ranged from 18 percent in the Northern Coastal Plain to 41 percent in the Piedmont. By ownership, the increase ranged from less than 7 percent on lands owned or leased by forest industry to 36 percent on nonindustrial private forest (NIPF) lands. Of the major softwood species, loblolly pine and slash pine made the greatest gains. Among the major hardwood species, the largest increases were in a variety of red oaks, sweetgum, and yellow-poplar. The large buildup in inventory included a 33 percent increase in volume of sawtimber.*

*—average rate of net annual growth increased from 53 to 77 cubic feet per acre of commercial forest. This average of 77 cubic feet is a record high across any entire State in the Southeast and is slightly above the upper estimate of prospective growth assumed in 1968. Softwoods accounted for 65 percent of the increase as extensive acreages of natural and planted pine stands established on old fields developed into merchantable trees. By Survey Unit, average growth per acre ranged from 69 cubic feet in the Northern Coastal Plain to 83 cubic feet in the Piedmont. By ownership class, average growth ranged from 74 cubic feet on farm woodlands to 88 cubic feet on public forests. In 1977, growth exceeded removals by 467 million cubic feet, or by 94 percent.*

*—timber was removed from about 410,000 acres annually through final harvests, intermedi-*

ate cutting, and forest diversions. Annual rate of final harvest averaged 197,000 acres. In 1977, removals of growing stock totaled 496 million cubic feet, up 12 percent from 1967. Some 82 percent of the growing stock removed was converted into roundwood products; 10 percent was left in the woods as logging residues; and the remaining 8 percent resulted from cultural practices, land clearing, or other actions where trees were removed from commercial forests but not used. Softwood removals were up 25 percent, while hardwood removals were down 12 percent.

—pulpwood remained the leading timber product and accounted for 48 percent of total roundwood output in 1977. About 60 percent of the round pulpwood produced in South Carolina in 1977 was processed in the State, while 40 percent was exported, primarily to mills in Georgia and North Carolina. Saw logs were the second leading product and accounted for 33 percent of total roundwood output. About 93 percent of the saw log output was processed in the State. Peeler logs were third, accounting for another 10 percent of the output. About 81 percent of the peeler logs were processed in the State.

—annual rate of regeneration averaged about 132,000 acres, with artificial regeneration accounting for 41 percent. This rate of regeneration was about 33 percent below the average rate of final harvest. Several conditions confirm that the rate of regeneration has decreased, particularly

for pine on NIPF lands. The stand-age distribution showed 1.2 million acres of pine in the 20- to 29-year-age class, 0.8 million acres in the 10- to 19-year class, and fewer than 0.7 million acres less than 10 years old, when all ownerships are included. A 20 percent decrease in number of softwood saplings between 1968 and 1978 further substantiates a slowdown in the rate of pine regeneration.

—half of the 12.5 million acres of commercial forest land experienced no significant treatment or disturbance. About 62 percent of these undisturbed stands were in relatively good condition, compared to almost 60 percent of the stands treated or disturbed. About 6 percent of the undisturbed stands were on sites unfavorable for intensive silvicultural practices either because of steep slopes or year-round water problems. Only 1 percent of the treated or disturbed stands occurred on similar sites.

—the overall outlook for prospective timber supplies has improved. Projections based on the 1968 conditions estimated a prospective available cut of about 830 million cubic feet annually by year 2000. Similar projections based on the 1978 conditions indicate a prospective available cut of almost 1,110 million cubic feet by 2007. These latest projections suggest that hardwoods will account for more than half of the prospective increase in total growing stock but for a much smaller proportion of the prospective increase in sawtimber.



## FOREST TRENDS

South Carolina encompasses 19.3 million acres of land, of which 65 percent is forested. In addition to its land area, South Carolina has more than 0.5 million acres of inland water. A belt of dry, excessively drained sandhills extends across the middle of the State and divides it into two major physiographic regions: Coastal Plain and Piedmont. From the sandhills, the Coastal Plain extends southeast some 100 miles to the Atlantic Ocean. Northwest of the sandhills, the rolling Piedmont Plateau extends some 100 miles to the Appalachian Mountains. Portions of Oconee, Pickens, and Greenville Counties actually extend into the mountains. For statistical purposes, the mountainous areas are considered as part of the Piedmont and the sandhills as part of the Coastal Plain. Also, because of its large size and some important sectional differences, this analysis retains the traditional division of the Coastal Plain into southern and northern Survey Units (fig. 1).

Altogether, the Coastal Plain contains 12.6 million acres of land, of which 63 percent is forested. About 25 percent of the land is used for either agricultural crops or pasture. Another 4 percent is classified as "marsh." In addition to the sounds and inlets extending in from the Ocean, several major rivers flow through the Coastal Plain. Broad, low, forested flood plains flank most of these streams. Lakes Murray, Marion, and Moultrie inundate extensive acreages in the Coastal Plain Forest Survey Units and account for a large part of the State's inland water. Except for two major urban centers, Columbia and Charleston, the Coastal Plain is rather sparsely populated.

The Piedmont contains 6.7 million acres of land, of which 68 percent is forested. Once a major farming region, less than 22 percent of its land is now used for agricultural purposes and almost half of this is pasture. A significant amount of the cropland is in orchards. Two large reservoirs on the Savannah River, Lake Hartwell and Clark Hill Reservoir, account for most of the inland water in the region. Generally, urban and industrial development are more prevalent in the Piedmont than in the Coastal Plain. Although less than 35 percent of the land is in this region, more than 40 percent of the population resides in the Piedmont. Greenville, Spartanburg, and Anderson are major urban centers.

### FOREST ACREAGE SEEMS TO HAVE PEAKED

When the first Statewide inventory of South Carolina was conducted in 1936, forests occupied 10.7 million acres, or 55 percent of the land. Subsequent inventories, completed in 1947, 1958, and 1968, measured a 17 percent increase in forest acreage as extensive areas of idle cropland and pasture reverted to forest. Between 1968 and 1978, forest acreage increased less than 1 percent and seems to have peaked at just under 12.6 million acres. This is particularly true for commercial timberland, which totaled 12.5 million acres in 1978.

This conclusion is based on evidence of renewed agricultural activity and a sharp reduction in idle cropland, the primary source of new forest land. Acreage of cropland harvested is one measure of agricultural activity. Based on Census of Agriculture statistics, 4.3 million acres of cropland were harvested in South Carolina in 1940. Between 1940 and 1969, the area of cropland harvested yearly decreased to about 2.0 million acres. The almost 2.3 million acres of cropland harvested in 1974 indicate some expansion in agriculture. In the 1947 forest inventory of South Carolina, almost 1.6 million acres were classified as "idle cropland." Each successive inventory has measured a reduction in idle cropland; in 1978 only 0.3 million acres were in this category. This source of new forest land has now diminished to the point where future forest diversions and withdrawals are likely to translate into net reductions of commercial timberland.

The small net increase in acreage of timberland between 1968 and 1978 masked land use changes on almost 0.7 million acres (table I). Almost 0.3 million acres of timberland were either diverted to nonforest uses or reclassified as "noncommercial forest." The addition of almost 0.4 million acres of timberland more than offset these losses except in the Southern Coastal Plain.

### MORE FOREST LAND IN CORPORATE OWNERSHIP

Although farmers and other miscellaneous individuals still own about 63 percent of South Carolina's timberland, their share of the total declined

Table I.—Changes in area of commercial forest land, by Survey Unit, South Carolina, 1968–1978

Survey unit	Area of commercial forest land in:		Net change	Changes								
				Total gain	Additions from:		Total loss	Noncommercial forest	Diversions to:			
	1968	1978			Non-forest	Noncommercial forest			Agri-culture	Urban and other	Water	
<i>Thousand acres.</i>												
Southern												
Coastal Plain	3,264.3	3,223.4	-40.9	44.2	40.1	4.1	85.1	14.0	40.3	26.6	4.2	
Northern												
Coastal Plain	4,683.2	4,751.5	+68.3	186.8	169.8	17.0	118.5	8.1	46.0	60.5	3.9	
Piedmont	4,479.1	4,528.0	+48.9	140.3	129.0	11.3	91.4	3.4	37.5	31.7	18.8	
State	12,426.6	12,502.9	+76.3	371.3	338.9	32.4	295.0	25.5	123.8	118.8	26.9	

from 72 percent in 1968. Land acquisitions by companies with primary wood-using plants (forest industry) account for only a small part of this decline. Altogether, forest industries expanded their fee-simple holdings by about 195,000 acres. They have an additional 82,500 acres of timberland under long-term lease. Holdings by other types of private corporations increased by almost 945,000 acres. The other corporate ownership class includes utility companies, railroad and oil companies, realty and development firms, banks and trust companies, hunting clubs, and all other corporations other than those classified as "forest industry."

Less than 9 percent of the timberland is publicly owned, about the same as in 1968. Increases in National Forests and other Federal holdings more than offset reductions in State, county, and municipal forests. The Francis Marion and Sumter National Forests and the Savannah River Plant lands near Aiken are the largest concentrations of public timberland. Other major public holdings include the Fort Jackson Military Reservation, the Sand Hills and Manchester State Forests, the Carolina Sand Hills National Wildlife Refuge, and forests around Lake Hartwell and Clark Hill Reservoir.

#### ACREAGE OF LOBLOLLY PINE UP 17 PERCENT

Loblolly pine, the primary species featured in timber management in South Carolina, is the predominant softwood forest type in each of the three Survey Units. In contrast to declines in acreage occupied by other major softwood types, acreage of loblolly pine increased from 2.9 to 3.4 million acres, or by 17 percent between 1968 and 1978.

Often, loblolly pine is either planted or seeds naturally on idle agricultural lands as they revert to forest. Over this period, pines dominated the stocking on two-thirds of all acreage reverting to commercial forests.

While declines in acreage of shortleaf pine, longleaf pine, and pond pine were continuations of past trends, an 11 percent reduction in acreage of slash pine was new. Slash pine was often planted in areas in South Carolina well north of its natural range. Here it has been highly susceptible to fusiform rust and to ice storm damage. A significant number of these slash pine plantations are being liquidated and replanted to loblolly pine.

Oak-hickory is the second leading forest type, occupying 2.9 million acres, and is the predominant hardwood type in the Piedmont. In each of the Coastal Units, oak-gum-cypress is the predominant hardwood type. Many of the hardwood species associated with these types are aggressive competitors and form dense understories in pine stands. In the absence of site preparation or some control measures, these hardwoods tend to replace pines following harvest. Hardwood encroachment is most likely to occur on lands which have been forested for long periods. In pine stands established on abandoned cropland, where cultivation has eliminated the hardwood rootstock, hardwoods are initially less competitive. Foresters seeking to regenerate pine find it difficult to duplicate old-field conditions through site preparation.

Another major forest type is oak-pine, occupying some 1.7 million acres. In this type, pine makes up at least 25 but less than 50 percent of the stocking. Many large, high-quality pine trees occur in these mixed stands where the pine component is a residual of an older stand harvested to

some minimum diameter. We think that there has been a considerably smaller reduction in the acreage in this type than is suggested by comparing the 1978 estimate with that reported for 1968. In 1968, sample plots were allowed to straddle two or more forest conditions. If one portion of the plot was in a pine stand and the other in an oak-hickory stand, the area was often typed as oak-pine. That practice was eliminated in the 1978 survey.

The highest rate of type change occurred on acres where a final timber harvest had taken place. Between 1968 and 1978, 1.1 million acres of pine types were harvested and remained in commercial forest, excluding thinnings and other intermediate cuttings. At time of remeasurement, hardwood stocking exceeded pine on 42 percent of this acreage, thereby changing the forest type to either oak-pine or hardwood. Hardwood stocking was most prevalent on those harvested acres where no evidence of site preparation or artificial regeneration was found. This condition occurred most frequently on NIPF lands. Apparently, many NIPF owners accept whatever species replace their harvested stands.

Since 1968, more than 0.9 million acres of oak-pine and other hardwood types experienced a final harvest and were retained in commercial forest. At time of remeasurement, hardwoods still dominated the stocking on 84 percent of this acreage. These statistics suggest that final harvesting in the absence of regeneration practices, primarily on NIPF lands, is increasing the acreage in hardwood forest types. To a lesser extent, thinning and other intermediate cutting in pine stands have similar effects when hardwoods in the understory are released to fill the openings created.

#### **MORE POLETIMBER AND SAWTIMBER STANDS**

The largest numbers of pine stands in South Carolina are between 20 and 40 years old; most of the better stocked hardwood stands are between 30 and 60 years old. There are more poletimber and sawtimber stands in South Carolina than at any time since the initial forest inventory in 1936. Between 1968 and 1978, acreage occupied by sawtimber stands increased from 4.9 to nearly 5.5 million acres, or by 11 percent. In three-fourths of these stands, volume of sawtimber averaged more than 5,000 board feet per acre. Acreage occupied by poletimber stands increased by 3 percent, from less than 3.5 to almost 3.6 million acres. Acreage

in sapling and seedling stands dropped by 12 percent, from more than 3.6 to 3.2 million acres. Only 273,000 acres were classified as nonstocked, compared to almost 400,000 acres in 1968.

The age and stand-size distributions differ significantly among ownership classes. Although National Forests and other public holdings make up less than 9 percent of timberland, almost 13 percent of the sawtimber stands are on these public forests. Forest industries either own or lease some 19 percent of the timberland but hold only 15 percent of the sawtimber stands. Because of their rapid rate of harvesting and regeneration, forest industry holdings now account for 26 percent of the sapling and seedling stands. NIPF lands have the highest proportion of poletimber stands. Over the next 2 decades, NIPF and public lands will likely provide increasing shares of the sawtimber requirements. After that, forest industries should be able to rely more heavily upon their own lands, particularly for pine. NIPF lands will be the primary source of the hardwood timber.

#### **FEWER ACRES ARE POORLY STOCKED**

Since growth exceeded removals throughout the remeasurement period, stocking improved across all ownership classes and most forest types. About 35 percent of all stands were fully stocked with growing-stock trees, compared to only 17 percent in 1968. The highest proportions of fully stocked stands occurred on public lands and lands managed by forest industry—39 and 47 percent, respectively. Acreage less than 60 percent stocked with trees meeting minimum requirements for growing stock decreased from 3.5 to 2.4 million acres, or by 31 percent. The highest proportion of poorly stocked stands, 20 percent, was on NIPF lands. A plurality of stands is best described as medium stocked, from 60 to 99 percent occupied with growing stock. In these medium-stocked stands, rough and rotten trees and other inhibiting vegetation occupy about 20 percent of the growing space. Stocking classifications are defined in the Appendix of this report.

The stocking increase occurred mainly in poletimber and sawtimber trees and was reflected in average basal area. When all growing-stock trees 5.0 inches and larger at d.b.h. are grouped, average basal area increased from 46 to 60 square feet per acre. Average basal area of rough and rotten trees 5.0 inches and larger remained at about 11 square feet. Average number of saplings per acre declined from 651 to 626. That the greatest reduc-

tion in growing-stock saplings occurred in the pine forest types is significant. There was a noticeable reduction in the rate of pine regeneration on NIPF lands.

### INVENTORY VOLUME UP 29 PERCENT

Between 1968 and 1978, volume of growing stock on commercial forest land increased from 13.3 to 17.2 billion cubic feet, or by 29 percent. Softwoods accounted for 57 percent of the increase as a preponderance of pine stands established between 1940 and the early 1960's developed into pole timber and saw timber. The rapid growth of these pine stands outpaced a sharp upturn in the level of softwood removals. Hardwood growth was also up in each Survey Unit; however, part of the increase in hardwood inventory is attributed to reductions in hardwood removals since 1967 (fig. 2).

By Survey Unit, the increase in inventory volume ranged from 18 percent in the Northern Coastal Plain to 41 percent in the Piedmont. In the Southern Coastal Plain, volume was up 30 percent. By ownership, the largest increase occurred on NIPF lands where inventory volume was up 36 percent. Over the next 2 decades, this large accumulation of timber inventory on these lands is the most promising source for additional timber supplies. The smallest volume increase, less than 7 percent, occurred on lands owned or leased by forest industries. Wood-using companies have harvested their lands relatively rapidly to convert their natural stands to plantations, particularly on sites suitable for pine. Volume on public lands was up 26 percent.

For both softwoods and hardwoods, the volume increases extended across all tree sizes. Plotting volume over diameter class for the three most recent inventories shows a significant reduc-

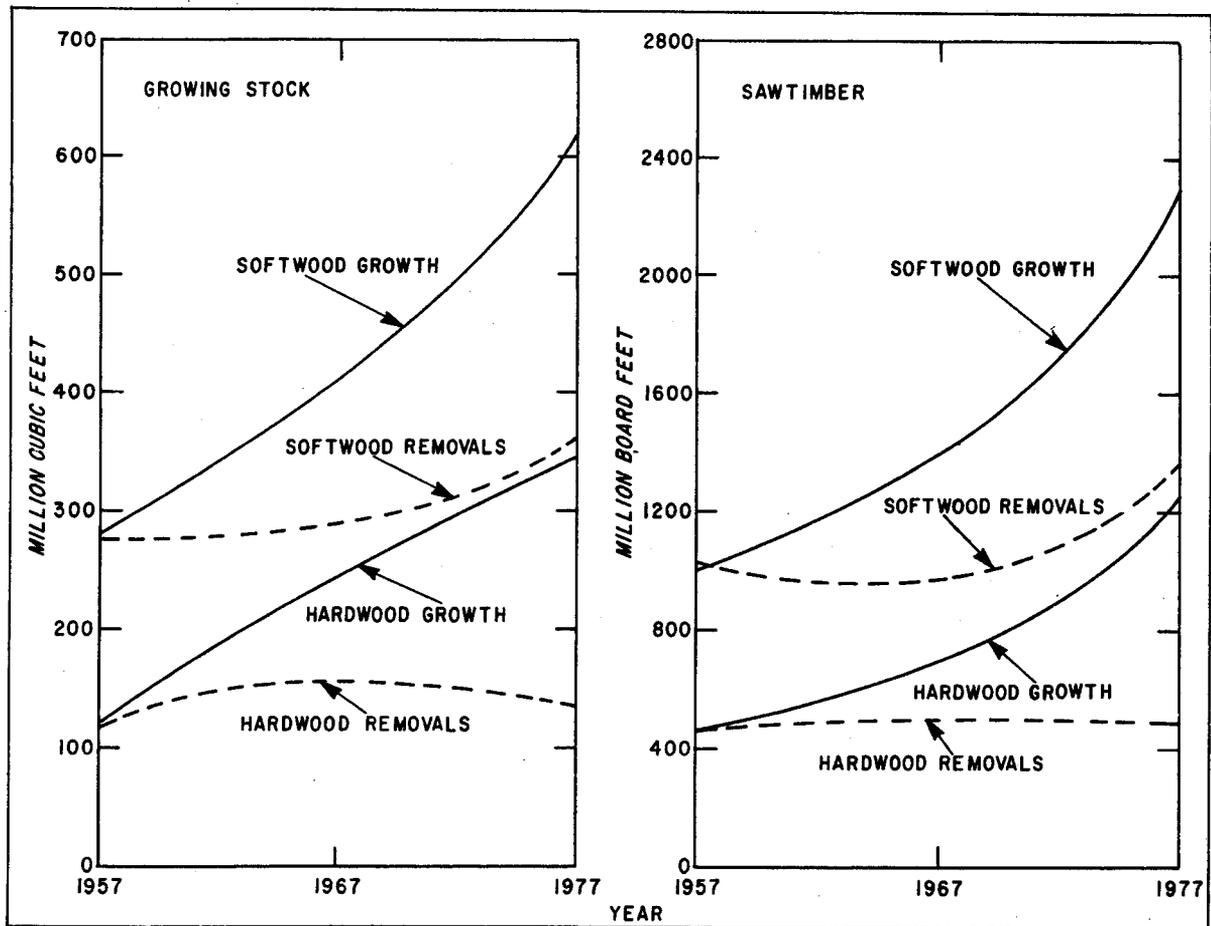


Figure 2.—Trends in the growth and timber removals in South Carolina since 1957.

tion in the rate of volume increase for 6-inch softwoods (fig. 3). This finding, together with the 20 percent decrease in number of softwood saplings, portends a likely decline in softwood pole timber in the near future. Unless there is substantial improvement in the historic mortality rates, ingrowth into the 6- and 8-inch-diameter classes is not likely to replace the outgrowth from these diameter classes. South Carolina appears to be some 10 to 15 years into an era of reduced softwood regeneration, particularly on NIPF lands. Continued volume increases in softwood sawtimber are likely over the short term, with rates of increase contingent upon rates of harvest.

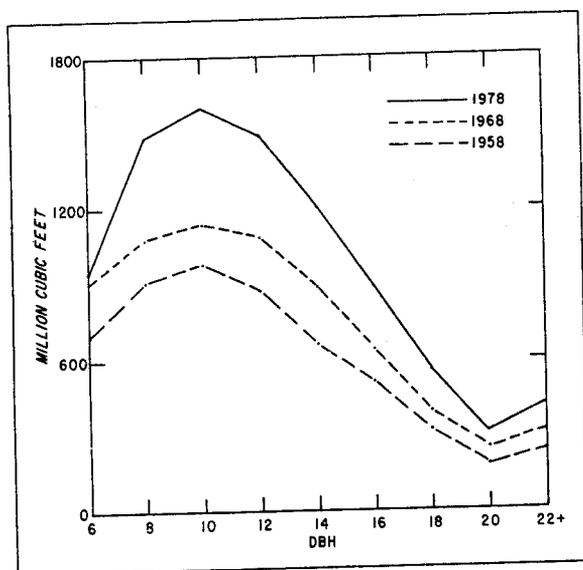


Figure 3.—Volume of softwood growing stock, by tree diameter, 1958, 1968, and 1978.

Changes in hardwood volume are more consistent across the range of diameters. The hardwood inventory reflects a long history of custodial management, periodic high grading of preferred species, and limited markets for many of the species. In the aggregate, the hardwood statistics fail to support a widespread perception on the part of hardwood users of a decrease in average tree size and deterioration in grade. Although more than 40 percent of the hardwood volume is in trees 10 to 14 inches in diameter, there is more volume in larger trees than at any time since the initial inventory in 1936.

Concerns about hardwood supply probably stem from spot shortages of certain species, tree sizes, and grades. During a particular era or within a particular timbershed, selective use of certain

species, tree sizes, and grades can lead to procurement problems. Typically, hardwood stands contain a mixture of species, tree sizes, and grades. Markets may exist for only a small part of the total volume within a stand. If the prospective timber buyer cannot use the species, sizes, and grades growing in association with the timber he needs and the landowner is unwilling to allow the buyer to high-grade the stand, the preferred timber is essentially unavailable.

In contrast to softwoods, there was little evidence of any significant departure from past trends in the rate of hardwood regeneration. Number of hardwood saplings was up 4 percent, and volume in 6-inch hardwood growing stock was up 19 percent (fig. 4). Many hardwoods sprout prolifically after harvest. Often, advanced hardwood reproduction prevails in the understory of pine stands.

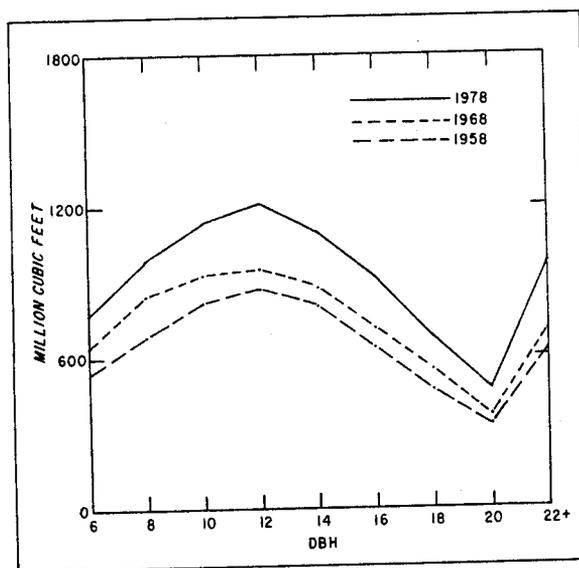


Figure 4.—Volume of hardwood growing stock, by tree diameter, 1958, 1968, and 1978.

The 1978 inventory of growing stock included 55.6 billion board feet of sawtimber, up 33 percent since 1968. By Survey Unit and ownership class, the buildup in sawtimber inventory followed much the same pattern as described for total growing stock. About 51 percent of the sawtimber volume was in trees 15.0 inches d.b.h. and larger, which is about the same as in the two previous inventories.

The 1978 inventory measured an additional 2.2 billion cubic feet of timber in trees failing to qualify as growing stock because of species, poor

form, or excessive internal rot. Although these trees are unsuited for saw logs, they contain 11 percent of the volume of all live trees 5.0 inches d.b.h. and larger. About 89 percent of this material is hardwood. Much of this timber can be used for pulpwood, other fiber products, and fuelwood.

### LOBLOLLY PINE DOMINATES THE GROWING STOCK

Loblolly pine makes up more than 30 percent of South Carolina's growing-stock timber and is the dominant species in each of the three Survey Units. Except in the extreme northwest counties, loblolly pine is indigenous throughout South Carolina and grows on a wide range of sites. Between 1968 and 1978, volume of loblolly pine increased from 3.7 to 5.3 billion cubic feet, or by 43 percent, accounting for 73 percent of the total gain in softwood volume (fig. 5). In South Carolina, it is the species most often featured in intensive pine management.

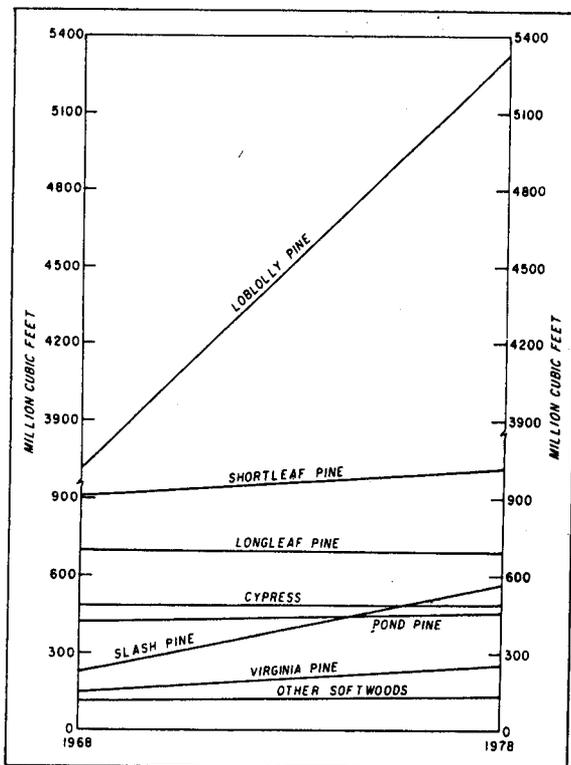


Figure 5.—Change in volume of softwood growing stock, by species, 1968-1978.

In terms of volume, shortleaf pine is the second leading softwood species with about 1.0 billion

cubic feet of the growing stock. Except along the coast, shortleaf pine is also indigenous throughout the State but is most common in the Piedmont. Volume of shortleaf pine increased less than 12 percent. Longleaf pine is the third leading softwood species but showed no significant change in volume. It is indigenous to the Coastal Plain, including the Sandhills, but seldom occurs in the Piedmont.

Over the remeasurement period, volume of slash pine more than doubled, surpassing both pond pine and cypress in the softwood rankings. Initially confined to the extreme southwest portion of the State, slash pine was widely planted outside its natural range during the late 1950's and early 1960's. Because of a high incidence of fusiform rust and susceptibility to ice damage, some of these plantations were unsuccessful and are being liquidated at an early age. The inventory measured a sharp decrease in the number of slash pine saplings and a decline in slash pine forest type; therefore, the rapid increase in slash pine volume cannot be sustained. A 72 percent increase in the volume of Virginia pine in the Piedmont was the only other significant change in softwood inventory.

Sweetgum, tupelo and blackgum, and a variety of red oak species dominate South Carolina's hardwood forests. Sweetgum occurs throughout the State and is the leading hardwood species in terms of growing-stock volume (fig. 6). Volume of sweetgum increased by 30 percent, from 1.2 to 1.6 billion cubic feet, surpassing tupelo and blackgum in the hardwood rankings. Although more sweetgum than tupelo and blackgum was harvested, sweetgum had a much faster growth rate.

When grouped together, the "other red oaks" account for 1.8 billion cubic feet or 21 percent of the hardwood growing stock. The species makeup of this group varies by Survey Unit. In the Piedmont, southern red oak and scarlet oak are the principal species in this group. In the Coastal Units, water oak and laurel oak are the most common red oaks.

Altogether, select oaks, yellow-poplar, hickory, and ash make up about 25 percent of the hardwood inventory in South Carolina. In figure 6, ash is included with other hardwoods. Most of these preferred hardwoods are concentrated in the upper Piedmont. Of all the major hardwood species, yellow-poplar made the largest percentage gain, 51 percent, in growing-stock volume. Because of its rapid growth rate, yellow-poplar has overtaken white oak in the hardwood rankings.

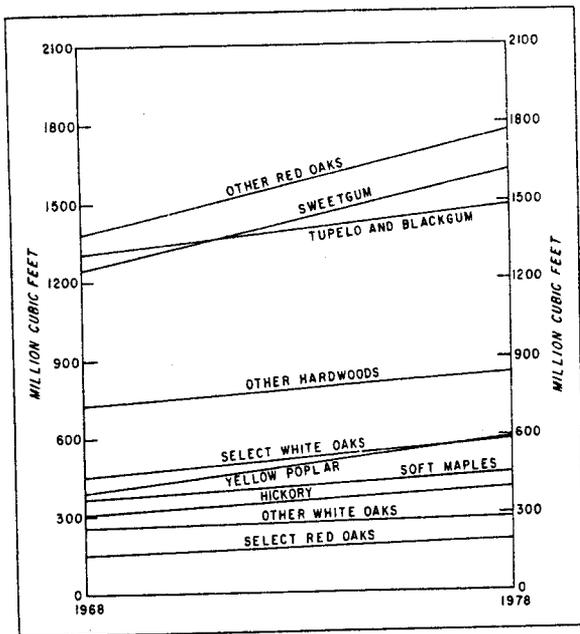


Figure 6.—Change in volume of hardwood growing stock, by species, 1968–1978.

#### ANNUAL GROWTH AVERAGES 77 CUBIC FEET PER ACRE

In 1977, net growth of growing-stock timber averaged 77 cubic feet per acre of commercial forest land, compared to 53 cubic feet in 1967. The 1977 growth rate is a record high for any State in the Southeast and approximates the potential growth rate assumed for South Carolina 10 years ago. Based on the site classifications, annual growth is now approaching the inherent capacity of the State's forests when fully stocked with natural stands. The establishment and development of additional plantations could provide some further increase in growth. Another 10-year increase of this magnitude is unlikely in light of the slowdown in pine regeneration on NIPF lands. In fact, it might be difficult to sustain the current pine growth rate on NIPF lands once the large concentration of 20- to 40-year-old pine stands matures and is harvested. Acreage of existing sapling-seedling stands cannot fully replace the poletimber and sawtimber stands now dominating the inventory. Further increases in pine growth will likely occur on lands owned or leased by wood-using companies. Prospects are much better for some continued increase in hardwood growth on NIPF lands. These observations are based on analyses of the age distributions of stands in each ownership class. Over time,

changes in rates of harvesting and regeneration can alter this outlook.

By Survey Unit, average growth per acre in 1977 ranged from 69 cubic feet in the Northern Coastal Plain to 83 cubic feet in the Piedmont. In the Southern Coastal Plain, growth averaged 81 cubic feet per acre. In the Piedmont, the high rate of growth is largely attributed to the development of young pine stands established on cropland retired between 1940 and the early 1960's. In the Southern Coastal Plain, the high growth rate is attributed in part to a relatively large concentration of older plantations. In this Unit, crews found evidence of artificial regeneration in 18 percent of the stands. Plantations have been established on more than 40 percent of the Savannah River Plant forests in the upper part of this Unit.

By ownership class, average growth per acre ranged from 74 cubic feet on farm woodlands to 88 cubic feet on public forests. On the other ownerships, the growth rates clustered around the Statewide average. In the near future, there should be a sharp upturn in the growth rate on the intensively managed lands owned and leased by forest industries. A high proportion of their stands is still in the sapling-seedling stage of development.

A more detailed breakdown of gross growth into its various components by Survey Unit and species group, along with the distribution of mortality and removals, provides a better understanding of annual change in timber volume (table II). 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 84 percent of gross growth. Ingrowth, the net volume of growing-stock trees reaching 5.0 inches d.b.h. during the year, and the subsequent growth on these trees accounted for another 15 percent. Growth on removals before removal, and growth on mortality before death, made up the remaining 1 percent.

In 1977, mortality of growing stock totaled almost 112 million cubic feet and reduced gross growth by about 10 percent. When compared to the mortality estimates in 1967, softwood mortality more than doubled, while hardwood mortality was up by less than 10 percent. The 1977 mortality losses included 313 million board feet of sawtimber, of which 63 percent was softwood. Insects, primarily pine bark beetles, and disease were the leading identifiable causes of death for softwood sawtimber. Weather and disease were

Table II.—Annual components of change in the volume of growing stock on commercial forest land, by Survey Unit and softwood and hardwood, South Carolina, 1977

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	185.1	152.9	24.9	3.9	3.0	0.4	12.2	172.9	96.2	+76.7
Hardwood	97.9	84.9	11.2	1.0	.6	.2	10.8	87.1	32.8	+54.3
Total	283.0	237.8	36.1	4.9	3.6	.6	23.0	260.0	129.0	+131.0
Northern										
Coastal Plain:										
Softwood	223.7	191.8	23.6	3.8	3.5	1.0	28.1	195.6	135.4	+60.2
Hardwood	151.8	131.5	17.3	1.7	1.0	.3	17.9	133.9	60.1	+73.8
Total	375.5	323.3	40.9	5.5	4.5	1.3	46.0	329.5	195.5	+134.0
Piedmont:										
Softwood	279.4	224.2	44.6	5.8	3.8	1.0	30.2	249.2	129.0	+120.2
Hardwood:	137.1	117.6	17.0	1.5	.8	.2	12.5	124.6	42.5	+82.1
Total	416.5	341.8	61.6	7.3	4.6	1.2	42.7	373.8	171.5	+202.3
State:										
Softwood	688.2	568.9	93.1	13.5	10.3	2.4	70.5	617.7	360.6	+257.1
Hardwood	386.8	334.0	45.5	4.2	2.4	.7	41.2	345.6	135.4	+210.2
Total	1,075.0	902.9	138.6	17.7	12.7	3.1	111.7	963.3	496.0	+467.3

the leading causes of death identified for hardwood sawtimber. In the smaller diameter classes, suppression was a major cause of death for both softwoods and hardwoods.

Less than 5 percent of the mortality was attributed to wildfire, and this speaks well for South

Carolina's fire protection efforts. Over the past decade, the area burned annually averaged less than 50,000 acres. All of the State's forest land is under fire protection, and in most years wildfires have been contained and suppressed at an average size of less than 10 acres (table III).

Table III.—Area under fire protection, protected area burned, number of fires, and average size of fires, South Carolina, 1968-1977<sup>1</sup>

Year	Area protected <sup>2</sup>		Protected area burned		Fires	Average size of fires
	M acres	Percent	M acres	Percent		
1968	12,700	100	114	0.90	6,804	17
1969	12,702	100	35	.30	3,885	9
1970	12,702	100	65	.51	5,733	11
1971	12,705	100	31	.24	4,554	7
1972	12,814	100	33	.26	4,697	7
1973	12,817	100	19	.15	4,315	4
1974	12,824	100	34	.26	5,981	6
1975	12,819	100	13	.10	3,539	4
1976	14,062	100	84	.60	10,063	8
1977	14,062	100	34	.24	8,088	4

<sup>1</sup>Source: U.S. Department of Agriculture, Forest Service, *Wildfire Statistics*, 1968-1977.

<sup>2</sup>Includes forest and nonforested watershed lands.

## TIMBER PRODUCTS OUTPUT

The forest products industry is the third largest manufacturing industry in South Carolina; it is exceeded only by the textile and chemical industries. Based on statistics from the State Department of Labor for fiscal year 1978, 626 firms were classified as part of the forest products industry, including logging contractors. These firms employed almost 30,000 people and generated an annual payroll of \$333 million. Value of forest products manufactured totaled almost \$1.9 billion. These statistics clearly indicate that a large share of the State's economy is based upon its forest resources. In addition to providing timber for consumptive uses, South Carolina's forests provide wildlife habitat, outdoor recreation opportunities, esthetic values, and enhance the quality of soil, water, and air.

This report contains estimates of timber products output in South Carolina for calendar year 1977. These estimates were developed by merging information from three separate studies: (1) the remeasurement of permanent sample locations provided estimates of total timber removals; (2) felled trees were measured at a sample of active harvesting operations to develop utilization factors for each of the roundwood products; and (3) all primary wood-using plants were canvassed to obtain information on wood receipts, product output, and wood residues. Some 155 primary wood-using plants operated in the State in 1977 (fig. 7).

Collectively, these studies indicated that 496 million cubic feet of growing-stock timber were removed from commercial forests in South Carolina in 1977. These removals included 1,842 million board feet of sawtimber. Timber products accounted for 407 million cubic feet, or 82 percent of the removals from growing stock. Almost 49 million cubic feet, or 10 percent, were left in the forests as logging residues. The remaining 40 million cubic feet, or 8 percent, resulted from cultural practices, land clearing, or other action where trees were removed from commercial forests but not used.

In addition to the 407 million cubic feet of growing stock cut for timber products, 73 million cubic feet of roundwood products were cut from timber not included in the inventory of growing stock. In addition to the 480 million cubic feet of roundwood products, the estimate of total output in-

cludes another 84 million cubic feet of plant by-products. Altogether, timber products output in South Carolina totaled about 564 million cubic feet in 1977.

### PULPWOOD IS THE LEADING TIMBER PRODUCT

In terms of quantity, pulpwood surpassed saw logs as the leading timber product in South Carolina some time between 1957 and 1967. Pulpwood has retained and increased its lead. In 1977, pulpwood accounted for 53 percent of total product output, 48 percent of the roundwood output, and 36 percent of the removals from growing stock.

There are some indications that a stronger demand for softwood saw logs and peeler logs has altered the sources of pulpwood. Although the 1977 pulpwood furnish included 301 million board feet of sawtimber, the use of sawtimber for pulpwood was down by more than 20 percent from the amount used in 1967. This finding suggests that the increase in pulpwood production in South Carolina has come largely from poletimber, chips or other plant byproducts, and nongrowing-stock sources.

The expansion of existing pulping facilities and the addition of two more mills between 1967 and 1977 boosted the daily pulping capacity within the State from 5,700 to 7,907 tons, or by 39 percent. Still, South Carolina is a net exporter of pulpwood, primarily to mills in Georgia and North Carolina. In 1977, 60 percent of the pulpwood harvested was processed in the State, while 40 percent was exported. The amount of pulpwood going out of the State exceeded imports by 215 percent.

Between 1967 and 1977, annual pulpwood production increased from the equivalent of 2,947,500 cords up to 4,421,400 cords, or by 50 percent (fig. 8). Softwoods provided 57 percent of the increase, reflecting a continued preference for the long-fiber pines along with a greater amount of pine chips and byproducts generated at sawmills. Because of improved utilization, this large increase in pulpwood production was achieved with only a 14 percent increase in annual removals of growing stock for pulpwood.

By Survey Unit, the largest increase in round pulpwood production occurred in the Piedmont,

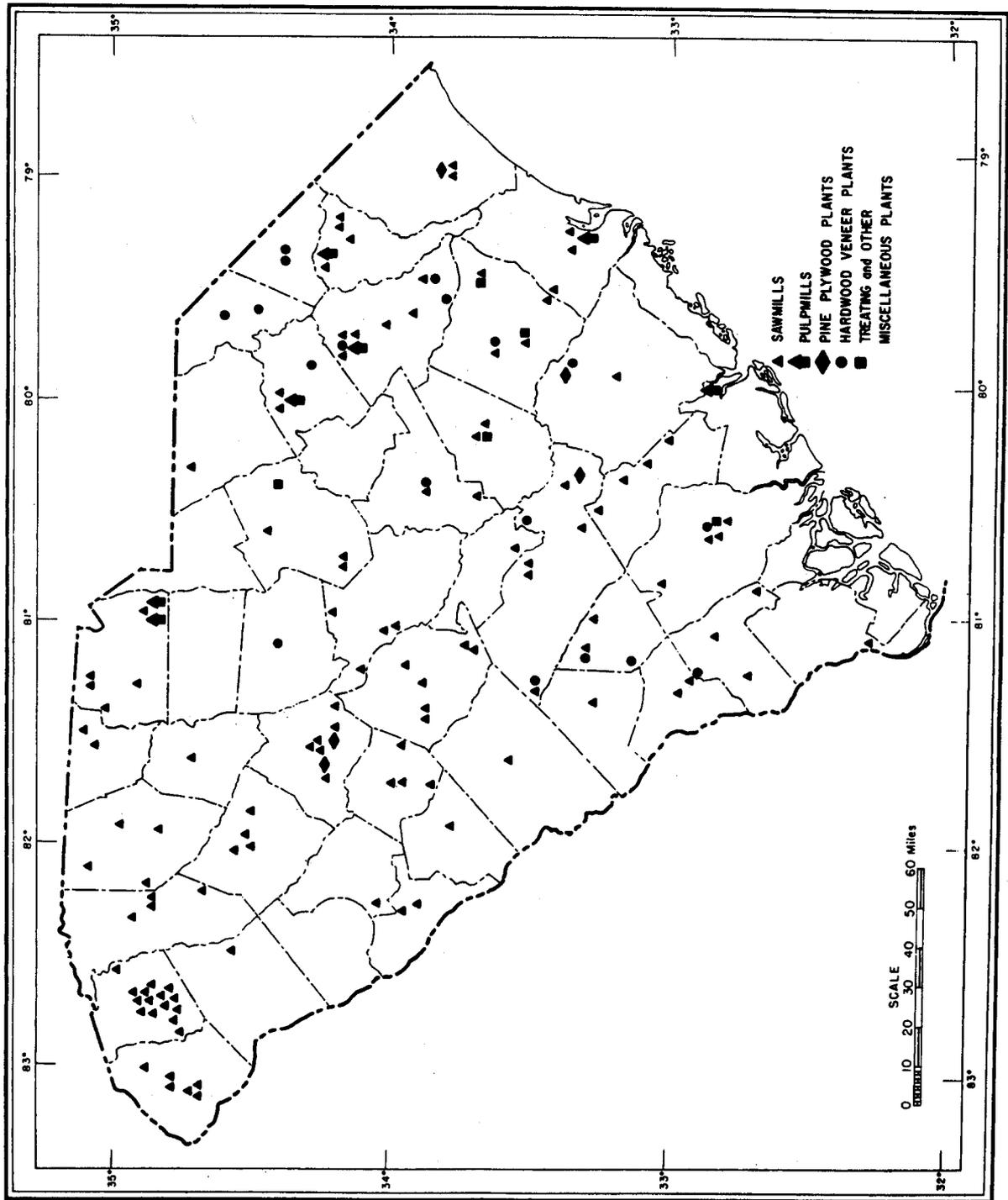


Figure 7.—Location of primary wood-using industries in South Carolina, 1977.

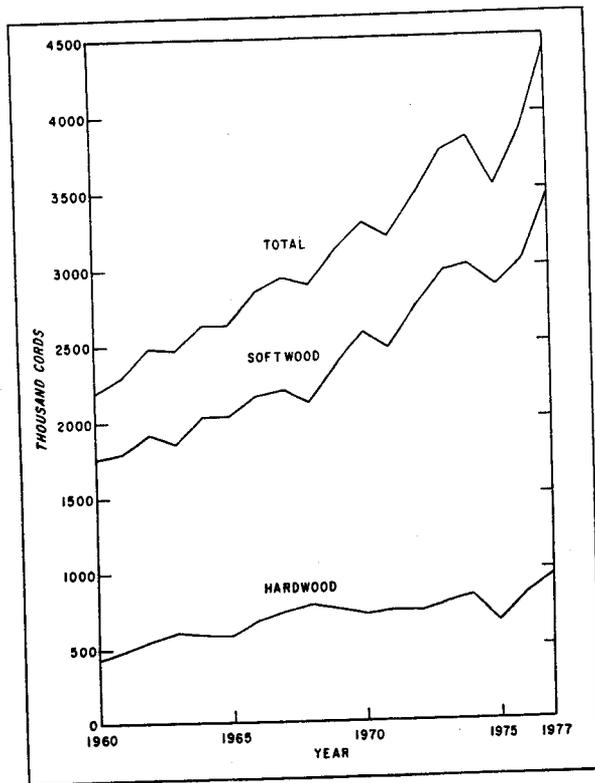


Figure 8.—Pulpwood production in South Carolina, 1960-1977.

where production was up 32 percent. In the Southern Coastal Plain, round pulpwood production was up 14 percent. In the Northern Coastal Plain, production was down about 8 percent. Since five of the seven pulpmills in South Carolina are located in the Northern Coastal Plain, these production trends suggest that much of the pulpwood is being transported a considerable distance from its origin for processing.

While the total 1977 pulpwood production figures in this report agree with the South Carolina figures published in Resource Bulletin SE-46, "Southern Pulpwood Production, 1977," differences are acknowledged in the breakdown between roundwood and byproducts. With the increase in number and kinds of chipping installations, it has become increasingly difficult to maintain a true separation between volume of roundwood and volume of byproducts. Results from the more complete industry canvass provided a higher but more accurate measure of roundwood chipped and are used in this report.

#### SOFTWOOD SAW LOG PRODUCTION UP 15 PERCENT

South Carolina's softwood lumber industry has

continued its recovery from a low point in the early 1960's. Most of the small portable sawmills have now disappeared and new modern mills, many with chipping headrigs, have replaced many of the older outdated sawmills. Between 1967 and 1977, annual output of softwood saw logs increased from 711 to 815 million board feet, or by 15 percent. Over this same period, softwood lumber production in South Carolina increased by more than 50 percent, reflecting substantial improvement in utilization. The big jump in softwood lumber production occurred in the early 1970's (fig. 9). Production fell somewhat during the recession years but has risen again in recent years.

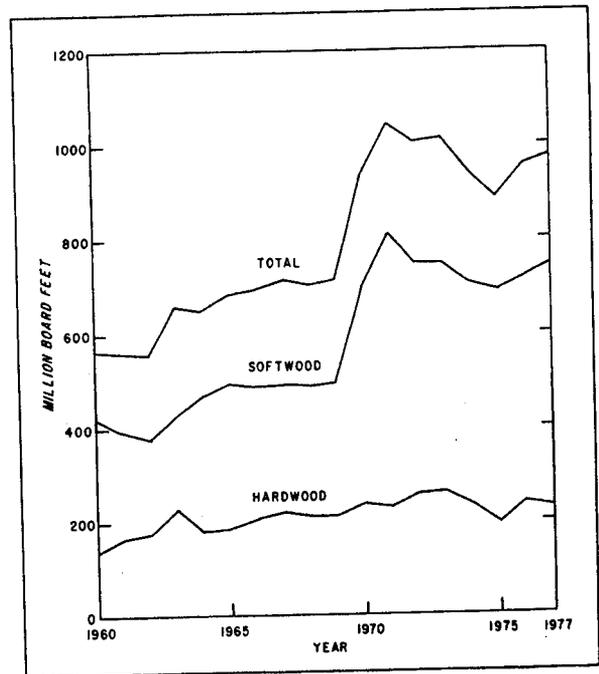


Figure 9.—Lumber production in South Carolina, 1960-1977.

In contrast to the softwood situation, annual output of hardwood saw logs decreased from 276 to 222 million board feet, or by almost 20 percent. Over the period, hardwood lumber production fluctuated between a high of 264 million board feet in 1973 and a low of 195 million board feet in 1975. Despite the reduction in output of hardwood saw logs, a small upward trend in hardwood lumber production was sustained, indicating improvement in utilization.

Altogether, saw logs accounted for 29 percent of total product output, 33 percent of the roundwood output, and 31 percent of the removals from growing stock in 1977. The total output of saw

logs included 5.1 million cubic feet of plant by-products, primarily veneer cores; 4.5 million cubic feet of logs from nongrowing-stock sources; and 4.2 million cubic feet of logs from poletimber. About 95 percent of the output of saw logs came from sawtimber trees.

In contrast to the high proportion of pulpwood exported to mills outside the State, about 93 percent of the saw logs produced in South Carolina in 1977 were sawn in the State. About 11.9 million cubic feet of saw logs were exported, and 8.6 million cubic feet of saw logs were brought in from outside the State. The interstate movement of hardwood saw logs just about balanced out. The exports of softwood saw logs exceeded imports by more than 50 percent.

When the output of saw logs in 1977 is compared to the output in 1967, the largest increase occurred in the Southern Coastal Plain. Here, output was up by 54 percent. The comparison indicates a small increase, 4 percent, in the Piedmont. In the Northern Coastal Plain, the output of saw logs was down 19 percent.

### **PEELER LOGS RANK THIRD**

The annual output of peeler logs increased from 13.0 to 48.6 million cubic feet, or by 374 percent. All of this increase is attributed to the growing pine plywood industry. Four new pine plywood plants came on stream between 1967 and 1977. Output of hardwood peeler logs continued to decline and was down by 43 percent.

In terms of quantity, peeler logs ranked third in output behind pulpwood and saw logs. In 1977, peeler logs accounted for 9 percent of total product output, 10 percent of the roundwood output, and 9 percent of the removals from growing stock. About 81 percent of the peeler logs were retained in the State; the remaining 19 percent were exported. Although the interstate movement of hardwood logs just about balanced out, softwood exports were 4 times greater than imports.

By Survey Unit, 53 percent of the peeler logs were produced in the Northern Coastal Plain, 28 percent in the Piedmont, and only 19 percent in the Southern Coastal Plain. This distribution of output is fairly consistent with the location of the plywood and veneer plants.

### **OUTPUT OF OTHER INDUSTRIAL PRODUCTS UP SHARPLY**

Collectively, the output of poles, piling, posts, cooperage bolts, particleboard furnish, and other

miscellaneous products was up from 9.8 to 22.5 million cubic feet, or by 130 percent. Most of this increase was in byproducts going into particleboard. Altogether these other products accounted for 4 percent of total output, 2 percent of the roundwood output, and 2 percent of the removals from growing stock. Softwood species were the source of 99 percent of these products. About 73 percent of the roundwood output came from the Northern Coastal Plain, and most of the remainder came from the Southern Coastal Plain.

### **NO INCREASE DETECTED IN FUELWOOD OUTPUT**

Although the industry canvass indicated a 367 percent increase in the use of plant byproducts for industrial fuel, the inventory measured a continued decline in fuelwood output. If wood used for industrial fuel is excluded, the estimates suggest that fuelwood output decreased from 53.7 to 31.1 million cubic feet between 1967 and 1977. It is widely recognized, however, that many people have turned to wood to supplement home heating over the past year or so. The long-term decline in domestic use of fuelwood which appears to have continued until 1977 may already have reversed.

As recently as 1940, the annual output of domestic fuelwood in South Carolina exceeded 100 million cubic feet. It is conceivable that output could return to this level without any great impact on the supply of growing stock. For example, the 1978 inventory measured 2,171 million cubic feet of volume in trees 5.0 inches d.b.h. and larger which failed to meet the standards for growing stock. The annual growth on this low-quality timber totaled 84 million cubic feet. Furthermore, 48 million cubic feet of logging residues were left in the woods in 1977.

If industrial fuel is excluded, fuelwood accounted for 6 percent of total product output, 6 percent of the roundwood output, and 3 percent of the removals from growing stock in 1977. About 96 percent of the growing stock removed for fuelwood was hardwood.

### **TIMBER USE IMPROVES**

Because of improved timber utilization, a 26 percent increase in product output between 1967 and 1977 was achieved with only a 12 percent increase in growing-stock removals. Byproducts produced from residues generated at primary manufacturing plants accounted for a substantial

share of the increase. Altogether these primary manufacturing plants generated approximately 114 million cubic feet of wood residues in 1977. About 76 percent of these residues were converted to byproducts, 20 percent were used for industrial fuel, and the remaining 4 percent were unused. For comparison, the primary manufacturing plants in 1967 generated about 75 million cubic feet of wood residues. About 62 percent were converted to byproducts, 8 percent were used for industrial fuel, and 30 percent were unused. These figures suggest that any additional major contribution from byproducts will have to come from expansion rather than improved utilization.

Greater use of timber not included in the growing stock also accounted for a large part of the increase in product output. In 1967, cull trees, dead trees, tops, limbs, saplings, and material cut

outside the commercial forests provided only 35 million cubic feet, or 9 percent of the total product output. In 1977, this kind of material provided 73 million cubic feet, or 15 percent of the total product output. There was no indication, however, that the volume of growing stock left in the woods as logging residue was declining. Logging residues increased from 44 to 48 million cubic feet, or by 11 percent. This rate of increase about equaled the rate of increase in roundwood output from growing stock.

An increase in the volume of other removals from 32 to 40 million cubic feet also offset part of the gain from improved utilization. These other removals include the volume of growing stock cut or withdrawn in cultural practices, land clearing, land use changes, and other actions where the timber was not used for products.



## TIMBER SUPPLY OUTLOOK

Upon completion of the fourth forest inventory in 1968, estimates of future timber supplies suggested that South Carolina's commercial forests could support an annual cut somewhere between 830 and 940 million cubic feet by year 2000. In light of the new inventory findings some 10 years later, these estimates of available cut appear to have been overly conservative. In 1968, net annual growth of growing stock totaled about 655 million cubic feet and was supporting an annual cut of almost 442 million cubic feet. Annual growth was projected to 744 million cubic feet for 1977. It was assumed that cut would increase to come into balance with growth by year 2000 and that recent trends in forest management would continue. A cut of 616 million cubic feet was projected for 1977.

Actual net annual growth in 1977 was 963 million cubic feet, which is well above the upper estimate made in 1968. Annual cut had increased to only 496 million cubic feet, which was almost 20 percent below the cutting rate assumed in the 1968 projection. All of the increased cut came from softwoods; hardwood cut actually declined. South Carolina also experienced a small increase in acreage of timberland. Furthermore, the rapid growth on the additional accumulation of growing stock had exceeded the earlier expectation.

In this chapter, we reappraise the 30-year outlook for timber supplies in South Carolina from a vantage point enhanced by another 10 years of measured change. Again, the primary objective is to bracket future estimates of timber supplies between a *prospective* available cut (the amount available if past trends are extrapolated for 30 years) and a *potential* available cut (the amount attainable through improved timber management). Since softwoods and hardwoods were projected separately, four different projections were made using the Timber Resource Analysis System (TRAS) computer model. The results should not be misinterpreted as bold forecasts; they are reasonable estimates of timber supplies if the stated assumptions hold true.

### LESS TIMBERLAND ACREAGE

As stated earlier in this report, acreage of commercial timberland in South Carolina seems to have peaked at about 12.5 million acres. Evidence

points to a likely decline in acreage available for timber production over the next 30 years. Only a small amount of idle agricultural land is available for reforestation or natural reversion to forest relative to the amounts available in past decades. Although future forest diversions and withdrawals may be less than in the past, there will be less opportunity for replacing whatever loss occurs.

An extrapolation of the trends between 1958 and 1978 points to an 8 percent decrease in acreage of timberland over the next 30 years. This would translate into a loss of almost 1 million acres. This rate of prospective loss is reasonably consistent with the results of an independent study of acreage trends made in conjunction with the 1980 national assessment required by the Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974. A net reduction of some 953,000 acres of timberland over the next 30 years is therefore assumed in each of the four projections.

### BALANCE BETWEEN GROWTH AND REMOVALS EXTENDED TO 2007

Net annual growth provides an estimate of the maximum cut that can be sustained without depleting the inventory. In the projections of prospective timber supplies, growth and mortality rates as determined in this latest inventory were retained throughout the 30-year period. It was assumed that the rapid rate of decrease in number of 2-inch softwood trees between 1968 and 1978 would gradually level off over the period and that there would be little further increase in the number of 2-inch hardwood trees. These assumptions are contingent upon greater control over the species composition within regenerated stands.

Removals were gradually increased to equal growth by 2007, extending the time of balance 7 years beyond the assumption used in 1968. The greater margin of growth over removals measured in 1977 as compared to 1967 supports this extension. Cutting rates determined in the latest inventory were used to distribute the removals, by diameter classes, for both softwoods and hardwoods. These cutting rates were held throughout the projections of prospective supplies. With all of these assumptions, net annual growth increases from 77 to 96 cubic feet per acre in 2007.

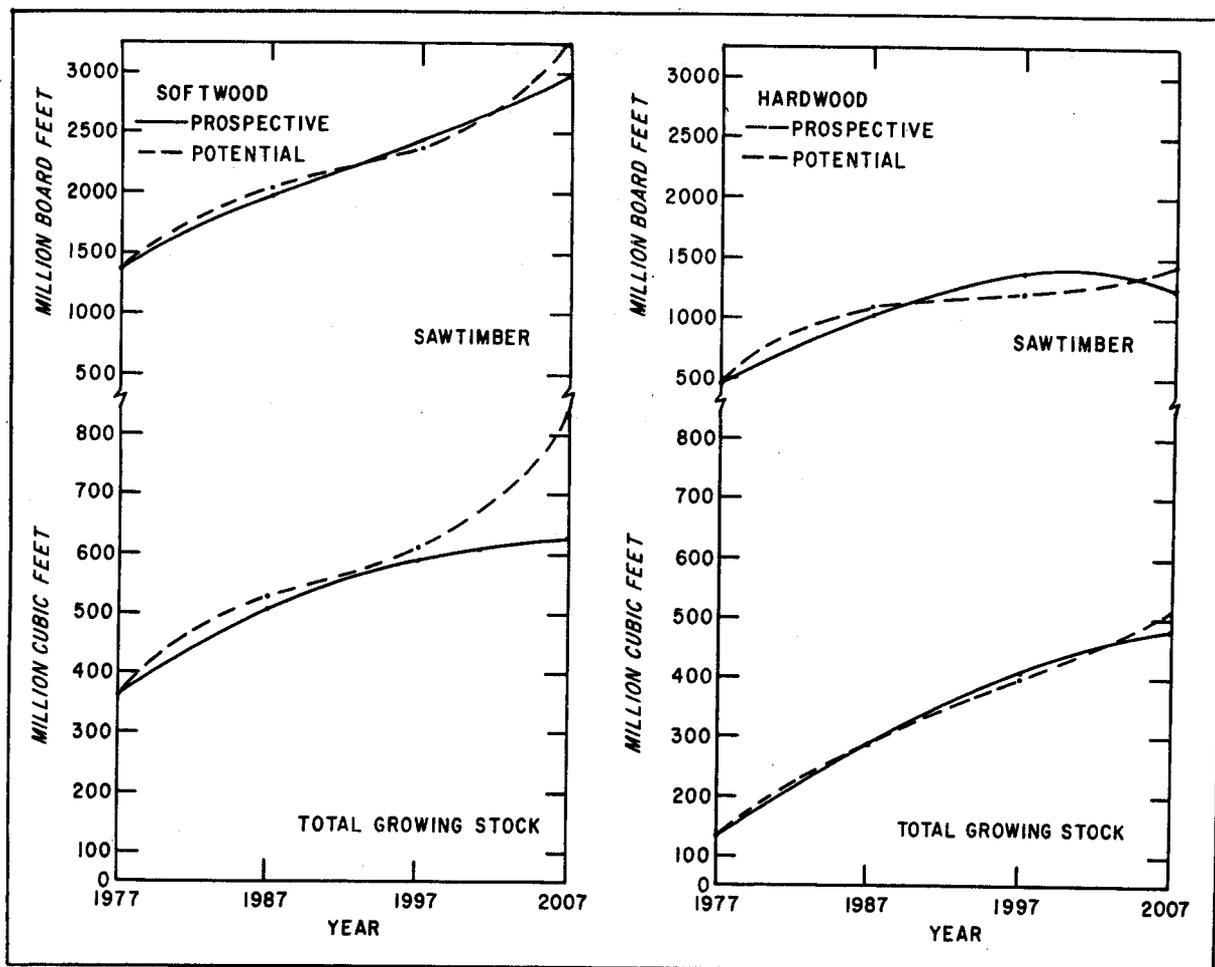


Figure 10.—Prospective and potential available cut, South Carolina, 1977–2007.

When the acreage assumptions are superimposed onto these results, *prospective* annual cut increases from 496 to 1,109 million cubic feet, and includes 4,241 million board feet of sawtimber.

#### HARDWOODS ACCOUNT FOR MORE THAN HALF OF THE PROSPECTIVE INCREASE

Under the stated assumptions, hardwoods account for 57 percent of the prospective increase in available cut based on total growing stock (fig. 10). By the end of the projection period, hardwoods would provide 44 percent of the annual removals, compared to 29 percent in 1957, 35 percent in 1967, and 27 percent in 1977. The prospective increase in hardwood sawtimber is significantly less than that indicated for total growing stock. The greater increase in hardwoods relative to softwoods occurs in the smaller diameter classes.

On the surface, the outlook for a greater increase in hardwood timber supplies than that indicated for softwoods might seem inconsistent with timber management practices which have generally favored pine. One must understand that most of the intensive effort to favor pine has been put forth on public and forest industry lands. Over the past decade, more than three-fourths of the artificial regeneration took place on these public and industry holdings, which make up only 27 percent of the commercial timberland. Although the projections were not made by ownership class, most of the prospective increase in hardwood cutting will come from the NIPF lands. Overall, the softwood projection indicates a prospective decrease in softwood pole timber over the next few decades. During this period, the rate of sapling ingrowth into the 6-inch and larger diameter classes will be significantly below the rate of ingrowth over the past 10 or 15 years, especially on NIPF lands. This conclusion is based on evidence that

South Carolina is already some 15 years into a period of declining pine regeneration. Again, attention is called to the 20 percent decrease in number of softwood saplings between 1968 and 1978. A decline in pine acreage in stands less than 20 years old further substantiates the prospective drop in softwood ingrowth. Unless there is a compensating reduction in rate of mortality, the decrease in number of pine saplings will move upward through the softwood stand table.

### MORE THAN HALF OF THE YOUNG PINE STANDS ARE PLANTATIONS

By the end of this century, more than half of South Carolina's softwood timber supplies will likely come from pine plantations. Pine plantations make up 60 percent of all pine stands less than 10 years old and 56 percent of all pine stands less than 20 years old. On lands owned or leased by forest industry, more than 90 percent of all pine stands less than 10 years old and more than 85 percent of stands less than 20 years old are plantations. On public lands, plantations account for 58 percent of all pine stands less than 30 years old. On NIPF lands, natural pine stands predominate in all age classes.

Two independent estimates of plantation acreage are presented in this analysis. First, based on annual reports of forest planting and seeding compiled by the U.S. Department of Agriculture Forest Service, an average of 60,000 acres was

planted annually' during the remeasurement period (table IV). Second, based upon our field crews' determination of stand origin at each sample location visited in this latest inventory, an average of 57,000 acres was planted annually (table V). The small difference between these two independent estimates lends considerable credibility to both. Since some planting efforts fail because of poor survival and inadequate site preparation, the first estimate can be logically discounted. Furthermore, it probably includes a small amount of replanting. On the other hand, the second estimate is probably conservative since some planted stands are difficult to recognize on the ground. The average of the two estimates, 58,500 acres, is probably very close to the rate of successful plantation establishment.

This number provides additional evidence of a downturn in rate of pine regeneration. The same annual average for the preceding decade was 74,000 acres. The higher planting rate during the earlier period can be attributed to NIPF planting on old fields under the Conservation Reserve Soil Bank Program. Furthermore, during the Soil Bank era, extensive acreages of idle cropland reverted naturally to pine stands. The recent increases in pine growth and inventory on NIPF lands can be largely attributed to the rapid rates of pine regeneration between 1945 and 1965. Timber in these stands has developed to merchantable size and will support a higher rate of harvest over the next 2 decades. The more recent rates of re-

Table IV.—Acres of forest planting,<sup>1</sup> by ownership class, South Carolina, 1968-1977

Fiscal year	Ownership class				All ownerships	Accumulative total
	National Forest	Other public	Forest industry	Other private		
..... Acres .....						
						<sup>2</sup> 1,485,537
1968	6,131	2,496	19,755	20,310	48,692	1,534,229
1969	5,090	2,480	17,110	13,046	37,726	1,571,955
1970	4,986	3,330	22,650	14,483	45,449	1,617,404
1971	7,074	2,964	47,285	12,519	69,842	1,687,246
1972	7,629	2,866	36,729	10,523	57,747	1,744,993
1973	5,047	2,204	41,002	11,807	60,060	1,805,053
1974	5,798	2,423	39,816	8,902	56,939	1,861,992
1975	5,870	3,519	43,080	17,112	69,581	1,931,573
1976	4,863	2,995	53,460	12,803	74,121	2,005,694
1977	4,431	2,721	55,817	17,541	80,510	2,086,204

<sup>1</sup>Includes acres of planting by direct seeding. Source: U.S. Department of Agriculture, Forest Service, *Forest Planting, Seeding, and Silvical Treatments in the United States*.

<sup>2</sup>Accumulative total planted prior to FY 1968.

Table V.—Area of commercial forest land, by stand origin and Survey Unit, South Carolina, 1978

Stand origin	State		Survey Unit					
			Southern Coastal Plain		Northern Coastal Plain		Piedmont	
	<i>M acres</i>	<i>Percent</i>	<i>M acres</i>	<i>Percent</i>	<i>M acres</i>	<i>Percent</i>	<i>M acres</i>	<i>Percent</i>
Natural stands with no evidence of artificial regeneration	10,952.0	87.6	2,651.1	82.2	4,221.5	88.9	4,079.4	90.1
Stands originating wholly or in part from artificial regeneration since 1968	593.7	4.7	147.0	4.6	234.2	4.9	212.5	4.7
Stands originating wholly or in part from artificial regeneration prior to 1968	957.2	7.7	425.3	13.2	295.8	6.2	236.1	5.2
All stands	12,502.9	100.0	3,223.4	100.0	4,751.5	100.0	4,528.0	100.0

generation suggest that beyond the next 2 decades, there will likely be a reduction in softwood timber supplies on NIPF lands, along with an increase in softwood supplies on forest industry holdings, mainly from pine plantations. A net decrease in prospective softwood supplies is projected.

Distribution of the acres planted, by Survey Unit, suggests that 37 percent of the prospective increase in timber supplies from plantations will occur in the Southern Coastal Plain. In this Unit, 18 percent of all timber stands are plantations (table V). Another 34 percent of the planting has occurred in the Northern Coastal Plain and the remaining 29 percent in the Piedmont. Statewide, 43 percent of the pine plantations were on lands owned or leased by forest industries. Another 46 percent were on other private lands and the remaining 11 percent on public holdings (table VI).

Since very little hardwood has been planted in South Carolina, the acreage difference between table V and table VI calls for an explanation. Because of poor survival and inadequate site preparation, hardwood stocking exceeded the pine stocking on some 80,000 acres with evidence of planting, to the extent that either an oak-pine or other hardwood forest type was assigned. Hardwood competition is more common in pine plantations established on cutover forest land than in plantations established on old fields. In South Carolina, undetermined but high proportions of the older plantations were established on old fields. Less than 10 percent of the plantation acreage planted since 1968 was on old fields. In the older plantations, hardwood stocking exceeded the pine stocking on about 10 percent of the acreage. In the plantations established since 1968, hardwood stocking exceeded the pine stocking on 16 percent of the acreage.

### GROWTH PER ACRE CAN BE INCREASED BY 50 PERCENT

In the projections made to determine prospective timber supplies, growth per acre increased from 77 to 96 cubic feet per acre. A second set of projections estimated the potential timber supplies attainable over the same 30-year period through improved timber management. We find that growth per acre could be increased from 77 to 117 cubic feet. Since the average of 77 cubic feet per acre is already approaching the inherent growth potential of South Carolina's timberland with fully stocked natural stands, the higher estimates are attainable only through plantations. The estimate of 117 cubic feet does fall within the range of average biological potential developed for loblolly pine, by timber production province, east of the Mississippi River.<sup>1</sup>

In the projections of potential supplies, management goals were expressed in terms of basal area per acre and a stand-structure quotient for both softwoods and hardwoods. The stand-structure quotient is determined by dividing the number of trees in any 2-inch-diameter class by the number in the next larger class. In even-aged management, this quotient reflects the age distribution of the stands.

The goals selected would allow average stand densities of growing-stock trees 5.0 inches d.b.h. and larger to increase from 60 to about 90 square feet per acre. Stand-structure quotients were set at 1.70 for softwoods and 1.85 for hardwoods. It was assumed that improved pine regeneration

<sup>1</sup>Boyce, Stephen G., Joe P. McClure, and Herbert S. Sternitzke. Biological potential for the loblolly pine ecosystem east of the Mississippi River. U.S. Dep. Agric. For. Serv., Res. Pap. SE-142, 27 p. Southeast. For. Exp. Stn., Asheville, N.C. 1975.

Table VI.—Area of commercial forest land, by broad management, ownership, and past treatment or disturbance classes, South Carolina, 1978

Broad management and ownership classes <sup>1</sup>	Total area	Primary treatment or disturbance between 1968 and 1978							
		Harvesting with artificial regeneration	Harvesting with natural regeneration	Other harvesting	Intermediate cutting	Artificial planting	Natural disturbance	Other <sup>2</sup>	None
..... Thousand acres .....									
<b>Nonstocked forest:</b>									
Public	13.6	—	—	1.1	—	—	—	1.5	11.0
Forest industry	55.3	2.5	9.1	28.5	—	—	5.3	4.6	5.3
Other private	203.6	—	5.8	37.3	11.3	—	—	43.5	105.7
<b>Total</b>	<b>272.5</b>	<b>2.5</b>	<b>14.9</b>	<b>66.9</b>	<b>11.3</b>	<b>—</b>	<b>5.3</b>	<b>49.6</b>	<b>122.0</b>
<b>Pine plantations:</b>									
Public	147.5	37.9	—	1.5	39.7	—	10.1	8.0	50.3
Forest industry	583.1	243.0	—	—	34.7	65.7	89.5	46.2	104.0
Other private	623.0	91.1	—	7.9	167.2	47.8	107.2	50.1	151.7
<b>Total</b>	<b>1,353.6</b>	<b>372.0</b>	<b>—</b>	<b>9.4</b>	<b>241.6</b>	<b>113.5</b>	<b>206.8</b>	<b>104.3</b>	<b>306.0</b>
<b>Natural pine stands:</b>									
Public	508.8	—	22.7	11.5	184.8	—	46.3	57.8	185.7
Forest industry	574.4	—	28.3	37.4	103.7	—	69.7	69.0	266.3
Other private	3,084.5	—	168.0	110.0	555.2	—	286.9	403.1	1,561.3
<b>Total</b>	<b>4,167.7</b>	<b>—</b>	<b>219.0</b>	<b>158.9</b>	<b>843.7</b>	<b>—</b>	<b>402.9</b>	<b>529.9</b>	<b>2,013.3</b>
<b>Oak-pine stands:</b>									
Public	129.0	3.3	13.1	4.5	10.9	—	18.3	19.9	59.0
Forest industry	217.8	30.6	20.7	9.7	15.5	11.3	13.6	5.2	111.2
Other private	1,368.7	9.7	107.1	84.0	243.6	1.8	85.3	134.3	702.9
<b>Total</b>	<b>1,715.5</b>	<b>43.6</b>	<b>140.9</b>	<b>98.2</b>	<b>270.0</b>	<b>13.1</b>	<b>117.2</b>	<b>159.4</b>	<b>873.1</b>
<b>Upland hardwood stands:</b>									
Public	161.0	—	4.0	9.0	29.7	—	11.9	2.7	103.7
Forest industry	321.3	4.9	106.2	33.4	35.7	2.7	6.3	14.4	117.7
Other private	2,277.8	4.6	201.4	244.4	315.8	4.7	108.7	208.5	1,189.7
<b>Total</b>	<b>2,760.1</b>	<b>9.5</b>	<b>311.6</b>	<b>286.8</b>	<b>381.2</b>	<b>7.4</b>	<b>126.9</b>	<b>225.6</b>	<b>1,411.1</b>
<b>Lowland hardwood stands:</b>									
Public	130.9	—	2.5	—	2.5	—	3.0	17.9	105.0
Forest industry	490.7	3.6	34.0	28.4	28.0	2.8	10.5	9.7	373.7
Other private	1,611.9	—	68.4	175.0	142.2	—	71.7	73.4	1,081.2
<b>Total</b>	<b>2,233.5</b>	<b>3.6</b>	<b>104.9</b>	<b>203.4</b>	<b>172.7</b>	<b>2.8</b>	<b>85.2</b>	<b>101.0</b>	<b>1,559.9</b>
<b>All classes:</b>									
Public	1,090.8	41.2	42.3	27.6	267.6	—	89.6	107.8	514.7
Forest industry	2,242.6	284.6	198.3	137.4	217.6	82.5	194.9	149.1	978.2
Other private	9,169.5	105.4	550.7	658.6	1,435.3	54.3	659.8	912.9	4,792.5
<b>Total</b>	<b>12,502.9</b>	<b>431.2</b>	<b>791.3</b>	<b>823.6</b>	<b>1,920.5</b>	<b>136.8</b>	<b>944.3</b>	<b>1,169.8</b>	<b>6,285.4</b>

<sup>1</sup> Forest industry includes lands under long-term lease.

<sup>2</sup> Includes grazing, draining, prescribed burning, site preparation, and other miscellaneous treatments.

could reverse the decline in number of softwood saplings by 1990. A smaller increase in number of hardwood saplings was assumed than was indicated in the prospective projection, along with some improvement in the proportion of hardwood

trees that qualify as growing stock. Finally, it was assumed that mortality rates for both softwoods and hardwoods could be gradually reduced by 50 percent over the next 30 years.

If the same assumptions are applied with regard

to the decline in acreage as were applied in the prospective projections. *potential* annual cut increases to 1,357 million cubic feet by year 2007, including 4,696 million board feet of sawtimber. The most significant increase over prospective supplies occurs in the volume of softwood growing stock in the pole-timber-size classes (fig. 10). Achieving and sustaining an inventory capable of supporting these high cuts would require more regeneration of pine following harvesting and development of additional hardwood markets that would accommodate the harvest of low-quality trees.

### STAND-AGE DISTRIBUTION REFLECTS DECREASE IN PINE REGENERATION

The distribution of commercial forest acreage by stand-age class and major forest type provides another indicator of future timber supplies. A stand-age profile of South Carolina's timberland clearly shows a decrease in pine regeneration

over the past 2 decades (fig. 11). The largest concentration of pine stands, almost 1.2 million acres, is in the 20- to 29-year-age class. As these stands develop and are harvested, pine acreage can be expected to decline. For example, there are fewer than 0.7 million acres in the 0- to 9-year-age class. Some compensation can be expected, however, since 60 percent of the pine stands less than 10 years old are plantations, compared to 32 percent in the 20- to 29-year-age class.

Under a regulated, even-aged management scheme, an average rotation of 40 years would require some 1.4 million acres of pine in the 0- to 9-year-age class. An average rotation of 50 years would require 1.1 million acres in this age class. If all pine stands that underwent a final harvest between 1968 and 1978 and were retained in commercial forest had been adequately regenerated to pine, the inventory should have revealed some 1.1 million acres in pine stands less than 10 years old, exclusive of any additional pine acreage from nonforest or hardwood conversion.

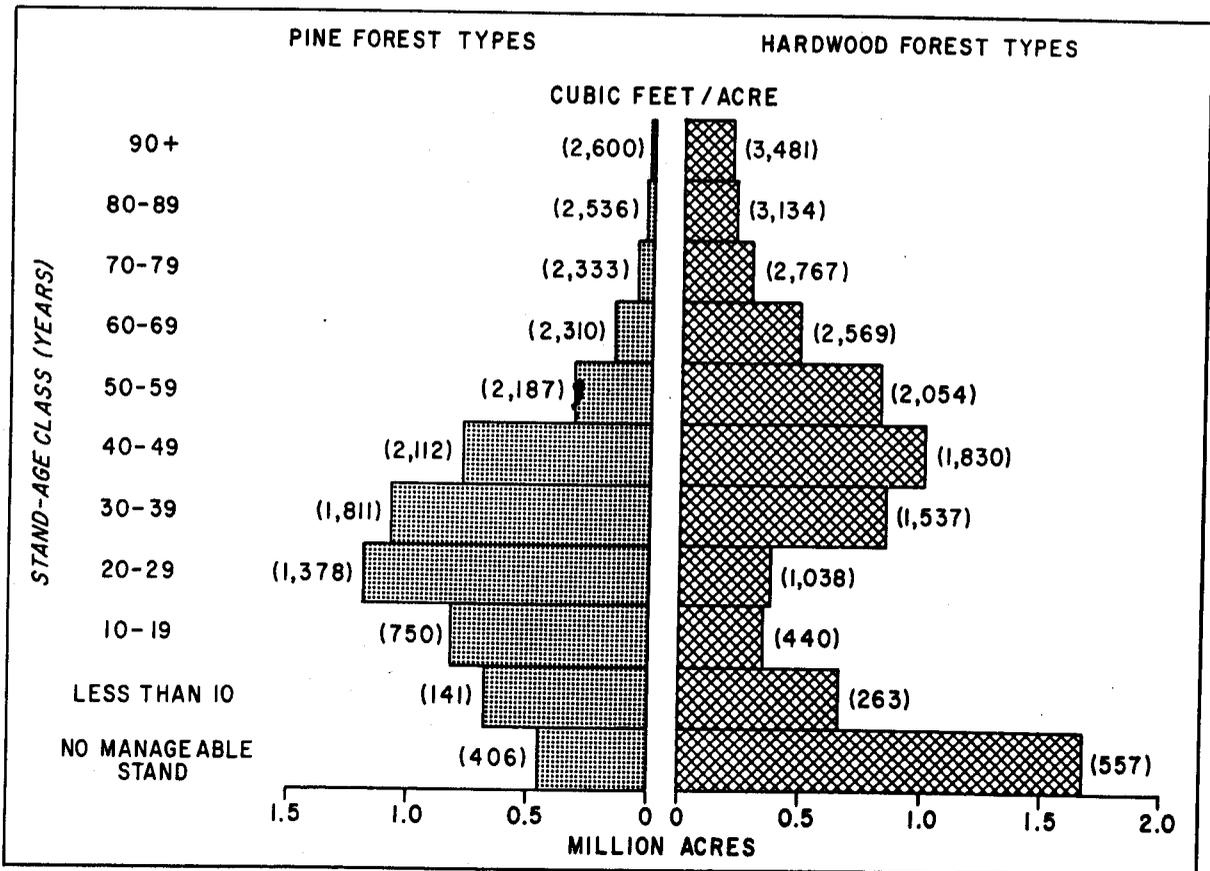


Figure 11.—Profile of area of commercial forest land, by stand-age class, by pine and hardwood forest types, with average volume of growing stock per acre (in parentheses), South Carolina, 1978.

## SERIOUS STOCKING DEFICIENCIES ON 24 PERCENT OF THE HARDWOOD FOREST TYPES

Although the hardwood outlook has improved over the past decade, about 1 out of every 4 acres of timberland with a hardwood forest type was inadequately stocked with trees meeting minimum requirements for growing stock. In figure 11, these acres are displayed as having no manageable stand. On these areas, volume of growing stock averaged 557 cubic feet per acre. Some of these acres support substantial additional volumes in rough and rotten trees. Conditions on some of these acres will improve, but most of the acres will require treatment before they can contribute to future timber supplies.

The largest concentration of the better stocked hardwood stands, covering about 1.0 million acres, is in the 40- to 49-year-age class. Here again, as these stands develop and are harvested, the stand-age profile suggests they will not be fully replaced because the acreage in the next lower age class is smaller. Attention is called to the relatively small acreage of hardwoods between 10 and 29 years old (fig. 11). Unlike the pine situation, however, there has been an increase in hardwood regeneration over the past decade. Some of these young hardwood stands are coming in on areas where pine has been harvested but not regenerated. Still, there were fewer than 0.7 million acres of hardwood classified as 0 to 9 years of age, exclusive of the areas with no manageable stand. If all hardwood stands that underwent a final harvest between 1968 and 1978 and were retained in commercial forest had been adequately regenerated to hardwood, the inventory should have included some 0.9 million acres in this age class. Under a regulated, even-aged management scheme, an average rotation of 70 years would require about 1.0 million acres of hardwood in the 0- to 9-year-age class.

Altogether, recent rates of harvesting in South Carolina indicate a need to regenerate some 2.0 million acres to either pine or hardwood each decade. Based on the acreage classified as having no manageable stand, there is an additional backlog of some 2.1 million acres in need of regeneration. Yet, figure 11 implies that only 1.3 million acres were adequately regenerated to either pine or hardwood over the past decade.

Average volume per acre shown for each condition or age class in figure 11 excludes the volume in rough and rotten trees and all trees less than 5.0

inches d.b.h. Mortality, thinnings, and other types of intermediate cutting also removed undetermined amounts of volume from some of the stands. The average volumes demonstrate the minimum performance of reasonably well-stocked stands across the range of sites. The correlations between average volume per acre and age lend considerable credibility to the age classifications.

## FINAL HARVEST ON 197,000 ACRES ANNUALLY

Before examining the management opportunities available for increasing timber supplies in South Carolina, measures of recent rates of forestry activities are needed. In this latest inventory, field crews attempted to determine the most significant treatment or disturbance evidenced at each sample location over the remeasurement period. For the State as a whole, the remeasurement period averaged 10.4 years. This report contains a summary of this information on recent stand history, by broad management and ownership classes (table VI). In this summary, the broad management and ownership classes apply to the stands at the end of the remeasurement period rather than at the beginning.

Timber harvesting was the most common forestry activity observed. Of the 12.5 million acres classified as commercial forest in 1978, about 2.0 million acres had experienced a final harvest since the 1968 inventory. On the average, 197,000 acres were harvested annually and retained in commercial forest, exclusive of intermediate cuttings and diversions of forest to some other land use. Over the period, thinnings and other intermediate cuttings averaged almost 185,000 acres annually. An additional 28,000 acres were diverted from commercial forest to some other land use each year. Some timber was also harvested from these acres. When the estimates of harvesting, intermediate cutting, and diversions are grouped, they suggest that timber was removed from about 410,000 acres each year.

On the acreage where a final harvest had been followed by artificial regeneration, an average of 1,726 cubic feet of growing stock per acre had been cut. On the acreage where a final harvest had been followed by natural regeneration, an average of 1,563 cubic feet had been cut. Where the final harvest had not been followed with adequate regeneration, about 1,246 cubic feet were cut per acre, on the average. The remeasurement statis-

tics further indicated that thinnings and other intermediate cuttings, on the average, took out about 723 cubic feet of growing stock per acre treated. In all of these practices, undetermined amounts of nongrowing-stock timber were also cut.

When average annual rates of final harvest over the remeasurement period are expressed in percent of total area of commercial forest land in 1978, significant differences among the three broad ownership classes are revealed (table VI). These rates indicate that slightly less than 1 percent of the public forests are harvested each year. On the other extreme, almost 2.7 percent of the timberland owned or leased by forest industry is harvested annually. On other private forests, the annual harvest rate is about 1.4 percent. By broad ownership class, the annual rates of intermediate cutting average 2.4 percent on public forests, 0.9 percent on lands owned or leased by forest industry, and 1.5 percent on other private holdings.

Between 568,000 and 594,000 acres were artificially regenerated since the previous inventory. Almost 76 percent of this reforestation effort occurred on forest acres which were also harvested during the remeasurement period. Another 17 percent of the planting effort was on the backlog of acreage needing regeneration. The remaining 7 percent was on old fields or other nonforest land. In addition to the artificial regeneration, a significant amount of natural regeneration occurred on some 790,000 acres following harvest.

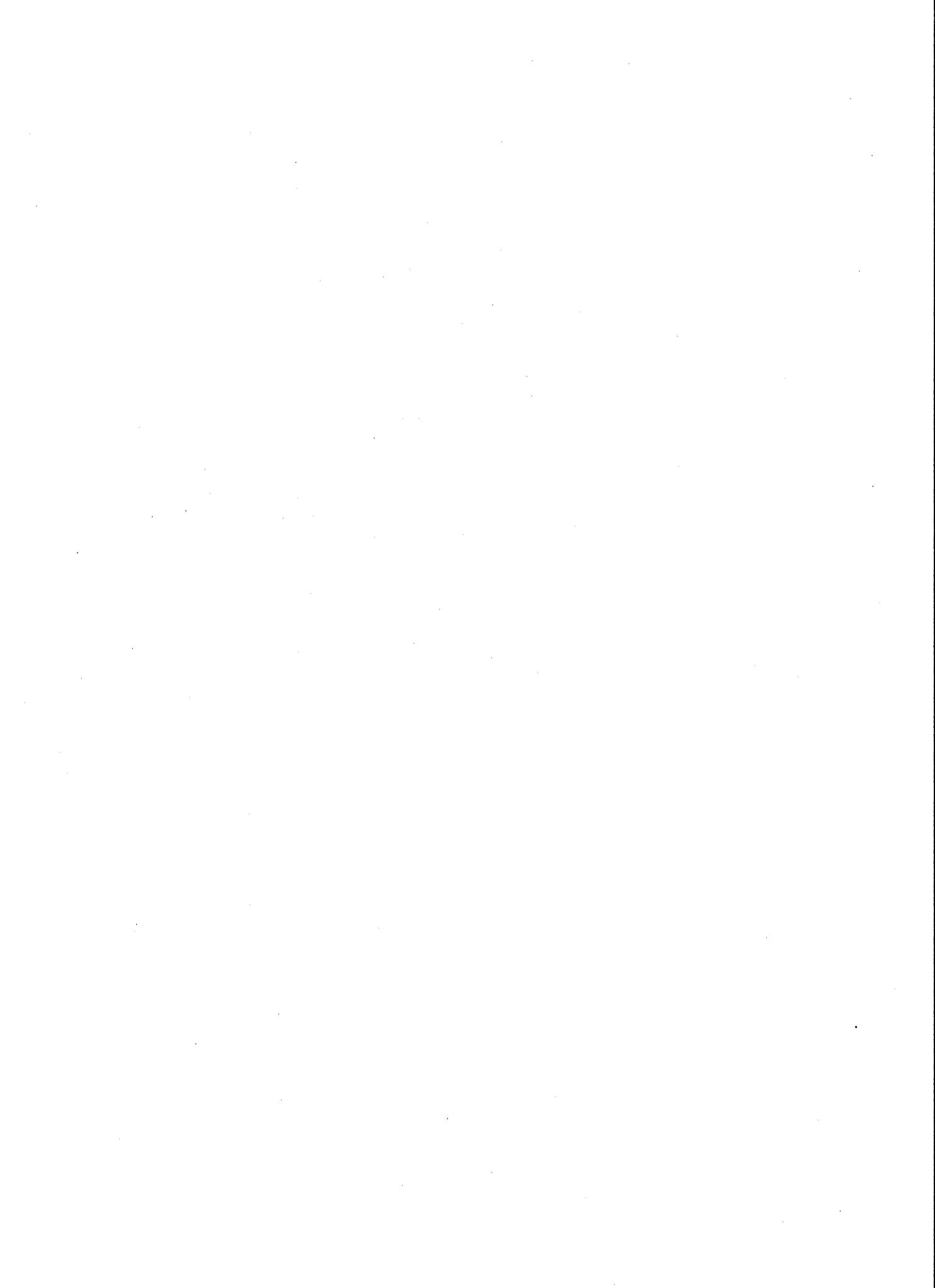
In addition to the acreage harvested or regenerated, other forestry practices or intentional

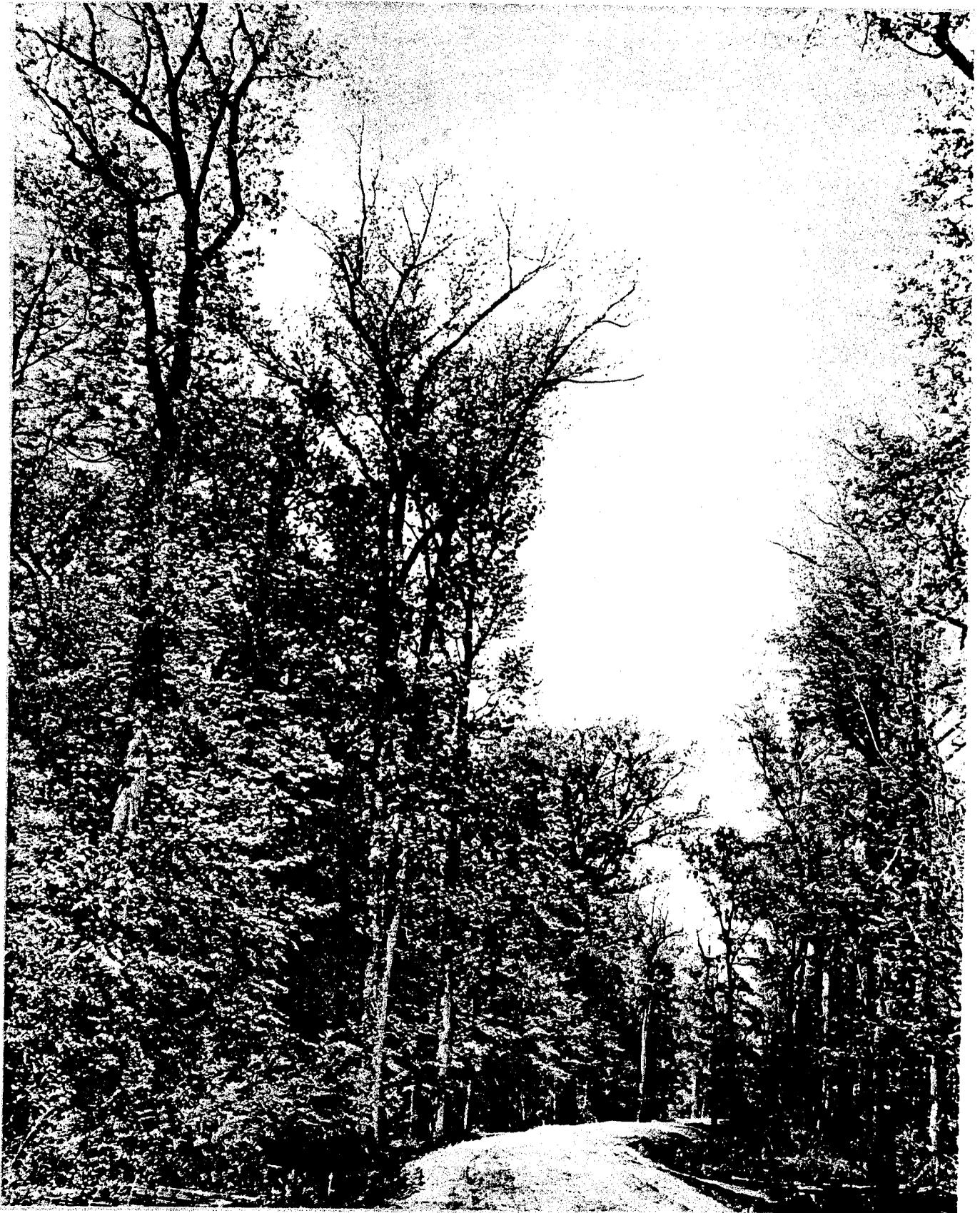
disturbances significantly affected the conditions on almost 1.2 million acres. These practices and disturbances included prescribed burning, site preparation, forest grazing, drainage, and other miscellaneous actions. Finally, natural disturbances such as insect infestations, disease, wild-fire, and weather significantly affected the conditions on some 0.9 million acres, otherwise untreated during the remeasurement period.

#### **50 PERCENT OF THE STANDS WERE UNDISTURBED**

No evidence of significant treatment or disturbance during the remeasurement period was found on 6.3 million acres, or 50 percent of the land classified as commercial forest in the new inventory. No significant difference was found in the proportion of commercial forest land classified as undisturbed among the three Survey Units. By ownership class, the proportion of undisturbed stands ranged from a low of 44 percent on lands owned or leased by forest industries to a high of 52 percent on other private lands. The proportion was 47 percent on public forest. By broad management class, the proportion undisturbed ranged from 23 percent for pine plantations to 70 percent for lowland hardwood stands.

About 6 percent of the undisturbed stands were on sites unfavorable for intensive silvicultural practices because of either steep slopes or year-round water problems. Only 1 percent of the treated or disturbed stands occurred on similar sites.





## MANAGEMENT OPPORTUNITIES

In the latest national assessment of forest and range land, the demand for roundwood timber is projected to increase by more than 65 percent between 1977 and 2000. This indicator of prospective wood requirements is based on the medium projection of demand under base level prices—changes in the prices of timber products relative to the general price level from the 1950's through the early 1970's are assumed to continue. Over this period, the national assessment indicates a major shift in the domestic sources of timber supplies from the West to the South. This likely scenario provides ample economic incentive for forestry interests in South Carolina to examine opportunities available for increasing timber supplies within the State. The forest products industry is already the third largest manufacturing industry in the Palmetto State.

On public lands, timber management decisions are generally sensitive to a broad range of special interests and environmental concerns. These interests and concerns are voiced through public policies, programs, and regulations and become an integral part of forest management plans. On forest industry lands, timber management decisions evolve from a strong profit motive within a framework of long-term investment. On NIPF lands, the myriad of forces affecting timber management decisions defies any meaningful characterization. Each NIPF owner views forests from a slightly different perspective. This analysis attempts to quantify some of the more obvious management opportunities in terms of acres, by these broad ownership classes (table VII).

### MOST TIMBERLAND SUITABLE FOR MANAGEMENT

In contrast to some other Southern States, adverse sites limit the practice of forestry on a relatively small portion of South Carolina's timberland. Only 0.4 million acres, or 3 percent of the commercial forest, were classified as adverse sites. These acres are either on steep slopes (40 percent plus) or in wet areas with year-round water problems. Over the past 10 years, only 14 percent of this acreage experienced any cutting or treatment. On the more gentle sites, there was evidence of cutting or treatment on more than 40 percent of the acreage.

Most of the steep slopes occur in the mountainous portion of the Piedmont Survey Unit. The wet sites are primarily located in the Northern Coastal Plain. By ownership class, the largest proportion of adverse sites, 6 percent, was on public lands. While timber can be harvested on these sites, they are excluded from the management opportunities in table VII.

### MORE THAN 7.4 MILLION ACRES SUPPORT STANDS IN GOOD CONDITION

More than 7.4 million acres, or 60 percent of the commercial forest land, supported stands in relatively good condition on manageable sites. Generally, these stands were 60 percent or better stocked with immature trees of acceptable quality and free from significant damage or competition. Hardwood stands, including oak-pine, occupied 45 percent of this acreage, natural pine stands 40 percent, and pine plantations the remaining 15 percent. Protection and the prompt regeneration of acreage harvested should sustain a high rate of timber growth on these lands.

By Survey Unit, the proportion of acreage suitable for timber management supporting stands in good condition ranged from 73 percent in the Piedmont to 55 percent in the Northern Coastal Plain. In the Southern Coastal Plain, 58 percent of the acreage on manageable sites supported stands in good condition. By ownership class, 68 percent of the stands owned or leased by forest industry and suitable for timber management were in good condition, compared to 63 percent on public lands and less than 60 percent on NIPF lands.

### OPPORTUNITIES ON 4.6 MILLION ACRES

Sustainable increases in future timber supplies from South Carolina are contingent upon improving existing conditions on some 4.6 million acres, or 37 percent of the State's timberland. Without treatment, these acres will contribute far below their potential to net annual growth. These acres are quantified into six management opportunities:

1. *Salvage and regenerate seriously damaged stands on 110,900 acres.*—These acres supported stands with merchantable-size timber seriously damaged by disease, insects, fire, weather,

Table VII.—Area of idle cropland and commercial forest land, by broad management, ownership, and treatment opportunity classes, South Carolina, 1978

Broad management and ownership classes <sup>1</sup>	Total area	Broad treatment opportunity classes							
		Salvage	Harvest	Commercial thinning	Other stand improvement	Stand conversion <sup>2</sup>	Regeneration	Stands in relatively good condition	Adverse sites or conditions <sup>3</sup>
..... Thousand acres .....									
<b>Idle cropland:</b>									
Public	—	—	—	—	—	—	—	—	—
Forest industry	—	—	—	—	—	—	—	—	—
Other private	310.7	—	—	—	—	—	310.7	—	—
<b>Total</b>	<b>310.7</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>310.7</b>	<b>—</b>	<b>—</b>
<b>Nonstocked:</b>									
Public	13.6	—	—	—	—	—	13.6	—	—
Forest industry	55.3	—	—	—	—	—	55.3	—	—
Other private	203.6	—	—	—	—	—	201.2	—	2.4
<b>Total</b>	<b>272.5</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>270.1</b>	<b>—</b>	<b>2.4</b>
<b>Pine plantations:</b>									
Public	147.5	0.1	—	2.8	8.0	—	1.4	135.2	—
Forest industry	583.1	12.3	—	26.7	9.6	2.9	11.2	520.4	—
Other private	625.9	17.0	3.3	128.7	8.7	3.2	40.8	424.2	—
<b>Total</b>	<b>1,356.5</b>	<b>29.4</b>	<b>3.3</b>	<b>158.2</b>	<b>26.3</b>	<b>6.1</b>	<b>53.4</b>	<b>1,079.8</b>	<b>—</b>
<b>Natural pine stands:</b>									
Public	508.8	9.7	60.8	23.0	26.0	—	24.5	349.8	15.0
Forest industry	574.4	15.8	5.0	42.9	22.1	5.4	48.1	432.1	3.0
Other private	3,086.9	28.9	83.5	179.9	237.4	53.4	271.3	2,210.5	22.0
<b>Total</b>	<b>4,170.1</b>	<b>54.4</b>	<b>149.3</b>	<b>245.8</b>	<b>285.5</b>	<b>58.8</b>	<b>343.9</b>	<b>2,992.4</b>	<b>40.0</b>
<b>Oak-pine stands:</b>									
Public	129.0	3.3	10.0	2.8	13.5	2.7	30.5	56.9	9.3
Forest industry	217.8	—	—	2.3	29.6	14.9	30.8	140.2	—
Other private	1,368.7	2.9	46.5	6.9	139.2	89.2	299.1	752.4	32.5
<b>Total</b>	<b>1,715.5</b>	<b>6.2</b>	<b>56.5</b>	<b>12.0</b>	<b>182.3</b>	<b>106.8</b>	<b>360.4</b>	<b>949.5</b>	<b>41.8</b>
<b>Upland hardwood stands:</b>									
Public	161.0	—	27.7	2.8	16.6	6.0	32.4	57.5	18.0
Forest industry	321.3	2.8	21.0	—	9.6	30.7	89.9	167.3	—
Other private	2,272.5	2.8	61.6	4.6	189.3	207.8	501.5	1,202.4	102.5
<b>Total</b>	<b>2,754.8</b>	<b>5.6</b>	<b>110.3</b>	<b>7.4</b>	<b>215.5</b>	<b>244.5</b>	<b>623.8</b>	<b>1,427.2</b>	<b>120.5</b>
<b>Lowland hardwood stands:</b>									
Public	130.9	—	23.2	16.9	12.2	—	7.7	52.4	18.5
Forest industry	490.7	5.6	75.7	4.1	22.7	7.7	96.8	220.7	57.4
Other private	1,611.9	9.7	203.0	28.0	119.5	71.0	316.0	718.6	146.1
<b>Total</b>	<b>2,233.5</b>	<b>15.3</b>	<b>301.9</b>	<b>49.0</b>	<b>154.4</b>	<b>78.7</b>	<b>420.5</b>	<b>991.7</b>	<b>222.0</b>
<b>All classes:</b>									
Public	1,090.8	13.1	121.7	48.3	76.3	8.7	110.1	651.8	60.8
Forest industry	2,242.6	36.5	101.7	76.0	93.6	61.6	332.1	1,480.7	60.4
Other private	9,480.2	61.3	397.9	348.1	694.1	424.6	1,940.6	5,308.1	305.5
<b>Total</b>	<b>12,813.6</b>	<b>110.9</b>	<b>621.3</b>	<b>472.4</b>	<b>864.0</b>	<b>494.9</b>	<b>2,382.8</b>	<b>7,440.6</b>	<b>426.7</b>

<sup>1</sup> Forest industry includes lands under long-term lease.

<sup>2</sup> Areas occupied with species unsuitable for the site from the standpoint of timber production.

<sup>3</sup> Areas where management opportunities are severely limited because of steep slopes or poor drainage.

or other agents. Pine stands made up 75 percent of the salvage opportunity, reflecting a high incidence of fusiform rust in both plantations and natural stands. The highest proportion of salvage opportunity was found on forest industry lands.

2. *Harvest and regenerate mature and over-mature stands on 621,300 acres.*—These acres supported old, high-risk stands with low growth and high mortality. In these stands, volume of sawtimber averaged more than 12,000 board feet per acre. More than half of these stands were in the Northern Coastal Plain. The highest proportion of harvest opportunities was found on public lands.

3. *Thin young, immature stands densely stocked with merchantable-size trees on 472,400 acres.*—These acres supported immature stands so heavily stocked that trees are receiving considerable competition from one another. Some of the future growth potential is likely to be lost to suppression mortality. Pine stands accounted for 85 percent of the commercial thinning opportunity. Because of the dense planting during the Soil Bank era, a high percentage of the older pine plantations on NIPF lands is included in the thinning opportunity.

4. *Remove undesirable trees and competing vegetation from other immature stands on 864,000 acres.*—These acres supported immature stands receiving serious competition from rough trees and other inhibiting vegetation. Some type of cleaning and release would enhance the future growth and quality of these stands. Oak-pine and other hardwood stands accounted for 64 percent of this timber stand improvement opportunity. The highest proportion in this opportunity was on NIPF lands.

5. *Convert stands with species obviously unsuitable for the site from the standpoint of timber production to more suitable species on 494,900 acres.*—These acres supported a manageable stand but will contribute very little net annual growth unless converted to species more suitable to the sites. More than 70 percent of these acres supported either oak-pine or upland hardwood stands. Many of these stands are on sites where low-grade hardwoods have replaced pines following harvesting. Some pine stands were included in this opportunity where the existing species has been particularly susceptible to a disease. An example would be shortleaf pine on a littleleaf site. The highest proportion of conversion opportunity was on NIPF lands.

6. *Regenerate 2,072,100 acres too poorly stocked with acceptable trees to manage for timber production.*—These acres represent the backlog of needed regeneration in South Carolina. The addition of acres classified as idle cropland would add some 310,700 acres to this opportunity. About 18 percent of the NIPF land was included in this opportunity.

## REGENERATE ACREAGE HARVESTED

While examining opportunities available for increasing timber supplies, forestry interests in South Carolina should look beyond the accumulation of treatment opportunity identified in this inventory. The primary focus should be on the prompt regeneration of stands following final harvest. As stated earlier in this report, almost 200,000 acres were harvested annually over the remeasurement period and retained in commercial forest, exclusive of intermediate cuttings. About 40 percent of these stands were not adequately regenerated. Failure to properly regenerate harvested stands is the major source of poorly stocked forests.

So long as harvested stands are not adequately regenerated, poorly stocked stands will abound. Corrective actions taken several years after the harvest are more costly and do not attack the source of the problem. Every year of delay results in substantial growth loss. If the landowner is to control the species composition and condition of his forests, it is vital that he exercise this control at time of harvest.

The inventory findings clearly show that a disproportionately high percentage of harvesting without regeneration occurs on the NIPF lands. Since 1974, the Forestry Incentives Program (FIP) has been available to assist small NIPF landowners. Professional advice and services are also available to the NIPF owners through forestry consultants, the South Carolina State Commission of Forestry, and Clemson University Extension Service foresters. In addition, some of the wood-using companies offer landowners technical assistance through various agreements made at time of harvest. Collectively, these programs reach only some fraction of the NIPF owners, as evidenced by conditions on the ground. The increased rates of timber growth, however, indicate that some progress has been made.



## APPENDIX

### PROCEDURE

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

1. Initial estimates of forest and nonforest acreages were developed from the classification of 67,524 sample clusters systematically spaced on the latest aerial photographs available. Field crews checked a subsample of 6,466 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 4,038 ground sample locations systematically distributed on the commercial forest land. A 10-point cluster of plots, measured with a basal area factor of 37.5 square feet per acre, was systematically spaced on an acre at each of these locations. 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 non-timber attributes measured or classified included land use, terrain, soils, erosion, litter, water, snags, and tree bole cavities.

4. Equations developed from detailed measurements of standing trees in South 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. In addition, felled trees were measured at 93 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 4,231 permanent sample plots established in the 1968 inventory. A 1977 survey of timber products output, conducted by the South Carolina State Commission of Forestry and Clemson University Cooperative Extension Service, along with the annual pulpwood production study in 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 sample 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 punched on cards and stored on magnetic tape for computer processing, sorting, and tabulation. Final estimates were based on statistical summaries of the data.

8. As each of the three Survey Units in South Carolina was completed, special summaries of the information were added to a master data bank of forest resource statistics maintained in Asheville for the entire Southeast. A Forest Information Retrieval (FIR) program is available for compiling the information for any area of interest as a cooperative service.

## RELIABILITY OF THE DATA

Statistical analysis of the data indicates a sampling error of  $\pm 0.27$  percent for the estimate of total commercial forest area, 1.35 percent for the total cubic-foot volume, 1.32 percent for total cubic-foot volume growth, and 3.36 percent for total cubic-foot 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 error <sup>1</sup> (percent)	Commercial forest area	Volume of growing stock		
		Inventory	Net growth	Removals
	<i>Macres</i>	<i>... Million cubic feet ...</i>		
1	911.5	—	—	—
2	227.9	7,827.8	419.6	—
3	101.3	3,479.0	186.5	—
4	57.0	1,957.0	104.9	349.9
5	36.5	1,252.4	67.1	224.0
10	9.1	313.1	16.8	56.0
15	4.1	139.2	7.5	24.9
20	2.3	78.3	4.2	14.0
25	1.5	50.1	2.7	9.0

<sup>1</sup>By random-sampling formula.

## DEFINITIONS OF TERMS

*Acceptable trees.*—Growing-stock trees of commercial species that meet specified standards of size and quality, but not qualifying as desirable trees.

*Available cut.*—The volume of timber that would be available for cutting on commercial forest land during a given period under specified assumptions concerning growth, cut, mortality, and forest management practices.

*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.

*Commercial forest land.*—Forest land producing or capable of producing crops of industrial wood and not withdrawn from timber utilization.

*Commercial species.*—Tree species suitable for industrial wood products.

*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.

*Desirable trees.*—Growing-stock trees of commercial species having no serious defects in quality that limit present or prospective use for timber products, of relatively high vigor, and containing no pathogens that may result in death or serious deterioration before rotation age.

*Diameter class.*—A classification of trees based on diameter outside bark (d.o.b.), measured at breast height (4½ feet above the ground). D.B.H. is the common abbreviation for "diameter at breast height." Two-inch-diameter classes are commonly used in Forest Survey, with the even inch the approximate midpoint for a class. For example, the 6-inch class includes trees 5.00 through 6.99 inches d.b.h., inclusive.

*Farm.*—Either a place operated as a unit of 10 or more acres from which the sale of agricultural products totaled \$50 or more annually, or a place operated as a unit of less than 10 acres from which the sale of agricultural products for the year amounted to at least \$250.

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

*Farmer-owned lands.*—Lands owned by farm operators.

*Forest industry lands.*—Lands owned by companies or individuals operating wood-using plants.

*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 upon the species forming a plurality of live-tree stocking.

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

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

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

*Oak-pine.*—Forests in which hardwoods (usually upland oaks) comprise a plurality of the stocking but in which pines comprise 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, comprise a plurality of the stocking, except where pines comprise 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.*—Bottomland forest in which tupelo, blackgum, sweetgum, oaks, or southern cypress, singly or in combination, comprise a plurality of the stocking, except where pines comprise 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, comprises 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, comprises a plurality of the stocking. (Common associates include hemlock, elm, basswood, and white pine.)

*Gross growth.*—Annual increase in net volume of trees in the absence of cutting and mortality.

*Growing-stock trees.*—Live trees of commercial species qualifying as desirable or acceptable trees.

*Growing-stock volume.*—Net volume in cubic feet of growing-stock trees 5.0 inches d.b.h. and over from a 1-foot stump to a minimum 4.0-inch top diameter outside bark of the central stem, or to the point where the central stem breaks into limbs. (Net volume in primary forks is included.)

*Hardwoods.*—Dicotyledonous trees, usually broad-leaved and deciduous.

*Soft hardwoods.*—Soft-textured hardwoods, such as boxelder, red and silver maple, 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.*—Includes former croplands, orchards, improved pastures and farm sites not tended within the past 2 years, and presently less than 16.6 percent stocked with trees.

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

*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, pole-timber, 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 1/8 of a statute mile in width, and lakes, reservoirs, and ponds less than 40 acres in area.

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

*Logging residues.*—The unused portions of trees cut or killed by logging.

*Miscellaneous Federal lands.*—Federal lands other than National Forests, lands administered by the Bureau of Land Management, and Indian lands.

*Miscellaneous private lands—corporate.*—Lands owned by private corporations other than forest industry.

*Miscellaneous private lands—individual.*—Privately owned lands other than forest industry, farmer-owned, or corporate lands.

*Mortality.*—Number or sound-wood volume of live trees dying from natural causes during a specified period.

*National Forest land.*—Federal lands which have been legally designated as National Forests or purchase units, and other lands under the administration of the Forest Service, including experimental areas and Bankhead-Jones Title III lands.

*Net annual growth.*—The increase in volume for a specific year.

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

*Noncommercial forest land.*—(a) Unproductive forest land incapable of yielding crops of industrial wood because of adverse site conditions, and (b) productive-reserved forest land.

*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.

*Nonstocked land.*—Commercial forest land less than 16.7 percent stocked with growing-stock trees.

*Other Federal lands.*—Federal lands other than National Forests, including lands administered by the Bureau of Land Management, Bureau of Indian Affairs, and other Federal agencies.

*Other public lands.*—Publicly owned lands other than National Forests.

*Other removals.*—The net volume of growing-stock 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 commercial forest.

*Overstocked areas.*—Areas where growth of trees is significantly reduced by excessive numbers of trees.

*Plant byproducts.*—Wood products such as pulp chips, obtained incidental to production of other manufactured products.

*Plant residues.*—Wood materials from manufacturing plants not utilized for some product.

*Poletimber trees.*—Growing-stock trees of commercial species at least 5.0 inches in d.b.h. but smaller than sawtimber size.

*Productive-reserved forest land.*—Forest land sufficiently productive to qualify as commercial forest land, but withdrawn from timber utilization through statute or administrative designation.

*Quality class.*—A classification of sawtimber volumes by log or tree grades.

*Rangeland.*—Land on which the natural plant cover is composed principally of native grasses, forbs, or shrubs valuable for forage.

*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 tree volume in sound material.

*Rough trees.*—(a) 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 tree volume in sound material; and (b) all live trees of noncommercial species.

*Roundwood products.*—Logs, bolts, or other round sections cut from trees for industrial or consumer uses.

*Salvable dead trees.*—Standing or down dead trees that are considered merchantable by Forest Survey standards.

*Saplings.*—Live trees 1.0 inch to 5.0 inches in diameter at breast height.

*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 the stump and the saw-log top.

*Saw-log top.*—The point on the bole of sawtimber trees above which a saw log cannot be produced. The minimum saw-log top is 7.0 inches d.o.b. for softwoods and 9.0 inches d.o.b. for hardwoods.

*Sawtimber trees.*—Live trees of commercial species containing at least a 12-foot saw log, or two contiguous saw logs, each 8 feet or longer, and with at least one-third of the gross board-foot volume between the 1-foot stump and minimum saw-log top being sound. Softwoods must be at least 9.0 inches and hardwoods at least 11.0 inches in diameter at breast height.

*Sawtimber volume.*—Net volume of the saw-log portion of live sawtimber in board-foot International ¼-inch rule.

*Seedlings.*—Live trees less than 1.0 inch in diameter at breast height 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.

*Class 1.*—Sites capable of producing 165 or more cubic feet per acre annually.

*Class 2.*—Sites capable of producing 120 to 165 cubic feet per acre annually.

*Class 3.*—Sites capable of producing 85 to 120 cubic feet per acre annually.

*Class 4.*—Sites capable of producing 50 to 85 cubic feet per acre annually.

*Class 5.*—Sites incapable of producing 50 cubic feet per acre annually, but excluding unproductive sites.

*Softwoods.*—Coniferous trees, usually evergreen, having needles or scale-like leaves.

*Pines.*—Yellow pine species which include loblolly, longleaf, slash, pond, shortleaf, pitch, Virginia, and Table-Mountain pine.

*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 of growing-stock trees on the area.

*Sawtimber stands.*—Stands at least 16.7 percent stocked with growing-stock trees, with half or more of total stocking in sawtimber and pole-timber 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 this 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 the stocking is saplings and seedlings.

*State, county, and municipal lands.*—Lands owned by States, counties, and local public agencies or municipalities, or lands 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 to a minimum standard, depending on tree size, to fully utilize the growth potential of the land. (See table at end of definitions.)

*Fully stocked.*—100 percent or more stocking

*Medium stocked.*—60 to 100 percent stocking

*Poorly stocked.*—Less than 60 percent stocking

*Survivor growth.*—The increase in volume of growing-stock trees that survive cutting and mortality for a specified year.

*Timber products.*—Roundwood products and plant by-products.

*Timber removals.*—The net volume of growing-stock trees removed from the inventory by harvesting; cultural operations, such as stand improvement; land clearing, or changes in land use.

*Unproductive forest land.*—Forest land incapable of producing 20 cubic feet per acre of industrial wood under natural conditions, because of adverse site conditions.

*Upper-stem portion.*—That part of the main stem or fork of sawtimber trees above the saw-log top to a 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 within the legal boundaries of cities and towns, suburban 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.

## Stocking Standard

D.b.h. class	Minimum number of trees per acre for full stocking	Minimal basal area per acre for full stocking	Percent stocking assigned each tally tree <sup>1</sup>
Seedlings	600	—	5.0
2	560	—	5.4
4	460	—	6.5
6	340	67	5.8
8	240	84	4.8
10	155	85	4.3
12	115	90	4.0
14	90	96	3.8
16	72	101	3.7
18	60	106	3.5
20	51	111	3.5

<sup>1</sup>Trees less than 5.0 inches d.b.h. were tallied on a 10-point cluster of circular, 1/300-acre plots at each sample location. Trees 5.0 inches d.b.h. and larger were tallied on a 10-point cluster of variable plots using a basal area factor of 37.5 at each sample location.

Overstocked — over 130 percent.

Fully stocked — 100–130 percent.

Medium stocked — 60–99 percent.

Poorly stocked — 16.7–59 percent.

Nonstocked — less than 16.7 percent.

## CONVERSION FACTORS

Cubic feet of wood per average cord  
(excluding bark)

D.b.h.	Pine	Other softwoods	Hardwood
6	61.0	68.2	60.0
8	68.1	76.0	68.4
10	73.1	81.3	73.4
12	76.7	85.3	76.4
14	79.4	88.1	78.4
16	81.6	90.6	79.8
18	83.3	92.4	80.8
20	84.7	93.8	81.5
22	86.0	94.8	82.1
24+	87.8	98.1	83.1
Average	73.9	85.9	74.3

Rough cords per M cubic feet (without bark) =

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

Where	Pine	Other softwoods	Hardwood
a =	10.01850	9.15960	11.68410
b =	34.42135	28.75793	3.74431
c =	22.73994	25.54418	157.39417

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Table 1.—Area of land classes,  
South Carolina, 1978

Land class	Area
	<i>Acres</i>
Forest land:	
Commercial	12,502,906
Productive-reserved	72,399
Unproductive	3,893
Total	<u>12,579,198</u>
Nonforest land:	
Cropland	3,606,957
Pasture and range	1,006,997
Other <sup>1</sup>	2,156,555
Total	<u>6,770,509</u>
All land <sup>2</sup>	<u>19,349,707</u>

<sup>1</sup>Includes swampland, industrial and urban areas, other nonforest land, and 230,308 acres classed as water by Forest Survey standards but defined by Bureau of Census as land.

<sup>2</sup>From U.S. Bureau of the Census, Land and Water Area of the United States, 1970.

Table 2.—Area of commercial forest land,  
by ownership classes, South Carolina, 1978

Ownership class	Area
	<i>Acres</i>
National Forest	<u>578,724</u>
Other Federal:	
Bureau of Land Management	—
Indian	—
Miscellaneous Federal	321,860
Total	<u>321,860</u>
State	<u>167,098</u>
County and municipal	<u>23,145</u>
Forest industry <sup>1</sup>	<u>2,242,580</u>
Farmer-owned	<u>4,493,503</u>
Miscellaneous private:	
Individual	3,400,318
Corporate	1,275,678
Total	<u>4,675,996</u>
All ownership	<u>12,502,906</u>

<sup>1</sup>Not including 82,516 acres of miscellaneous private lands leased to forest industry.

Table 3.—Area of commercial forest land, by stand-size and ownership classes,  
South Carolina, 1978

Stand-size class	All ownerships	National Forest	Other public	Forest industry	Farmer and misc. private
	<i>Acres.</i>				
Sawtimber	5,454,246	398,940	289,109	824,642	3,941,555
Poletimber	3,552,830	83,642	92,115	550,900	2,826,173
Sapling and seedling	3,223,313	96,142	117,238	811,715	2,198,218
Nonstocked	272,517	—	13,641	55,323	203,553
All classes	<u>12,502,906</u>	<u>578,724</u>	<u>512,103</u>	<u>2,242,580</u>	<u>9,169,499</u>

Table 4.—Area of commercial forest land, by stand volume and ownership  
classes, South Carolina, 1978

Stand volume per acre <sup>1</sup>	All ownerships	National Forest	Other public	Forest industry	Farmer and misc. private
	<i>Acres.</i>				
Less than 1,500 fbm	4,614,637	99,696	197,489	1,108,896	3,208,556
1,500 to 5,000 fbm	3,785,024	125,694	148,853	473,107	3,037,370
More than 5,000 fbm	4,103,245	353,334	165,761	660,577	2,923,573
All classes	<u>12,502,906</u>	<u>578,724</u>	<u>512,103</u>	<u>2,242,580</u>	<u>9,169,499</u>

<sup>1</sup>International ¼-inch rule.

Table 5.—Area of commercial forest land, by stocking classes based on selected stand components, South Carolina, 1978

Stocking percentage	Stocking classified in terms of:					
	All live trees	Growing-stock trees			Rough and rotten trees	Inhibiting vegetation
		Total	Desirable	Acceptable		
	<i>Acres.</i>					
160	42,004	4,625	—	1,834	—	—
150-159	125,738	34,305	—	3,880	—	—
140-149	203,861	92,251	—	44,529	—	—
130-139	1,482,245	395,125	599	179,187	2,868	—
120-129	1,331,429	722,150	7,062	332,971	7,614	—
110-119	1,676,475	1,136,652	14,037	520,010	36,056	—
100-109	3,684,523	2,004,330	272,753	656,343	21,861	—
90-99	1,229,077	1,731,884	105,409	876,698	50,815	11,533
89-89	1,015,333	1,606,287	264,633	1,172,912	80,869	4,370
70-79	599,791	1,391,580	228,184	1,230,638	184,299	19,067
60-69	352,640	1,005,856	454,129	1,381,002	229,426	33,287
50-59	330,298	852,070	702,643	1,321,544	428,342	24,499
40-49	160,771	601,593	1,041,769	1,261,080	678,474	78,358
30-39	90,884	345,121	1,051,642	1,096,807	971,691	110,481
20-29	66,765	218,179	1,482,599	799,906	1,682,758	197,604
10-19	52,010	164,857	1,767,289	663,501	2,604,347	645,633
Less than 10	59,062	196,041	5,110,158	960,064	5,523,486	11,378,074
<b>Total</b>	<b>12,502,906</b>	<b>12,502,906</b>	<b>12,502,906</b>	<b>12,502,906</b>	<b>12,502,906</b>	<b>12,502,906</b>

Table 6.—Area of commercial forest land, by ownership and stocking classes<sup>1</sup> with percent occupancy by selected stand components, South Carolina, 1978

Ownership and stocking class	Area	Stand components					
		Growing-stock trees			Rough and rotten trees	Inhibiting vegetation	Nonstocked
		Total	Desirable	Acceptable			
	<i>Acres</i>	<i>Percent of area</i>					
<b>National Forest:</b>							
Fully stocked stands	270,646	95.3	36.4	58.9	4.7	—	—
Medium stocked stands	263,389	79.3	24.1	55.2	16.6	1.2	2.9
Poorly stocked stands	44,689	48.3	8.3	40.0	43.6	1.8	6.3
<b>All stands</b>	<b>578,724</b>	<b>85.3</b>	<b>29.3</b>	<b>56.0</b>	<b>12.4</b>	<b>.6</b>	<b>1.7</b>
<b>Other public:</b>							
Fully stocked stands	159,295	94.3	25.2	69.1	5.7	—	—
Medium stocked stands	208,086	77.8	21.4	56.4	15.3	1.9	5.0
Poorly stocked stands	144,722	37.4	11.0	26.4	38.3	7.0	17.3
<b>All stands</b>	<b>512,103</b>	<b>74.1</b>	<b>20.3</b>	<b>53.8</b>	<b>17.4</b>	<b>2.4</b>	<b>6.1</b>
<b>Forest industry:</b>							
Fully stocked stands	1,039,414	94.4	27.9	66.5	5.6	—	—
Medium stocked stands	855,669	76.0	18.1	57.9	18.6	2.3	3.1
Poorly stocked stands	347,497	37.8	11.5	26.3	27.7	13.3	21.2
<b>All stands</b>	<b>2,242,580</b>	<b>79.1</b>	<b>21.8</b>	<b>57.3</b>	<b>13.8</b>	<b>2.8</b>	<b>4.3</b>
<b>Farmer &amp; misc. private:</b>							
Fully stocked stands	2,920,083	94.0	23.5	70.5	6.0	—	—
Medium stocked stands	4,408,463	77.1	21.3	55.8	17.6	1.9	3.4
Poorly stocked stands	1,840,953	37.5	10.2	27.3	37.5	10.0	15.0
<b>All stands</b>	<b>9,169,499</b>	<b>74.9</b>	<b>19.8</b>	<b>55.1</b>	<b>17.6</b>	<b>2.9</b>	<b>4.6</b>
<b>All ownerships:</b>							
Fully stocked stands	4,389,438	94.2	25.4	68.8	5.8	—	—
Medium stocked stands	5,735,607	77.0	20.9	56.1	17.6	1.9	3.5
Poorly stocked stands	2,377,861	37.7	10.5	27.2	36.2	10.1	16.0
<b>All stands</b>	<b>12,502,906</b>	<b>76.1</b>	<b>20.6</b>	<b>55.5</b>	<b>16.7</b>	<b>2.7</b>	<b>4.5</b>

<sup>1</sup>Based on degree of growing-stock stocking.

Table 7.—Area of commercial forest land, by site and ownership classes, South Carolina, 1978

Site class	All ownerships	National Forest	Other public	Forest industry	Farmer and misc. private
..... <i>Acres</i> .....					
165 ft <sup>3</sup> or more	29,251	4,937	—	6,220	18,094
120-165 ft <sup>3</sup>	278,897	58,845	3,890	44,903	171,259
85-120 ft <sup>3</sup>	2,745,483	153,021	107,861	569,749	1,914,852
50-85 ft <sup>3</sup>	7,425,927	313,801	248,601	1,336,959	5,526,566
Less than 50 ft <sup>3</sup>	2,023,348	48,120	151,751	284,749	1,538,728
All classes	12,502,906	578,724	512,103	2,242,580	9,169,499

Table 8.—Area of commercial forest land, by forest types and ownership classes, South Carolina, 1978

Type	All ownerships	Public	Private
..... <i>Acres</i> .....			
<b>Softwood types:</b>			
White pine-			
hemlock	13,374	4,632	8,742
Longleaf pine	471,112	116,492	354,620
Slash pine	512,137	61,345	450,792
Loblolly pine	3,403,718	384,801	3,018,917
Shortleaf pine	655,877	53,693	602,184
Virginia pine	178,021	4,632	173,389
Eastern redcedar	22,764	—	22,764
Pond pine	301,549	25,326	276,223
Spruce pine	7,735	724	7,011
Pitch pine	4,633	4,633	—
Total	5,570,920	656,278	4,914,642
<b>Hardwood types:</b>			
Oak-pine	1,718,544	129,053	1,589,491
Oak-hickory	2,694,392	148,698	2,545,694
Chestnut oak	4,405	—	4,405
Southern scrub			
oak	246,457	24,524	221,933
Oak-gum-cypress	1,990,754	108,098	1,882,656
Elm-ash-cotton-			
wood	277,434	24,176	253,258
Total	6,931,986	434,549	6,497,437
All types	12,502,906	1,090,827	11,412,079

Table 9.—Area of noncommercial forest land, by forest types, South Carolina, 1978

Type	All areas	Productive- reserved areas	Unproductive areas
..... <i>Acres</i> .....			
Longleaf-slash pine	2,775	2,775	—
Loblolly-shortleaf pine	9,073	9,073	—
Oak-pine	7,044	7,044	—
Oak-hickory	40,674	37,981	2,693
Oak-gum-cypress	16,726	15,526	1,200
All types	76,292	72,399	3,893

Table 10.—Number of growing-stock trees on commercial forest land, by species and diameter class, South Carolina, 1978

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
<i>Thousand trees.</i>											
<b>Softwood:</b>											
Longleaf pine	59,372	17,945	14,256	11,348	8,000	4,802	2,104	692	157	66	2
Slash pine	88,228	45,788	25,910	10,315	4,032	1,155	681	251	55	41	—
Shortleaf pine	144,250	66,920	41,931	21,008	9,218	3,283	1,318	456	62	52	2
Loblolly pine	485,132	186,867	121,661	74,394	46,196	27,128	15,118	7,616	3,347	2,705	100
Pond pine	46,375	17,035	11,873	7,502	4,803	2,781	1,367	584	279	151	—
Virginia pine	35,209	15,838	9,939	5,631	2,393	1,015	234	131	15	13	—
Pitch pine	660	123	174	152	156	23	11	21	—	—	—
Table-mountain pine	—	—	—	—	—	—	—	—	—	—	—
Spruce pine	1,915	380	342	396	293	187	131	70	70	46	—
Sand pine	—	—	—	—	—	—	—	—	—	—	—
Eastern white pine	708	—	198	87	96	83	75	51	24	86	8
Eastern hemlock	605	256	149	70	65	32	12	—	—	21	—
Spruce and fir	—	—	—	—	—	—	—	—	—	—	—
Baldcypress	15,078	3,198	2,509	2,503	1,803	1,772	1,304	784	523	620	62
Pondcypress	11,227	3,547	2,570	2,203	1,122	839	470	186	155	128	7
Cedars	14,636	9,614	3,191	1,319	359	35	43	36	23	16	—
<b>Total softwoods</b>	<b>903,395</b>	<b>367,511</b>	<b>234,703</b>	<b>136,928</b>	<b>78,536</b>	<b>43,135</b>	<b>22,868</b>	<b>10,878</b>	<b>4,710</b>	<b>3,945</b>	<b>181</b>
<b>Hardwood:</b>											
Select white oaks <sup>1</sup>	51,342	20,004	12,237	7,942	4,538	2,957	1,856	892	395	473	48
Select red oaks <sup>2</sup>	12,626	3,828	2,547	2,016	1,516	1,122	786	412	136	232	31
Chestnut oak	4,341	1,221	941	981	572	290	150	116	8	62	—
Other white oaks	22,602	10,305	4,655	3,129	2,017	1,070	531	255	214	340	86
Other red oaks	156,633	65,768	37,681	20,869	12,935	7,539	5,014	2,686	1,689	2,105	347
Hickory	36,668	15,858	9,150	4,313	2,955	1,965	1,058	591	333	379	66
Yellow birch	—	—	—	—	—	—	—	—	—	—	—
Hard maple	783	454	39	213	22	28	11	—	7	9	—
Soft maple	44,356	20,433	9,514	6,086	3,367	2,221	1,307	664	395	350	19
Beech	1,896	447	377	293	355	138	85	53	37	108	3
Sweetgum	150,453	66,743	35,232	19,963	12,611	7,056	4,184	2,363	1,120	1,094	87
Tupelo and blackgum	101,768	29,475	22,429	15,455	13,060	9,341	5,462	3,058	1,567	1,744	177
Ash	21,280	8,409	4,131	3,544	2,016	1,527	706	476	230	217	24
Cottonwood	2,542	501	474	372	461	206	176	144	51	104	53
Basswood	133	88	—	—	45	—	—	—	—	—	—
Yellow-poplar	34,655	10,065	6,764	5,708	4,198	3,023	2,009	1,328	837	682	41
Bay and magnolia	2,502	1,466	539	208	137	58	59	5	10	16	4
Black cherry	2,744	1,820	711	154	50	9	—	—	—	—	—
Black walnut	488	201	24	104	47	26	25	40	5	16	—
Sycamore	2,076	72	420	196	483	399	111	106	104	172	13
Black locust	409	173	174	30	24	—	—	8	—	—	—
Elm	17,687	8,589	3,952	2,066	1,477	634	421	253	137	126	32
Other eastern hardwoods	15,499	7,051	3,713	1,784	1,249	714	472	216	159	139	2
<b>Total hardwoods</b>	<b>683,483</b>	<b>272,971</b>	<b>155,704</b>	<b>95,426</b>	<b>64,135</b>	<b>40,323</b>	<b>24,423</b>	<b>13,666</b>	<b>7,434</b>	<b>8,368</b>	<b>1,033</b>
<b>All species</b>	<b>1,586,878</b>	<b>640,482</b>	<b>390,407</b>	<b>232,354</b>	<b>142,671</b>	<b>83,458</b>	<b>47,291</b>	<b>24,544</b>	<b>12,144</b>	<b>12,313</b>	<b>1,214</b>

<sup>1</sup>Includes white, swamp white, swamp chestnut, and chinkapin oaks.

<sup>2</sup>Includes cherrybark, northern red, and Shumard oaks.

Table 11.—Volume of timber on commercial forest land, by class of timber and by softwood and hardwood, South Carolina, 1978

Class of timber	All species	Softwood	Hardwood
<i>..... Thousand cubic feet .....</i>			
Sawtimber trees:			
Saw log portion	10,825,859	6,085,737	4,740,122
Upper-stem portion	1,031,188	409,180	622,008
Total	11,857,047	6,494,917	5,362,130
Poletimber trees:	5,323,328	2,432,199	2,891,129
All growing-stock trees	17,180,375	8,927,116	8,253,259
Rough trees:			
Sawtimber-size trees	803,728	97,279	706,449
Poletimber-size trees	1,115,948	131,455	984,493
Total	1,919,676	228,734	1,690,942
Rotten trees:			
Sawtimber-size trees	223,213	16,922	206,291
Poletimber-size trees	27,906	546	27,360
Total	251,119	17,468	233,651
Salvable dead trees:			
Sawtimber-size trees	25,889	20,926	4,963
Poletimber-size trees	19,063	15,875	3,188
Total	44,952	36,801	8,151
Total, all timber	19,396,122	9,210,119	10,186,003



Table 12.—Volume of growing stock and sawtimber on commercial forest land, by ownership classes, and by softwood and hardwood, South Carolina, 1978

Ownership class	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
<i>..... Thousand cubic feet ..... Thousand board feet<sup>1</sup> .....</i>						
National Forest	1,162,510	765,979	396,531	4,625,502	3,426,554	1,198,948
Other public	762,154	475,217	286,937	2,613,422	1,813,382	800,040
Forest industry	2,888,867	1,470,607	1,418,260	9,357,563	4,586,853	4,770,710
Farmer and misc. private	12,366,844	6,215,313	6,151,531	38,971,572	21,492,027	17,479,545
All ownerships	17,180,375	8,927,116	8,253,259	55,568,059	31,318,816	24,249,243

<sup>1</sup> International ¼-inch rule.

Table 13.—Volume of growing stock on commercial forest land, by species and diameter class, South Carolina, 1978

Species	All classes	Diameter class (inches at breast height)											29.0 and larger
		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			
		Thousand cubic feet											
<b>Softwood:</b>													
Longleaf pine	694,977	52,545	94,159	137,984	153,871	132,312	76,472	32,785	8,856	5,708	285		
Slash pine	564,197	120,653	165,855	118,931	76,961	33,992	27,535	12,494	3,738	4,038			
Shortleaf pine	1,016,279	169,296	259,559	240,875	170,638	92,625	51,634	22,897	3,792	4,585	378		
Loblolly pine	5,316,362	474,296	764,942	876,451	889,811	775,232	606,318	404,355	232,400	273,174	19,383		
Pond pine	461,605	41,544	73,229	84,609	86,300	71,862	48,033	27,159	16,666	12,203			
Virginia pine	257,029	47,274	66,299	63,490	41,007	24,466	7,445	5,156	884	1,008			
Pitch pine	7,849	354	1,055	1,801	2,791	566	346	936					
Table-mountain pine													
Spruce pine	35,494	1,079	2,827	4,761	5,840	4,444	4,631	3,275	4,471	4,166			
Sand pine	23,236		1,082	1,098	1,686	2,173	2,693	2,344	1,551	9,616	993		
Eastern white pine	7,135	588	960	730	979	1,011	454			2,413			
Eastern hemlock													
Spruce and fir	349,293	11,027	19,696	35,486	37,636	51,904	50,558	38,307	33,423	58,140	13,116		
Baldcypress	133,964	11,107	16,039	25,525	19,195	20,630	14,917	7,795	7,744	9,444	1,568		
Pondcypress	59,696	21,408	15,326	12,215	5,077	654	1,274	1,270	1,349	1,123			
Cedars													
<b>Total softwoods</b>	<b>8,227,116</b>	<b>951,171</b>	<b>1,481,028</b>	<b>1,603,956</b>	<b>1,491,792</b>	<b>1,211,871</b>	<b>892,310</b>	<b>558,773</b>	<b>314,874</b>	<b>385,618</b>	<b>35,723</b>		
<b>Hardwood:</b>													
Select white oaks <sup>1</sup>	585,406	58,350	78,253	91,817	84,175	80,018	67,075	43,699	25,272	45,372	11,375		
Select red oaks <sup>2</sup>	203,276	12,775	17,329	25,442	28,175	32,159	29,025	21,551	8,822	22,538	5,460		
Chestnut oak	53,116	3,089	6,257	10,681	9,461	7,349	5,230	5,655	396	4,998			
Other white oaks	234,705	27,039	25,194	31,465	31,969	25,390	17,840	11,955	13,585	31,724	18,544		
Other red oaks	1,774,432	194,580	236,185	237,002	235,660	197,971	181,282	127,634	105,039	191,234	67,845		
Hickory	400,630	41,875	53,623	47,266	53,506	53,069	41,995	31,091	22,481	39,991	15,733		
Yellow birch													
Hard maple	8,341	1,442	485	2,752	394	1,170	575		503	1,020			
Soft maple	461,436	66,925	63,913	72,415	61,853	58,653	47,814	31,870	23,801	31,000	3,192		
Beech	37,962	1,247	2,076	3,656	6,571	3,604	3,261	2,815	2,677	11,414	441		
Sweetgum	1,621,784	161,685	223,517	250,170	207,771	175,785	129,499	80,738	115,933	18,952			
Tupelo and blackgum	1,485,701	86,852	144,213	186,467	244,076	243,228	193,919	137,943	87,960	135,091	25,952		
Ash	284,325	26,626	29,136	46,492	42,095	44,676	28,333	24,951	15,160	22,379	4,477		
Cottonwood	69,018	1,688	3,069	5,072	9,346	5,933	7,129	7,757	3,784	11,375	13,865		
Basswood	1,042	260			782								
Yellow-poplar	589,935	30,498	46,854	70,562	82,321	85,885	78,577	68,437	54,408	63,148	9,245		
Bay and magnolia	18,378	4,241	3,434	2,340	2,510	1,249	2,029	178	557	1,140	700		
Black cherry	12,585	5,140	4,679	1,589	975	202							
Black walnut	8,756	599	139	1,165	725	703	1,160	2,315	318	1,632			
Sycamore	62,474	296	2,812	3,259	9,524	11,684	4,115	5,783	6,926	15,521	2,554		
Black locust	2,246	473	788	291	300			394					
Elm	178,676	22,335	24,933	24,328	28,960	17,876	17,471	13,732	9,571	13,295	6,175		
Other eastern hardwoods	159,035	18,224	22,998	20,772	23,248	19,389	17,958	9,966	10,431	15,479	540		
<b>Total hardwoods</b>	<b>8,253,259</b>	<b>766,239</b>	<b>989,887</b>	<b>1,135,003</b>	<b>1,214,360</b>	<b>1,098,179</b>	<b>920,573</b>	<b>677,255</b>	<b>472,429</b>	<b>774,284</b>	<b>205,050</b>		
<b>All species</b>	<b>17,180,375</b>	<b>1,717,410</b>	<b>2,470,915</b>	<b>2,738,959</b>	<b>2,706,152</b>	<b>2,310,050</b>	<b>1,812,883</b>	<b>1,236,028</b>	<b>787,303</b>	<b>1,159,902</b>	<b>240,773</b>		

<sup>1</sup>Includes white, swamp white, swamp chestnut, and chinkapin oaks.

<sup>2</sup>Includes cherry bark, northern red, and Shumard oaks.

Table 14.—Volume of sawtimber on commercial forest land, by species and diameter class, South Carolina, 1978

Species	All classes	Diameter class (inches at breast height)										21.0-28.9	29.0 and larger	
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	Thousand board feet						
<b>Softwood:</b>														
Longleaf pine	2,743,173	558,328	740,940	708,620	439,610	199,296	56,089	38,236	2,054					
Slash pine	1,248,606	438,761	351,590	176,738	155,698	75,230	23,683	26,906	—					
Shortleaf pine	2,596,103	884,499	765,974	470,515	285,165	134,609	23,377	29,341	2,623					
Loblolly pine	20,055,541	3,071,456	3,934,079	3,918,931	3,357,623	2,386,323	1,443,307	1,804,917	138,905					
Pond pine	1,673,412	319,142	390,316	364,764	263,360	157,149	100,827	77,854	—					
Virginia pine	574,085	219,762	169,257	111,446	36,651	26,545	4,771	5,653	—					
Pitch pine	27,592	5,870	11,389	2,835	1,961	5,537	—	—	—					
Table-mountain pine	—	—	—	—	—	—	—	—	—					
Spruce pine	154,716	20,806	27,337	21,435	23,097	16,689	23,231	22,121	—					
Sand pine	—	—	—	—	—	—	—	—	—					
Eastern white pine	123,652	4,139	7,116	10,491	14,106	12,822	9,012	59,519	6,447					
Eastern hemlock	28,146	2,283	3,942	4,782	2,355	—	—	14,784	—					
Spruce and fir	—	—	—	—	—	—	—	—	—					
Baldcypress	1,520,593	103,564	141,697	224,339	242,977	196,964	182,470	341,815	86,767					
Pondcypress	466,628	78,658	75,237	91,837	72,747	40,720	42,239	55,068	10,122					
Cedars	106,569	49,388	23,834	3,269	7,134	7,359	8,391	7,194	—					
<b>Total softwoods</b>	<b>31,318,816</b>	<b>5,756,656</b>	<b>6,642,708</b>	<b>6,110,002</b>	<b>4,902,484</b>	<b>3,259,243</b>	<b>1,917,397</b>	<b>2,483,408</b>	<b>246,918</b>					
<b>Hardwood:</b>														
Select white oaks <sup>1</sup>	1,533,957	—	274,746	311,967	291,214	207,600	126,590	252,440	69,400					
Select red oaks <sup>2</sup>	657,972	—	91,863	126,550	127,675	101,766	44,944	128,728	36,446					
Chestnut oak	131,261	—	29,461	27,392	21,639	25,343	1,868	25,558	—					
Other white oaks	738,015	—	114,817	106,945	83,040	60,034	72,167	183,130	117,882					
Other red oaks	5,261,646	—	848,479	833,683	845,003	643,513	560,039	1,099,014	431,915					
Hickory	1,179,648	—	180,839	213,065	189,803	152,107	116,990	226,825	100,019					
Yellow birch	—	—	—	—	—	—	—	—	—					
Hard maple	16,082	—	1,416	4,790	2,497	—	2,367	5,012	—					
Soft maple	1,043,461	—	194,689	217,982	198,701	142,661	112,839	158,655	17,934					
Beech	122,523	—	24,085	14,441	12,709	11,222	10,838	47,353	1,875					
Sweetgum	4,601,234	—	911,469	885,340	845,500	678,188	450,128	701,968	128,641					
Tupelo and blackgum	4,582,304	—	748,114	919,390	844,246	664,317	454,957	777,680	173,600					
Ash	767,059	—	137,733	171,941	121,090	115,545	74,531	119,990	26,229					
Cottonwood	287,904	—	29,052	22,754	30,693	36,574	19,012	62,828	86,991					
Basswood	2,825	—	2,825	—	—	—	—	—	—					
Yellow-poplar	2,158,297	—	292,708	369,422	382,023	361,272	305,413	383,312	64,147					
Bay and magnolia	39,670	—	8,063	4,981	9,706	806	2,679	7,651	5,784					
Black cherry	4,174	—	774	—	—	—	—	—	—					
Black walnut	24,250	—	2,499	2,452	4,087	8,219	1,133	5,860	—					
Sycamore	253,760	—	29,455	44,371	17,764	27,501	34,548	84,673	15,448					
Black locust	2,541	—	1,039	—	—	1,502	—	—	—					
Elm	450,470	—	97,543	68,923	74,350	62,450	45,481	67,502	34,221					
Other eastern hardwoods	390,190	—	73,506	70,983	73,016	44,254	48,146	77,174	3,111					
<b>Total hardwoods</b>	<b>24,249,243</b>	—	<b>4,097,801</b>	<b>4,418,146</b>	<b>4,174,756</b>	<b>3,344,874</b>	<b>2,484,670</b>	<b>4,415,353</b>	<b>1,313,643</b>					
<b>All species</b>	<b>55,568,059</b>	<b>5,756,656</b>	<b>10,740,509</b>	<b>10,528,148</b>	<b>9,077,240</b>	<b>6,604,117</b>	<b>4,402,067</b>	<b>6,898,761</b>	<b>1,560,561</b>					

<sup>1</sup>Includes white, swamp chestnut, and chinquapin oaks.

<sup>2</sup>Includes cherrybark, northern red, and Shumard oaks.

Table 15.—Volume of sawtimber on commercial forest land, by species and quality classes, South Carolina, 1978

Species	All grades	Log grade			
		1	2	3	4
..... Thousand board feet. ....					
Softwood:					
Yellow pines <sup>1</sup>	29,073,228	5,715,554	3,539,708	19,817,966	( <sup>2</sup> )
Eastern white pine <sup>3</sup>	123,652	36,686	56,048	30,918	—
Cypress <sup>3</sup>	1,987,221	302,863	1,144,633	539,725	—
Other eastern softwoods <sup>3</sup>	134,715	6,957	10,629	89,452	27,677
Total	31,318,816	6,062,060	4,751,018	20,478,061	27,677
Hardwood: <sup>4</sup>					
Select white and red oaks	2,191,929	435,149	506,254	1,061,432	189,094
Other white and red oaks	6,130,922	1,030,013	1,516,079	2,898,022	686,808
Hickory	1,179,648	227,866	224,030	479,861	247,891
Hard maple	16,082	1,580	4,870	6,588	3,044
Sweetgum	4,601,234	877,264	1,116,556	2,359,384	248,030
Ash, walnut, and black cherry	795,483	—	313,366	432,840	49,277
Yellow-poplar	2,158,297	761,071	322,025	818,179	257,022
Other hardwoods	7,175,648	1,611,208	2,213,632	3,058,372	292,436
Total	24,249,243	4,944,151	6,216,812	11,114,678	1,973,602
All species	55,568,059	11,006,211	10,967,830	31,592,739	2,001,279

<sup>1</sup>Based on Southern Pine Log Grades for Yard and Structural Lumber, Research Paper SE-39, published by the Southeastern Forest Experiment Station in 1968.

<sup>2</sup>Not applicable.

<sup>3</sup>Based on Trial Log Grades for Eastern White Pine prepared by the Northeastern Forest Experiment Station in 1960.

<sup>4</sup>Graded according to Hardwood Log Grades for Standard Lumber published by the U.S. Forest Products Laboratory in 1953. Specifications for the grade 4 tie and timber logs are based chiefly on knot size and log soundness.

Table 16.—Net annual growth and removals of growing stock on commercial forest land, by species, South Carolina, 1977

Species	Net annual growth	Annual timber removals
<i>Thousand cubic feet</i>		
Softwood:		
Yellow pines	599,841	353,875
Eastern white pine	1,069	406
Cypress	11,117	4,859
Other eastern softwoods	5,722	1,390
Total softwoods	617,749	360,530
Hardwood:		
Select white and red oaks	36,353	19,641
Other white and red oaks	100,544	40,304
Hickory	13,668	6,005
Hard maple	222	
Sweetgum	73,372	26,778
Ash, walnut, and black cherry	10,329	3,140
Yellow-poplar	32,227	8,819
Tupelo and blackgum	36,679	17,757
Other eastern hardwoods	42,202	12,981
Total hardwoods	345,596	135,425
All species	963,345	495,955

Table 18.—Net annual growth and removals of sawtimber on commercial forest land, by species, South Carolina, 1977

Species	Net annual growth	Annual timber removals
<i>Thousand board feet</i>		
Softwood:		
Yellow pines	2,237,806	1,330,964
Eastern white pine	5,245	2,120
Cypress	55,271	23,443
Other eastern softwoods	9,167	3,967
Total softwoods	2,307,489	1,360,494
Hardwood:		
Select white and red oaks	136,250	73,788
Other white and red oaks	341,586	137,887
Hickory	40,663	20,602
Hard maple	2,541	—
Sweetgum	240,626	89,001
Ash, walnut, and black cherry	39,017	11,347
Yellow-poplar	148,610	38,091
Tupelo and blackgum	154,616	66,868
Other eastern hardwoods	117,825	44,267
Total hardwoods	1,221,734	481,851
All species	3,529,223	1,842,345

Table 17.—Net annual growth and removals of growing stock on commercial forest land, by ownership classes, and by softwood and hardwood, South Carolina, 1977

Ownership class	Net annual growth			Annual timber removals		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
<i>Thousand cubic feet</i>						
National Forest	52,880	37,267	15,613	30,738	28,857	1,881
Other public	42,721	29,834	12,887	19,831	15,273	4,558
Forest industry	172,757	121,994	50,763	123,132	92,653	30,479
Farmer and misc. private	694,987	428,654	266,333	322,254	223,747	98,507
All ownerships	963,345	617,749	345,596	495,955	360,530	135,425

Table 19.—Net annual growth and removals of sawtimber on commercial forest land, by ownership classes, and by softwood and hardwood, South Carolina, 1977

Ownership class	Net annual growth			Annual timber removals		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	<i>Thousand board feet</i>					
National Forest	233,147	176,887	56,260	118,107	114,318	3,789
Other public	170,748	126,190	44,558	66,197	52,253	13,944
Forest industry	592,765	390,699	202,066	470,305	359,700	110,605
Farmer and misc. private	2,532,563	1,613,713	918,850	1,187,736	834,223	353,513
All ownerships	3,529,223	2,307,489	1,221,734	1,842,345	1,360,494	481,851



Table 20.—Mortality of growing stock and sawtimber on commercial forest land, by species, South Carolina, 1977

Species	Growing stock	Saw-timber
	<i>M cubic feet</i>	<i>M board feet</i>
<b>Softwood:</b>		
Yellow pines	68,149	192,830
Eastern white pine	—	—
Spruce and fir	—	—
Cypress	813	761
Other eastern softwoods	1,538	4,724
<b>Total softwoods</b>	<b>70,500</b>	<b>198,315</b>
<b>Hardwood:</b>		
Select white and red oaks	1,591	4,080
Other white and red oaks	13,439	36,531
Hickory	802	2,842
Yellow birch	—	—
Hard maple	—	—
Sweetgum	6,690	20,287
Ash, walnut, and black cherry	2,855	5,193
Yellow-poplar	1,778	4,231
Tupelo and blackgum	2,526	8,665
Bay and magnolia	131	—
Other eastern hardwoods	11,350	32,653
<b>Total hardwoods</b>	<b>41,162</b>	<b>114,482</b>
<b>All species</b>	<b>111,662</b>	<b>312,797</b>

Table 21.—Mortality of growing stock and sawtimber on commercial forest land, by ownership classes, and by softwood and hardwood, South Carolina, 1977

Ownership class	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	<i>Thousand cubic feet</i>			<i>Thousand board feet</i>		
National Forest	12,174	8,838	3,336	46,842	34,686	12,156
Other public	7,707	4,017	3,690	20,561	9,380	11,181
Forest industry	16,076	11,374	4,702	39,388	28,860	10,528
Farmer and misc. private	75,705	46,271	29,434	206,006	125,389	80,617
All ownerships	111,662	70,500	41,162	312,797	198,315	114,482

Table 22.—Mortality of growing stock and sawtimber on commercial forest land, by causes, and by softwood and hardwood, South Carolina, 1977

Cause of death	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	<i>Thousand cubic feet</i>			<i>Thousand board feet</i>		
Fire	4,444	3,005	1,439	7,217	4,834	2,383
Insects	20,594	20,176	418	76,287	74,304	1,983
Disease	12,409	10,948	1,461	37,056	31,454	5,602
Weather	9,677	5,402	4,275	33,771	19,976	13,795
Suppression	20,378	15,000	5,378	19,320	16,513	2,807
Animals	571	168	403	1,790	922	868
Undetermined	43,589	15,801	27,788	137,356	50,312	87,044
All causes	111,662	70,500	41,162	312,797	198,315	114,482

Table 23.—Output of timber products, by product, by source of material, and by softwood and hardwood, South Carolina, 1977

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
<b>Saw logs:</b>							
Softwood	M fbm <sup>1</sup>	814,793	131,975	783,245	126,865	31,548	5,110
Hardwood	M fbm <sup>1</sup>	221,958	33,714	221,958	33,714	—	—
Total	M fbm <sup>1</sup>	1,036,751	165,689	1,005,203	160,579	31,548	5,110
<b>Veneer logs and bolts:</b>							
Softwood	M fbm <sup>1</sup>	267,304	41,687	267,304	41,687	—	—
Hardwood	M fbm <sup>1</sup>	47,001	6,944	47,001	6,944	—	—
Total	M fbm <sup>1</sup>	314,305	48,631	314,305	48,631	—	—
<b>Pulpwood:<sup>2</sup></b>							
Softwood	Cords <sup>3</sup>	3,461,894	232,955	2,642,040	177,786	819,854	55,169
Hardwood	Cords <sup>3</sup>	959,456	63,400	805,412	53,221	154,044	10,179
Total	Cords <sup>3</sup>	4,421,350	296,355	3,447,452	231,007	973,898	65,348
<b>Cooperage logs and bolts:</b>							
Softwood	M fbm <sup>1</sup>	—	—	—	—	—	—
Hardwood	M fbm <sup>1</sup>	164	24	164	24	—	—
Total	M fbm <sup>1</sup>	164	24	164	24	—	—
<b>Poles and piling:</b>							
Softwood	M pieces	4,697	9,269	4,697	9,269	—	—
Hardwood	M pieces	—	—	—	—	—	—
Total	M pieces	4,697	9,269	4,697	9,269	—	—
<b>Posts (round and split):</b>							
Softwood	M pieces	20	14	20	14	—	—
Hardwood	M pieces	—	—	—	—	—	—
Total	M pieces	20	14	20	14	—	—
<b>Other:<sup>4</sup></b>							
Softwood	M ft <sup>3</sup>	13,027	13,027	57	57	12,970	12,970
Hardwood	M ft <sup>3</sup>	190	190	—	—	190	190
Total	M ft <sup>3</sup>	13,217	13,217	57	57	13,160	13,160
<b>Total industrial products:</b>							
Softwood		—	428,927	—	355,678	—	73,249
Hardwood		—	104,272	—	93,903	—	10,369
Total		—	533,199	—	449,581	—	83,618
<b>Fuelwood:<sup>5</sup></b>							
Softwood	Cords	42,250	2,843	37,940	2,553	4,310	290
Hardwood	Cords	427,668	28,260	420,919	27,814	6,749	446
Total	Cords	469,918	31,103	458,859	30,367	11,059	736
<b>All products:<sup>6</sup></b>							
Softwood		—	431,770	—	358,231	—	73,539
Hardwood		—	132,532	—	121,717	—	10,815
Total		—	564,302	—	479,948	—	84,354

<sup>1</sup> International ¼-inch rule.

<sup>2</sup> Roundwood figures include 51,301 thousand cubic feet of roundwood chipped at other primary wood-using plants.

<sup>3</sup> Rough wood basis (includes chips converted to equivalent standard cords).

<sup>4</sup> Includes particleboard, charcoal, and specialty products.

<sup>5</sup> Excludes approximately 23,179 thousand cubic feet of plant byproducts used for industrial fuel.

<sup>6</sup> Excludes 1,946 thousand cubic feet of plant byproducts used for litter and mulch.

Table 24.—Output of roundwood products, by product, by source, and by softwood and hardwood, South Carolina, 1977

Product and species group	All sources	Growing-stock trees <sup>1</sup>			Cull trees <sup>1</sup>	Salvable dead trees <sup>1</sup>	Other sources <sup>2</sup>
		Total	Sawtimber	Poletimber			
..... Thousand cubic feet .....							
Saw logs:							
Softwood	126,865	125,272	122,502	2,770	264	96	1,233
Hardwood	33,714	30,833	29,439	1,394	2,594	—	287
Total	160,579	156,105	151,941	4,164	2,858	96	1,520
Veneer logs and bolts:							
Softwood	41,687	41,009	41,009	—	—	—	678
Hardwood	6,944	5,986	5,986	—	895	—	63
Total	48,631	46,995	46,995	—	895	—	741
Pulpwood:							
Softwood	177,786	140,450	62,436	78,014	9,818	1,053	26,465
Hardwood	53,221	38,628	18,027	20,601	10,040	67	4,486
Total	231,007	179,078	80,463	98,615	19,858	1,120	30,951
Cooperage logs and bolts:							
Softwood	—	—	—	—	—	—	—
Hardwood	24	23	23	—	—	—	1
Total	24	23	23	—	—	—	1
Poles and piling:							
Softwood	9,269	8,992	8,992	—	—	—	277
Hardwood	—	—	—	—	—	—	—
Total	9,269	8,992	8,992	—	—	—	277
Posts (round and split):							
Softwood	14	7	2	5	3	—	4
Hardwood	—	—	—	—	—	—	—
Total	14	7	2	5	3	—	4
Other:							
Softwood	57	54	54	—	—	—	3
Hardwood	—	—	—	—	—	—	—
Total	57	54	54	—	—	—	3
Total industrial products:							
Softwood	355,678	315,784	234,995	80,789	10,085	1,149	28,660
Hardwood	93,903	75,470	53,475	21,995	13,529	67	4,837
Total	449,581	391,254	288,470	102,784	23,614	1,216	33,497
Fuelwood:							
Softwood	2,553	633	—	633	734	—	1,186
Hardwood	27,814	15,263	4,542	10,721	6,525	—	6,026
Total	30,367	15,896	4,542	11,354	7,259	—	7,212
All products:							
Softwood	358,231	316,417	234,995	81,422	10,819	1,149	29,846
Hardwood	121,717	90,733	58,017	32,716	20,054	67	10,863
Total	479,948	407,150	293,012	114,138	30,873	1,216	40,709

<sup>1</sup> On commercial forest land.

<sup>2</sup> Includes trees less than 5.0 inches in diameter, tree tops and limbs from commercial forest areas, or material from noncommercial forest land or nonforest land such as fence rows or suburban areas.

Table 25.—Annual timber removals from growing stock on commercial forest land, by items, and by softwood and hardwood, South Carolina, 1977

Item	All species	Softwood	Hardwood
. . . Thousand cubic feet . . .			
Roundwood products:			
Saw logs	156,105	125,272	30,833
Veneer logs and bolts	46,995	41,009	5,986
Pulpwood	179,078	140,450	38,628
Cooperage logs and bolts	23	—	23
Poles and piling	8,992	8,992	—
Posts	7	7	—
Other	54	54	—
Fuelwood	15,896	633	15,263
All products	407,150	316,417	90,733
Logging residues	48,472	25,318	23,154
Other removals	40,333	18,795	21,538
Total removals	495,955	360,530	135,425

Table 27.—Volume of unused residues at primary manufacturing plants, by industry and type of residue, and by softwood and hardwood, South Carolina, 1977

Species group and type of residues	All industries	Lumber	Veneer and plywood	Other
. . . Thousand cubic feet . . .				
Softwoods:				
Coarse <sup>1</sup>	305	305	—	—
Fine <sup>2</sup>	1,667	1,660	—	7
Total	1,972	1,965	—	7
Hardwoods:				
Coarse <sup>1</sup>	103	103	—	—
Fine <sup>2</sup>	2,236	2,118	118	—
Total	2,339	2,221	118	—
All species:				
Coarse <sup>1</sup>	408	408	—	—
Fine <sup>2</sup>	3,903	3,778	118	7
Total	4,311	4,186	118	7

<sup>1</sup>Material such as slabs, edgings, and veneer cores.  
<sup>2</sup>Material such as sawdust, shavings, and veneer clippings.

Table 26.—Annual timber removals from live sawtimber on commercial forest land, by items, and by softwood and hardwood, South Carolina, 1977

Item	All species	Softwood	Hardwood
. . . Thousand board feet . . .			
Roundwood products:			
Saw logs	945,116	733,528	211,588
Veneer logs and bolts	302,144	257,192	44,952
Pulpwood	301,018	224,313	76,705
Cooperage logs and bolts	173	—	173
Poles and piling	51,167	51,167	—
Posts	7	7	—
Other	324	324	—
Fuelwood	22,804	—	22,804
All products	1,622,753	1,266,531	356,222
Logging residues	101,422	48,796	52,626
Other removals	118,170	45,167	73,003
Total removals	1,842,345	1,360,494	481,851

Table 28.—Projection of net annual growth, available cut, and inventory of sawtimber and growing stock on commercial forest land by softwood and hardwood, South Carolina, 1977 to 2007<sup>1</sup>

Species group	1977	Projected to:		
		1987	1997	2007
GROWING STOCK (in thousand cubic feet)				
Softwood:				
Cut	360,530	510,500	591,100	624,700
Growth	617,745	682,400	676,200	624,700
Inventory <sup>2</sup>	8,927,116	10,921,800	11,845,300	11,755,800
Hardwood:				
Cut	135,425	289,900	411,400	484,300
Growth	345,596	418,600	468,400	484,300
Inventory <sup>2</sup>	8,253,259	9,777,300	10,384,600	10,176,800
Total:				
Cut	495,955	800,400	1,002,500	1,109,000
Growth	963,345	1,101,000	1,144,600	1,109,000
Inventory <sup>2</sup>	17,180,375	20,699,100	22,229,900	21,932,600
SAWTIMBER (in thousand board feet)				
Softwood:				
Cut	1,360,494	1,989,400	2,447,700	2,989,400
Growth	2,307,489	2,852,600	3,081,500	2,989,400
Inventory <sup>2</sup>	31,318,816	40,125,300	46,421,300	48,862,900
Hardwood:				
Cut	481,851	1,024,400	1,390,700	1,251,700
Growth	1,221,734	1,276,500	1,311,900	1,251,700
Inventory <sup>2</sup>	24,249,243	28,235,300	28,060,900	24,939,600
Total:				
Cut	1,842,345	3,013,800	3,838,400	4,241,100
Growth	3,529,223	4,129,100	4,393,400	4,241,100
Inventory <sup>2</sup>	55,568,059	68,360,600	74,482,200	73,802,500

<sup>1</sup>Assumptions:  
1. Area of commercial forest land will decline by about 950,000 acres.  
2. The rapid rate of decrease in number of 2-inch softwood trees between 1968 and 1978 will gradually level off and there will be little further increase in number of 2-inch hardwood trees.  
3. Cut starting at the 1977 level will gradually increase and come into balance with growth by 2007.  
<sup>2</sup>Inventory as of January 1 of the following year.

Table 29.—Basal area per acre of growing stock and rough and rotten trees 5.0 inches d.b.h. and larger, by forest type and survey unit, South Carolina, 1978

Forest type	State	Survey unit		
		Southern Coastal Plain	Northern Coastal Plain	Piedmont
. . . . . <i>Square feet</i> . . . . .				
White pine-hemlock:				
Growing stock	18.8	—	—	18.8
Rough and rotten trees	3.8	—	—	3.8
All trees	22.6	—	—	22.6
Longleaf-slash pine:				
Growing stock	51.8	57.4	45.6	105.0
Rough and rotten trees	3.0	3.0	3.0	7.5
All trees	54.8	60.4	48.6	112.5
Loblolly- shortleaf pine:				
Growing stock	63.6	60.5	62.5	66.5
Rough and rotten trees	4.8	4.5	4.6	5.2
All trees	68.4	65.0	67.1	71.7
Oak-pine:				
Growing stock	48.2	44.6	48.2	51.4
Rough and rotten trees	8.5	8.5	8.1	9.1
All trees	56.7	53.1	56.3	60.5
Oak-hickory:				
Growing stock	44.5	32.2	40.1	56.9
Rough and rotten trees	11.6	11.8	11.1	12.0
All trees	56.1	44.0	51.2	68.9
Oak-gum-cypress:				
Growing stock	82.8	81.4	83.6	—
Rough and rotten trees	26.0	22.7	28.0	—
All trees	108.8	104.1	111.6	—
Elm-ash-cottonwood:				
Growing stock	72.2	93.3	66.1	71.8
Rough and rotten trees	23.4	24.4	25.6	19.6
All trees	95.6	117.7	91.7	91.4
All types:				
Growing stock	60.0	58.8	59.9	61.3
Rough and rotten trees	11.0	11.0	12.3	8.4
All trees	71.0	69.8	72.2	69.7

Table 30.—Number of growing stock and rough and rotten trees 1.0-4.9 inches d.b.h. per acre, by forest type and survey unit, South Carolina, 1977

Forest type	State	Survey unit		
		Southern Coastal Plain	Northern Coastal Plain	Piedmont
. . . . . <i>Number of trees</i> . . . . .				
White pine-hemlock:				
Growing stock	100.0	—	—	100.0
Rough and rotten trees	33.0	—	—	33.0
All trees	133.0	—	—	133.0
Longleaf-slash pine:				
Growing stock	223.0	235.0	210.0	200.0
Rough and rotten trees	183.0	172.0	196.0	.0
All trees	406.0	407.0	406.0	200.0
Loblolly- shortleaf pine:				
Growing stock	378.0	299.0	347.0	458.0
Rough and rotten trees	229.0	179.0	237.0	245.0
All trees	607.0	478.0	584.0	703.0
Oak-pine:				
Growing stock	308.0	273.0	282.0	383.0
Rough and rotten trees	388.0	383.0	407.0	360.0
All trees	696.0	656.0	689.0	743.0
Oak-hickory:				
Growing stock	224.0	184.0	238.0	232.0
Rough and rotten trees	407.0	454.0	419.0	364.0
All trees	631.0	638.0	657.0	596.0
Oak-gum-cypress:				
Growing stock	273.0	259.0	281.0	—
Rough and rotten trees	406.0	408.0	492.0	—
All trees	733.0	667.0	773.0	—
Elm-ash-cottonwood:				
Growing stock	118.0	129.0	130.0	93.0
Rough and rotten trees	323.0	286.0	353.0	293.0
All trees	441.0	415.0	483.0	386.0
All types:				
Growing stock	296.0	252.0	284.0	364.0
Rough and rotten trees	330.0	313.0	355.0	300.0
All trees	626.0	565.0	639.0	664.0

Table 31.—Area of commercial forest land, by stand volume (board feet) and ownership classes, by physiographic classes, South Carolina, 1978

Ownership class and stand volume per acre <sup>1</sup> (board feet)	All classes	Physiographic class								
		Deep swamps	Broad stream margins	Narrow stream margins	Mountain tops and slopes	Flatwoods and dry pocosins	Bays and wet pocosins	Rolling uplands	Sandhills	Other misc. classes
..... Acres .....										
<b>National Forest:</b>										
Less than 1,500	99,696	—	—	—	—	34,753	2,482	62,461	—	—
1,500 to 5,000	125,694	—	—	11,657	27,796	42,695	15,058	28,488	—	—
More than 5,000	353,334	15,557	3,010	49,753	27,797	75,793	27,470	151,471	—	2,483
<b>All classes</b>	<b>578,724</b>	<b>15,557</b>	<b>3,010</b>	<b>61,410</b>	<b>55,593</b>	<b>153,241</b>	<b>45,010</b>	<b>242,420</b>	<b>—</b>	<b>2,483</b>
<b>Other public:</b>										
Less than 1,500	197,489	2,920	2,055	6,098	—	38,242	4,523	38,546	101,811	3,294
1,500 to 5,000	148,853	2,920	—	8,536	—	50,729	5,413	32,230	41,803	7,222
More than 5,000	165,761	2,796	9,755	25,556	2,580	47,479	1,461	43,307	26,136	6,691
<b>All classes</b>	<b>512,103</b>	<b>8,636</b>	<b>11,810</b>	<b>40,190</b>	<b>2,580</b>	<b>136,450</b>	<b>11,397</b>	<b>114,083</b>	<b>169,750</b>	<b>17,207</b>
<b>Forest industry:</b>										
Less than 1,500	1,108,896	4,314	10,689	19,956	—	486,935	60,820	400,192	116,181	9,809
1,500 to 5,000	473,107	26,442	20,859	39,845	—	214,118	44,344	99,994	20,670	6,835
More than 5,000	660,577	123,981	70,124	72,054	—	244,254	27,602	106,890	—	15,672
<b>All classes</b>	<b>2,242,580</b>	<b>154,737</b>	<b>101,672</b>	<b>131,855</b>	<b>—</b>	<b>945,307</b>	<b>132,766</b>	<b>607,076</b>	<b>136,851</b>	<b>32,316</b>
<b>Farmer and misc. private:</b>										
Less than 1,500	3,208,556	15,973	24,563	162,342	40,696	813,245	91,656	1,457,074	549,561	53,446
1,500 to 5,000	3,037,370	41,155	67,577	325,150	43,668	845,042	64,621	1,402,985	198,699	48,473
More than 5,000	2,923,573	164,744	154,281	498,191	37,621	996,458	96,556	868,375	47,738	59,609
<b>All classes</b>	<b>9,169,499</b>	<b>221,872</b>	<b>246,421</b>	<b>985,683</b>	<b>121,985</b>	<b>2,654,745</b>	<b>252,833</b>	<b>3,728,434</b>	<b>795,998</b>	<b>161,528</b>
<b>All ownerships:</b>										
Less than 1,500	4,614,637	23,207	37,307	188,396	40,696	1,373,175	159,481	1,958,273	767,553	66,549
1,500 to 5,000	3,785,024	70,517	88,436	385,188	71,464	1,152,584	129,436	1,563,697	261,172	62,530
More than 5,000	4,103,245	307,078	237,170	645,554	67,998	1,363,984	153,089	1,170,043	73,874	84,455
<b>All classes</b>	<b>12,502,906</b>	<b>400,802</b>	<b>362,913</b>	<b>1,219,138</b>	<b>180,158</b>	<b>3,889,743</b>	<b>442,006</b>	<b>4,692,013</b>	<b>1,102,599</b>	<b>213,534</b>

<sup>1</sup>International ¼-inch rule.

Table 32.—Area of commercial forest land, by stand volume (cubic feet) and ownership classes, by physiographic classes, South Carolina, 1978

Ownership class and stand volume per acre <sup>1</sup> (cubic feet)	All classes	Physiographic class								
		Deep swamps	Broad stream margins	Narrow stream margins	Mountain tops and slopes	Flatwoods and dry pocosins	Bays and wet pocosins	Rolling uplands	Sandhills	Other misc. classes
.....Acres.....										
<b>National Forest:</b>										
Less than 500	69,366	—	—	—	—	29,788	2,482	37,096	—	—
500 to 1,000	62,984	—	—	—	13,897	22,506	5,130	21,451	—	—
More than 1,000	446,374	15,557	3,010	61,410	41,696	100,947	37,398	183,873	—	2,483
All classes	578,724	15,557	3,010	61,410	55,593	153,241	45,010	242,420	—	2,483
<b>Other public:</b>										
Less than 500	183,225	1,460	1,285	6,098	—	37,289	1,907	32,845	95,835	6,506
500 to 1,000	77,394	2,920	—	—	—	18,429	5,232	13,617	37,196	—
More than 1,000	251,484	4,256	10,525	34,092	2,580	80,732	4,258	67,621	36,719	10,701
All classes	512,103	8,636	11,810	40,190	2,580	136,450	11,397	114,083	169,750	17,207
<b>Forest industry:</b>										
Less than 500	875,316	4,314	4,985	17,177	—	391,264	40,939	313,358	94,260	9,019
500 to 1,000	340,560	13,387	11,042	14,897	—	148,435	36,143	83,585	32,281	790
More than 1,000	1,026,704	137,036	85,645	99,781	—	405,608	55,684	210,133	10,310	22,507
All classes	2,242,580	154,737	101,672	131,855	—	945,307	132,766	607,076	136,851	32,316
<b>Farmer and misc. private:</b>										
Less than 500	2,176,460	15,781	19,364	71,406	13,429	609,982	77,755	807,087	522,225	39,431
500 to 1,000	1,800,395	13,243	22,290	203,240	31,955	511,865	39,974	794,131	159,304	24,393
More than 1,000	5,192,644	192,848	204,767	711,037	76,601	1,532,898	135,104	2,127,216	114,469	97,704
All classes	9,169,499	221,872	246,421	985,683	121,985	2,654,745	252,833	3,728,434	795,998	161,528
<b>All ownerships:</b>										
Less than 500	3,304,367	21,555	25,634	94,681	13,429	1,068,323	123,083	1,190,386	712,320	54,956
500 to 1,000	2,281,333	29,550	33,332	218,137	45,852	701,235	86,479	912,784	228,781	25,183
More than 1,000	6,917,206	349,697	303,947	906,320	120,877	2,120,185	232,444	2,588,843	161,498	133,395
All classes	12,502,906	400,802	362,913	1,219,138	180,158	3,889,743	442,006	4,692,013	1,102,599	213,534

<sup>1</sup>Growing-stock volume.

Table 33.—Average net volume and growth per acre on commercial forest land, by physiographic class, tree class, and species group, South Carolina, 1978

Physiographic class and tree class	Net volume per acre						Net growth per acre					
	Softwood		Hardwood		Total		Softwood		Hardwood		Total	
	<i>Cubic feet</i>	<i>Board feet</i>										
<b>Deep swamps:</b>												
Growing stock	558.8	2,463	2,460.3	8,447	3,019.1	10,911	13.7	72	72.7	317	86.4	390
Rough and rotten trees	33.7	—	695.7	—	729.4	—	.4	—	12.8	—	13.2	—
Total	592.5	2,463	3,156.0	8,447	3,748.5	10,911	14.1	72	85.5	317	99.6	390
<b>Broad stream margins:</b>												
Growing stock	257.2	1,214	2,215.1	8,452	2,472.3	9,666	6.9	37	68.6	326	75.5	362
Rough and rotten trees	15.5	—	419.8	—	435.3	—	.9	—	8.3	—	9.2	—
Total	272.7	1,214	2,634.9	8,452	2,907.6	9,666	7.8	37	76.9	326	84.7	362
<b>Narrow stream margins:</b>												
Growing stock	285.6	1,329	1,621.9	5,307	1,907.5	6,636	11.9	59	59.2	248	71.1	307
Rough and rotten trees	7.4	—	375.0	—	382.4	—	.4	—	11.7	—	12.1	—
Total	293.0	1,329	1,996.9	5,307	2,289.9	6,636	12.3	59	70.9	248	83.2	307
<b>Mountain tops and slopes:</b>												
Growing stock	459.1	1,663	888.6	2,503	1,347.7	4,167	28.0	83	38.7	130	66.7	213
Rough and rotten trees	28.0	—	259.5	—	287.5	—	2.5	—	13.2	—	15.7	—
Total	487.1	1,663	1,148.1	2,503	1,635.2	4,167	30.5	83	51.9	130	82.4	213
<b>Flatwoods &amp; dry pocosins:</b>												
Growing stock	903.6	3,468	413.9	1,102	1,317.5	4,570	61.9	253	20.4	62	82.3	315
Rough and rotten trees	20.5	—	97.5	—	118.0	—	1.8	—	2.7	—	4.5	—
Total	924.1	3,468	511.4	1,102	1,435.5	4,570	63.7	253	23.1	62	86.8	315
<b>Bays and wet pocosins:</b>												
Growing stock	595.5	2,381	710.4	1,986	1,305.9	4,367	31.4	148	25.9	93	57.3	241
Rough and rotten trees	15.5	—	206.0	—	221.5	—	1.1	—	4.2	—	5.3	—
Total	611.0	2,381	916.4	1,986	1,527.4	4,367	32.5	148	30.1	93	62.6	241
<b>Rolling uplands:</b>												
Growing stock	816.6	2,479	451.2	1,063	1,267.8	3,542	61.4	211	23.1	70	84.5	281
Rough and rotten trees	22.7	—	86.2	—	108.9	—	1.6	—	5.2	—	6.8	—
Total	839.3	2,479	537.4	1,063	1,376.7	3,542	63.0	211	28.3	70	91.3	281
<b>Sandhills:</b>												
Growing stock	427.0	1,294	45.8	89	472.8	1,383	39.6	110	2.6	6	42.2	116
Rough and rotten trees	15.1	—	58.2	—	73.3	—	1.8	—	2.3	—	4.1	—
Total	442.1	1,294	104.0	89	546.1	1,383	41.4	110	4.9	6	46.3	116
<b>Other misc. classes:</b>												
Growing stock	497.0	1,863	1,030.1	2,694	1,527.1	4,557	20.6	92	45.0	150	65.6	242
Rough and rotten trees	15.0	—	222.2	—	237.2	—	.7	—	7.1	—	7.8	—
Total	512.0	1,863	1,252.3	2,694	1,764.3	4,557	21.3	92	52.1	150	73.4	242
<b>All classes:</b>												
Growing stock	714.0	2,505	660.1	1,939	1,374.1	4,444	49.4	185	27.6	98	77.0	282
Rough and rotten trees	19.7	—	153.9	—	173.6	—	1.5	—	5.2	—	6.7	—
Total	733.7	2,505	814.0	1,939	1,547.7	4,444	50.9	185	32.8	98	83.7	282

Table 34.—Land area, by class, major forest type, and survey completion date, 1958, 1968, and 1978, South Carolina

Land use class	Survey completion date			Change 1968-1978
	1958	1968 <sup>1</sup>	1978	
..... Acres .....				
Forest land:				
Commercial forest land:				
Pine and oak-pine types	6,683,600	7,303,720	7,289,464	-14,256
Hardwood types	5,251,300	5,122,864	5,213,442	+90,578
Total	11,934,900	12,426,584	12,502,906	+76,322
Noncommercial forest land:				
Productive-reserved	73,900	70,500	72,399	+1,899
Unproductive	7,000	12,655	3,893	-8,762
Total	80,900	83,155	76,292	-6,863
Nonforest land:				
Cropland	5,259,000	4,032,137	3,606,957	-425,180
Pasture and range	743,500	1,029,342	1,006,997	-22,345
Other	1,203,700	1,616,980	1,926,247	+309,267
Total	7,206,200	6,678,459	6,540,201	-138,258
All land <sup>2</sup>	19,222,000	19,188,198	19,119,399	-68,799

<sup>1</sup> These figures differ slightly from reported figures because of revisions in the estimates of land area.

<sup>2</sup> Excludes all water areas.

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Table 35.—Volume<sup>1</sup> of sawtimber, growing stock, and all live timber on commercial forest land, by species group, diameter class, and survey completion date, South Carolina

Species group	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)											
Soft-wood	1958	18,214,376	—	—	3,532,893	3,925,759	3,358,254	2,822,328	1,904,753	1,110,288	1,560,101
	1968	22,943,680	—	—	4,094,647	4,865,673	4,507,888	3,533,950	2,326,512	1,536,213	2,078,797
	1978	31,318,816	—	—	5,756,656	6,642,708	6,110,002	4,902,484	3,259,243	1,917,397	2,730,326
Hard-wood	1958	16,856,942	—	—	—	2,940,992	3,235,270	2,917,276	2,320,395	1,751,623	3,691,386
	1968	18,920,016	—	—	—	3,242,024	3,529,884	3,259,744	2,704,859	1,923,838	4,259,667
	1978	24,249,243	—	—	—	4,097,801	4,418,146	4,174,756	3,344,874	2,484,670	5,728,996
GROWING STOCK (in thousand cubic feet)											
Soft-wood	1958	5,399,243	692,169	913,354	983,934	880,768	665,794	513,884	326,625	182,107	240,608
	1968	6,731,827	906,580	1,083,661	1,140,546	1,091,896	893,878	643,418	398,903	252,205	320,740
	1978	8,927,116	951,171	1,481,028	1,603,956	1,491,792	1,211,871	892,310	558,773	314,874	421,341
Hard-wood	1958	5,787,602	537,237	682,299	816,285	872,061	803,982	642,691	469,776	332,843	630,428
	1968	6,616,307	643,706	847,716	926,523	961,513	877,264	718,547	547,560	365,655	727,823
	1978	8,253,259	766,239	989,887	1,135,003	1,214,360	1,098,179	920,573	677,255	472,429	979,334
ALL LIVE TIMBER (in thousand cubic feet)											
Soft-wood	1958	5,554,358	737,211	955,364	1,012,894	895,159	672,635	518,647	327,992	184,241	250,215
	1968	6,925,443	966,680	1,133,616	1,174,146	1,109,749	902,983	649,217	400,462	255,223	333,367
	1978	9,173,318	1,014,984	1,549,216	1,651,594	1,516,194	1,224,052	900,304	560,897	318,420	437,657
Hard-wood	1958	7,148,396	817,178	909,354	1,024,962	1,049,442	933,398	722,321	533,915	381,646	776,180
	1968	8,189,515	979,175	1,129,193	1,161,982	1,156,999	1,017,252	807,798	622,371	418,925	895,820
	1978	10,177,852	1,164,494	1,317,547	1,420,941	1,456,982	1,270,863	1,033,313	768,475	540,592	1,204,645

<sup>1</sup> 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.

Table 36.—Volume of all live timber, by species group and Survey Unit, South Carolina, 1958, 1968, and 1978

Species group and Survey Unit	1958	1968	Change 1958-1968	1978	Change 1968-1978
	<i>Thousand cubic feet</i>	<i>Thousand cubic feet</i>	<i>Percent</i>	<i>Thousand cubic feet</i>	<i>Percent</i>
<b>Softwood:</b>					
Southern Coastal Plain	1,263,709	1,652,277	+30.7	2,355,147	+42.5
Northern Coastal Plain	2,327,740	2,883,478	+23.9	3,354,537	+16.3
Piedmont	1,962,909	2,389,688	+21.7	3,463,634	+44.9
All units	5,554,358	6,925,443	+24.7	9,173,318	+32.5
<b>Hardwood:</b>					
Southern Coastal Plain	2,063,804	2,292,263	+11.1	2,745,246	+19.8
Northern Coastal Plain	3,139,267	3,575,333	+13.9	4,277,334	+19.6
Piedmont	1,945,325	2,321,919	+19.4	3,155,272	+35.9
All units	7,148,396	8,189,515	+14.6	10,177,852	+24.3

Table 37.—Land area and total forest, by county, South Carolina, 1978

County	All land <sup>1</sup>	Total forest <sup>2</sup>		County	All land <sup>1</sup>	Total forest <sup>2</sup>	
	<i>Acres</i>	<i>Acres</i>	<i>Percent</i>		<i>Acres</i>	<i>Acres</i>	<i>Percent</i>
Abbeville	325,249	220,533	67.8	Hampton	359,680	245,589	68.3
Aiken	695,680	489,774	70.4	Horry	738,560	490,332	66.4
Allendale	267,520	158,504	59.2	Jasper	417,280	313,206	75.1
Anderson	477,332	208,201	43.6	Kershaw	499,840	395,135	79.1
Barnberg	252,800	148,795	58.9	Lancaster	322,050	235,933	73.3
Barnwell	353,920	226,357	64.0	Laurens	456,691	305,701	66.9
Beaufort	370,560	142,161	38.4	Lee	261,760	120,377	46.0
Berkeley	710,400	578,703	81.5	Lexington	458,880	267,942	58.4
Calhoun	241,280	130,243	54.0	McCormick	244,090	207,036	84.8
Charleston	600,960	310,989	51.7	Marion	311,680	215,743	69.2
Cherokee	252,781	155,752	61.6	Marlboro	309,120	172,181	55.7
Chester	374,532	290,814	77.6	Newberry	407,824	315,829	77.4
Chesterfield	505,600	339,177	67.1	Oconee	399,670	284,580	71.2
Clarendon	383,360	218,177	56.9	Orangeburg	707,840	369,503	52.2
Colleton	671,360	476,667	71.0	Pickens	320,775	214,980	67.0
Darlington	347,520	169,683	48.8	Richland	478,720	328,485	68.6
Dillon	260,480	144,979	55.7	Saluda	286,161	187,758	65.6
Dorchester	364,160	271,644	74.6	Spartanburg	531,182	271,268	51.5
Edgefield	308,297	234,637	76.1	Sumter	430,080	233,756	54.4
Fairfield	442,192	386,015	87.3	Union	329,600	272,386	82.6
Florence	515,200	287,280	55.8	Williamsburg	598,400	388,860	65.0
Georgetown	519,680	378,174	72.8	York	440,887	269,252	61.1
Greenville	508,208	299,821	59.0				
Greenwood	289,866	206,286	71.1	Total	19,349,707	12,579,198	65.0

<sup>1</sup>Excludes inland water.

<sup>2</sup>Includes both commercial and noncommercial forest.

Table 38.—Commercial forest land, by county and ownership, South Carolina, 1978

County	All ownerships	National Forest	Other public	Forest industry	Other private
.....Acres.....					
Abbeville	219,883	18,437	1,328	56,392	143,726
Aiken	488,900	6,021	64,032	46,825	372,022
Allendale	158,504	—	3,977	48,112	106,415
Anderson	208,201	—	13,404	7,260	187,537
Bamberg	148,440	—	140	20,529	127,771
Barnwell	226,228	—	110,036	20,610	95,582
Beaufort	140,531	—	6,445	9,478	124,608
Berkeley	577,407	183,687	22,179	154,798	216,743
Calhoun	130,243	—	1,629	5,009	123,605
Charleston	304,245	50,310	6,600	66,519	180,816
Cherokee	154,802	—	88	11,668	143,046
Chester	290,619	11,082	957	47,818	230,762
Chesterfield	337,976	—	90,199	22,194	225,583
Clarendon	217,210	—	6,994	43,153	167,063
Colleton	476,667	—	2,137	115,554	358,976
Darlington	169,683	—	1,890	12,710	155,083
Dillon	144,331	—	138	24,231	119,962
Dorchester	271,334	—	1,764	82,160	187,410
Edgefield	234,637	29,462	235	50,711	154,229
Fairfield	386,015	12,748	3,060	83,194	287,013
Florence	287,280	—	1,210	49,381	236,689
Georgetown	374,248	—	880	221,997	151,371
Greenville	278,448	—	2,580	6,895	268,973
Greenwood	205,672	7,896	2,089	30,949	164,738
Hampton	245,589	—	5,453	58,755	181,381
Horry	489,560	—	1,520	139,297	348,743
Jasper	299,706	—	139	100,059	199,508
Kershaw	394,680	—	2,529	69,936	322,215
Lancaster	235,604	—	512	28,905	206,187
Laurens	305,701	19,663	2,067	56,331	227,640
Lee	118,996	—	1,265	15,519	102,212
Lexington	267,942	—	599	2,511	264,832
McCormick	206,778	50,782	27,919	41,883	86,194
Marion	215,743	—	228	94,083	121,432
Marlboro	172,181	—	127	45,110	126,944
Newberry	315,829	55,231	599	54,836	205,163
Oconee	280,294	74,125	10,498	919	194,752
Orangeburg	369,300	—	7,819	36,599	324,882
Pickens	209,464	—	10,688	1,638	197,138
Richland	327,160	—	48,629	29,079	249,452
Saluda	187,758	2,531	196	29,160	155,871
Spartanburg	271,227	—	8,196	19,543	243,488
Sumter	231,926	—	33,316	23,901	174,709
Union	272,352	56,749	173	48,227	167,203
Williamsburg	388,860	—	168	88,094	300,598
York	264,752	—	5,472	20,048	239,232
<b>Total</b>	<b>12,502,906</b>	<b>578,724</b>	<b>512,103</b>	<b>2,242,580</b>	<b>9,169,499</b>

Table 39.—Commercial forest land, by county and broad forest type, South Carolina, 1978

County	All types	Planted pine	Natural pine	Oak-pine	Upland hardwood	Lowland hardwood
	.....Acres.....					
Abbeville	219,883	23,562	60,163	59,758	66,095	10,305
Aiken	488,900	109,270	150,497	64,678	107,616	56,839
Allendale	158,504	47,448	38,575	7,710	26,562	38,209
Anderson	208,201	22,780	45,978	42,948	81,297	15,198
Bamberg	148,440	23,422	28,455	18,254	29,432	48,877
Barnwell	226,228	73,350	40,663	30,665	36,120	45,430
Beaufort	140,531	9,094	41,650	24,303	28,901	36,583
Berkeley	577,407	60,221	246,272	69,621	60,463	140,830
Calhoun	130,243	23,690	37,864	12,344	27,774	28,571
Charleston	304,245	20,634	128,450	45,510	71,698	37,953
Cherokee	154,802	15,871	52,439	23,762	62,730	—
Chester	290,619	44,656	147,259	34,720	55,235	8,749
Chesterfield	337,976	66,702	86,764	53,867	88,721	41,922
Clarendon	217,210	7,780	56,992	17,172	54,173	81,093
Colleton	476,667	68,386	147,449	46,756	56,760	157,316
Darlington	169,683	16,065	28,485	31,821	63,508	29,804
Dillon	144,331	5,245	25,663	18,283	41,396	53,744
Dorchester	271,334	16,855	60,561	53,326	42,222	98,370
Edgefield	234,637	24,124	96,730	27,429	83,899	2,455
Fairfield	386,015	22,812	257,246	46,896	50,951	8,110
Florence	287,280	2,545	114,984	46,403	35,329	88,019
Georgetown	374,248	34,991	119,160	61,861	38,624	119,612
Greenville	278,448	21,024	53,485	26,278	177,661	—
Greenwood	205,672	29,241	89,015	41,936	32,899	12,581
Hampton	245,589	38,572	58,239	18,573	24,636	105,569
Horry	489,560	24,111	193,917	53,796	49,464	168,272
Jasper	299,706	58,994	85,830	20,913	28,136	105,833
Kershaw	394,680	91,600	119,737	53,384	81,770	48,189
Lancaster	235,604	25,626	62,619	41,398	105,961	—
Laurens	305,701	33,924	121,773	40,093	100,418	9,493
Lee	118,996	7,177	41,272	16,772	22,670	31,105
Lexington	267,942	19,377	96,485	45,215	87,202	19,663
McCormick	206,778	3,799	130,052	24,393	42,892	5,642
Marion	215,743	10,042	42,338	37,430	40,169	85,764
Marlboro	172,181	33,790	12,571	8,585	62,489	54,746
Newberry	315,829	28,650	185,046	32,619	48,679	20,835
Oconee	280,294	9,162	95,835	65,593	109,704	—
Orangeburg	369,300	23,968	59,995	57,990	83,717	143,630
Pickens	209,464	13,113	41,950	34,969	119,432	—
Richland	327,160	19,094	119,813	49,916	59,455	78,882
Saluda	187,758	18,880	99,190	22,901	46,787	—
Spartanburg	271,227	13,216	114,680	54,271	79,903	9,157
Sumter	231,926	19,807	55,177	24,918	56,795	75,229
Union	272,352	33,825	89,159	27,209	104,965	17,194
Williamsburg	388,860	23,357	121,622	54,878	69,396	119,607
York	264,752	21,665	107,304	26,427	100,548	8,808
<b>Total</b>	<b>12,502,906</b>	<b>1,361,517</b>	<b>4,209,403</b>	<b>1,718,544</b>	<b>2,945,254</b>	<b>2,268,188</b>

Table 40.—Volume of all live timber 5.0 inches and larger, by county and species group, South Carolina, 1978

County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
<i>..... Thousand cubic feet .....</i>					
Abbeville	277,589	100,136	5,283	83,461	88,709
Aiken	462,939	256,837	3,114	117,950	85,038
Allendale	266,987	130,910	10,629	65,461	59,987
Anderson	324,940	129,304	2,173	64,755	128,708
Bamberg	245,056	101,873	17,867	80,106	45,210
Barnwell	298,657	137,550	10,288	101,934	48,885
Beaufort	289,058	128,605	1,121	85,339	73,993
Berkeley	953,368	494,380	34,226	242,651	182,111
Calhoun	227,314	106,054	2,499	82,483	36,278
Charleston	609,138	331,856	27,301	138,055	111,926
Cherokee	180,765	81,501	968	25,536	72,760
Chester	311,585	180,561	4,679	54,878	71,467
Chesterfield	346,795	151,706	327	124,996	69,766
Clarendon	444,452	112,891	34,009	189,596	107,956
Colleton	817,417	367,802	28,016	252,422	169,177
Darlington	253,196	88,519	11,717	88,163	64,797
Dillon	248,473	59,731	9,789	128,755	50,198
Dorchester	542,958	184,748	38,969	177,369	141,872
Edgefield	437,122	301,783	1,300	76,944	57,095
Fairfield	455,120	310,267	5,073	70,560	69,220
Florence	574,801	258,892	30,806	179,018	106,085
Georgetown	587,515	253,616	24,102	204,684	105,113
Greenville	450,971	136,933	1,954	113,495	198,589
Greenwood	369,275	242,362	1,182	63,799	61,932
Hampton	514,255	164,115	30,123	174,483	145,534
Horry	936,907	321,816	53,972	410,954	150,165
Jasper	481,886	190,413	36,073	128,846	126,554
Kershaw	393,056	224,919	3,707	101,850	62,580
Lancaster	266,261	117,620	4,752	60,132	83,757
Laurens	430,011	201,483	5,549	109,348	113,631
Lee	158,500	57,540	314	66,927	33,719
Lexington	320,098	188,826	1,734	58,503	71,035
McCormick	334,463	224,539	3,296	51,774	54,854
Marion	516,931	117,242	32,299	268,273	99,117
Marlboro	218,766	44,179	9,576	121,522	43,489
Newberry	595,678	402,361	8,831	96,198	88,288
Oconee	401,449	173,775	23,867	39,369	164,438
Orangeburg	633,768	183,311	33,670	261,907	154,880
Pickens	301,528	65,432	6,269	64,483	165,344
Richland	459,138	176,611	8,500	169,029	104,998
Saluda	324,522	227,403	437	35,291	61,391
Spartanburg	402,050	182,620	2,553	75,701	141,176
Sumter	372,903	119,464	12,650	170,888	69,901
Union	416,590	169,522	2,419	107,883	136,766
Williamsburg	557,932	232,707	15,173	145,819	164,233
York	338,987	130,616	4,831	89,192	114,348
<b>Total</b>	<b>19,351,170</b>	<b>8,565,331</b>	<b>607,987</b>	<b>5,620,782</b>	<b>4,557,070</b>

Table 41.—Volume of growing stock, by county and species group, South Carolina, 1978

County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
..... <i>Thousand cubic feet</i> .....					
Abbeville	257,180	97,983	5,283	75,864	78,050
Aiken	412,087	252,355	3,114	98,209	58,409
Allendale	248,762	127,794	10,417	57,954	52,597
Anderson	307,461	127,964	2,173	59,229	118,095
Bamberg	218,776	96,358	17,112	68,215	37,091
Barnwell	274,695	134,917	10,288	85,672	43,818
Beaufort	228,677	121,992	1,121	67,475	38,089
Berkeley	854,590	486,448	33,635	188,538	145,969
Calhoun	202,718	104,399	2,499	66,806	29,014
Charleston	549,600	326,790	26,908	117,694	78,208
Cherokee	158,699	77,652	659	19,937	60,451
Chester	293,323	178,026	4,544	48,852	61,901
Chesterfield	295,708	148,310	204	100,016	47,178
Clarendon	394,458	109,696	32,578	159,109	93,075
Colleton	731,037	356,163	26,606	204,373	143,895
Darlington	215,025	86,413	10,962	68,222	49,428
Dillon	220,365	59,219	8,168	110,055	42,923
Dorchester	463,973	180,130	37,834	137,363	108,646
Edgefield	399,078	292,359	906	60,151	45,662
Fairfield	415,502	300,493	4,420	58,489	52,100
Florence	502,981	254,672	24,770	139,864	83,675
Georgetown	528,175	250,583	23,302	173,253	81,037
Greenville	386,597	132,725	1,954	89,732	162,186
Greenwood	345,712	239,568	1,031	57,530	47,583
Hampton	482,891	161,868	29,986	156,235	134,802
Horry	796,755	314,808	49,768	314,727	117,452
Jasper	424,890	187,269	33,960	100,120	103,541
Kershaw	345,372	212,803	3,521	80,511	48,537
Lancaster	237,948	113,089	4,252	51,712	68,895
Laurens	400,295	200,243	5,307	94,623	100,122
Lee	139,973	55,841	314	58,209	25,609
Lexington	263,191	183,726	1,734	34,244	43,487
McCormick	304,906	217,507	2,907	40,842	43,650
Marion	438,702	115,763	30,480	214,398	78,061
Marlboro	189,490	41,785	9,033	102,306	36,366
Newberry	542,065	389,959	8,182	72,637	71,287
Oconee	341,284	164,855	23,867	29,707	122,855
Orangeburg	546,952	179,229	31,173	209,738	126,812
Pickens	271,733	63,125	6,057	61,543	141,008
Richland	386,368	169,368	7,934	128,204	80,862
Saluda	300,222	220,663	437	27,848	51,274
Spartanburg	364,137	178,216	2,291	62,282	121,348
Sumter	325,008	117,171	11,787	140,131	55,919
Union	366,812	167,024	2,211	81,875	115,702
Williamsburg	495,497	229,805	13,020	115,005	137,667
York	310,705	126,666	4,615	79,878	99,546
<b>Total</b>	<b>17,180,375</b>	<b>8,353,792</b>	<b>573,324</b>	<b>4,569,377</b>	<b>3,683,882</b>

Table 42.—Volume of sawtimber, by county and species group, South Carolina, 1978

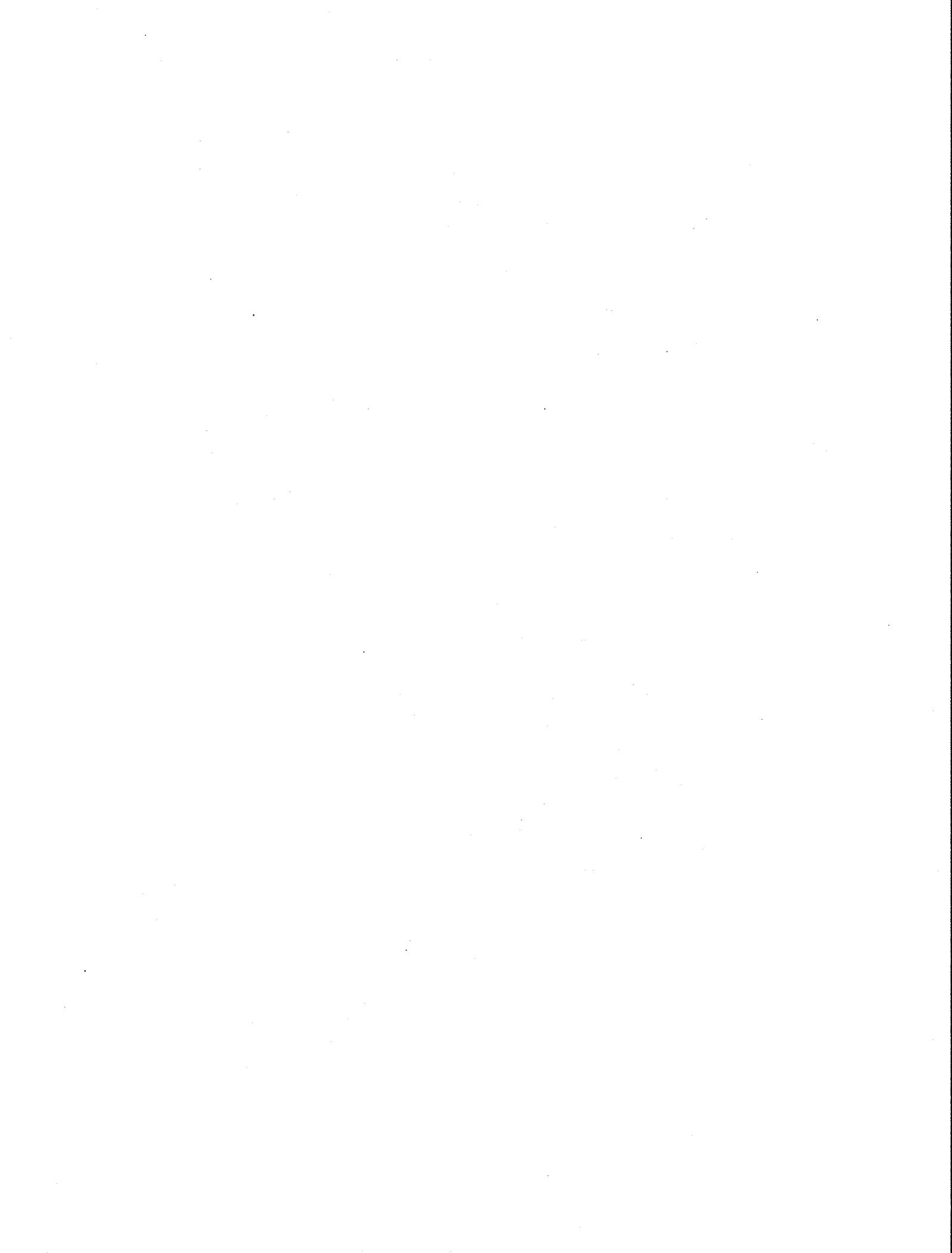
County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
<i>..... Thousand board feet .....</i>					
Abbeville	689,320	302,384	5,793	215,406	165,737
Aiken	1,343,079	866,739	12,763	318,101	145,476
Allendale	870,083	454,096	40,969	194,573	180,445
Anderson	779,065	314,192	8,373	193,176	263,324
Bamberg	673,813	300,586	68,892	217,015	87,320
Barnwell	828,715	462,714	29,845	208,119	128,037
Beaufort	874,086	497,020	5,055	248,052	123,959
Berkeley	3,317,555	2,055,314	129,314	557,252	575,675
Calhoun	724,599	405,861	9,645	221,220	87,873
Charleston	2,050,810	1,402,742	106,742	313,805	227,521
Cherokee	354,100	196,010	1,706	44,428	111,956
Chester	730,848	460,387	4,120	106,134	160,207
Chesterfield	926,282	496,923	—	318,799	110,560
Clarendon	1,368,597	453,101	129,855	443,809	341,832
Colleton	2,363,972	1,248,851	101,949	545,398	467,774
Darlington	811,618	387,956	54,753	240,991	127,918
Dillon	689,880	233,969	38,945	316,026	100,940
Dorchester	1,585,779	676,871	163,565	378,975	366,368
Edgefield	1,433,246	1,154,416	2,854	170,579	105,397
Fairfield	1,107,055	884,473	5,668	120,162	96,752
Florence	1,960,511	1,100,862	106,729	472,425	280,495
Georgetown	1,816,176	946,588	96,478	514,216	258,894
Greenville	989,120	291,772	8,690	235,140	453,518
Greenwood	1,217,978	888,031	2,046	177,390	150,511
Hampton	1,581,062	523,263	123,167	450,505	484,127
Horry	2,782,756	1,200,833	201,074	971,297	409,552
Jasper	1,452,082	613,665	147,807	299,750	390,860
Kershaw	1,057,201	685,456	11,667	254,016	106,062
Lancaster	516,692	224,025	7,352	127,076	158,239
Laurens	1,037,430	549,711	5,080	229,196	253,443
Lee	416,786	177,152	1,429	174,028	64,177
Lexington	947,213	712,566	4,349	102,020	128,278
McCormick	1,109,470	864,504	4,131	132,941	107,894
Marion	1,712,887	509,769	145,912	789,979	267,227
Marlboro	557,868	134,749	40,029	275,339	107,751
Newberry	1,721,735	1,324,929	14,874	210,342	171,590
Oconee	908,038	409,753	122,351	78,630	297,304
Orangeburg	1,623,777	619,783	112,154	546,285	345,555
Pickens	786,296	171,198	24,371	204,954	385,773
Richland	1,335,079	601,650	27,489	462,551	243,389
Saluda	899,504	706,268	1,294	46,650	145,292
Spartanburg	931,578	445,925	6,953	186,205	292,495
Sumter	1,201,590	492,527	47,888	489,385	171,790
Union	1,104,002	478,154	4,657	287,101	334,090
Williamsburg	1,714,016	905,624	50,471	295,528	462,393
York	664,710	239,866	6,340	227,277	191,227
<b>Total</b>	<b>55,568,059</b>	<b>29,073,228</b>	<b>2,245,588</b>	<b>13,612,246</b>	<b>10,636,997</b>

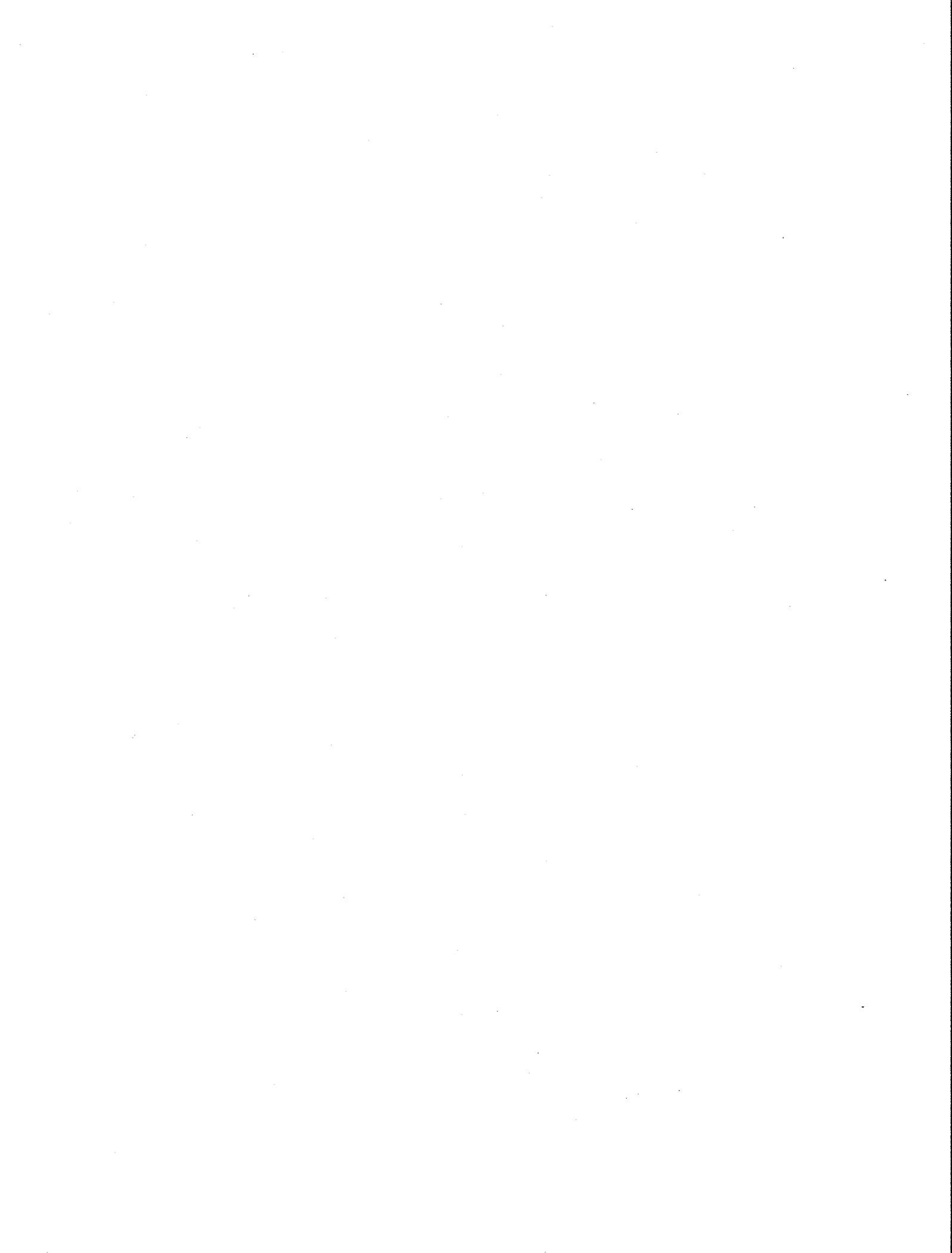
Table 43.—Net annual change of growing stock on commercial forest land, by species group and county, South Carolina, 1977

County	Net change	Pine	Other softwood	Soft hardwood	Hard hardwood
<i>Thousand cubic feet</i>					
Abbeville	+8,249	+1,355	+575	+4,070	+2,249
Aiken	+8,696	+5,762	-97	+1,839	+1,192
Allendale	+8,436	+5,502	+185	+1,476	+1,273
Anderson	+13,631	+6,113	+105	+2,306	+5,107
Bamberg	+7,828	+4,353	+16	+1,992	+1,467
Barnwell	+10,963	+5,627	+212	+3,276	+1,848
Beaufort	+9,228	+6,630	+29	+2,081	+488
Berkeley	+10,759	+5,686	+490	+2,450	+2,133
Calhoun	+4,596	+2,055	+50	+1,808	+683
Charleston	+11,127	+5,324	+527	+3,533	+1,743
Cherokee	+4,559	+2,732	+30	+509	+1,288
Chester	+16,195	+12,837	+630	+1,458	+1,270
Chesterfield	+9,064	+4,471	+58	+3,824	+711
Clarendon	+5,832	+1,359	+179	+1,409	+2,885
Colleton	+23,205	+17,508	+484	+3,377	+1,836
Darlington	+2,205	-124	+226	+1,470	+633
Dillon	+4,523	-169	+212	+4,211	+269
Dorchester	+13,543	+5,804	+762	+3,331	+3,646
Edgefield	+11,291	+6,976	+37	+2,591	+1,687
Fairfield	+13,153	+10,580	+2	+804	+1,767
Florence	+13,544	+7,081	+588	+3,187	+2,688
Georgetown	+3,455	+1,106	-279	+2,942	-314
Greenville	+14,059	+8,001	+69	+3,312	+2,677
Greenwood	+2,405	+917	+129	+2,025	-666
Hampton	+14,313	+4,684	+626	+4,450	+4,553
Horry	+22,008	+9,728	+1,209	+6,629	+4,442
Jasper	+10,470	+5,752	+664	+1,755	+2,299
Kershaw	+11,163	+7,751	+74	+1,435	+1,903
Lancaster	+7,620	+2,747	+258	+2,736	+1,879
Laurens	+18,200	+12,918	+83	+1,956	+3,243
Lee	+4,746	+2,681	+3	+1,186	+876
Lexington	+9,232	+6,711	+46	+1,464	+1,011
McCormick	+7,789	+4,222	+130	+1,456	+1,981
Marion	+8,052	+1,738	-383	+5,103	+1,594
Marlboro	+1,599	-740	+270	+1,714	+355
Newberry	+19,258	+14,921	+328	+1,388	+2,621
Oconee	+12,227	+7,848	+683	+965	+2,731
Orangeburg	+10,547	+3,508	-117	+3,339	+3,817
Pickens	+2,596	-2,267	+61	+3,287	+1,515
Richland	+8,738	+4,623	+517	+3,351	+247
Saluda	+8,594	+6,022	+17	+1,032	+1,523
Spartanburg	+16,820	+7,772	+906	+2,627	+5,515
Sumter	+5,898	+804	+1	+2,805	+2,288
Union	+10,806	+4,517	+26	+2,580	+3,683
Williamsburg	+11,270	+4,965	+252	+3,616	+2,437
York	+14,898	+7,575	+380	+2,704	+4,239
<b>Total</b>	<b>+467,390</b>	<b>+245,966</b>	<b>+11,253</b>	<b>+116,859</b>	<b>+93,312</b>

Table 44.—Net annual change of sawtimber on commercial forest land, by species group and county, South Carolina, 1977

County	Net change	Pine	Other softwood	Soft hardwood	Hard hardwood
<i>Thousand board feet</i>					
Abbeville	+23,228	+3,582	+229	+12,404	+7,013
Aiken	+39,404	+30,496	-538	+6,196	+3,250
Allendale	+38,524	+25,661	+816	+4,562	+7,485
Anderson	+44,330	+20,366	+155	+8,849	+14,960
Bamberg	+34,388	+20,965	-60	+8,783	+4,700
Barnwell	+49,376	+29,130	+1,023	+11,897	+7,326
Beaufort	+33,444	+24,929	+128	+7,014	+1,373
Berkeley	+49,226	+27,394	+1,869	+8,490	+11,473
Calhoun	+13,196	+456	+264	+9,692	+2,784
Charleston	+69,909	+45,392	+3,235	+12,884	+8,398
Cherokee	+15,111	+10,104	+87	+723	+4,197
Chester	+46,924	+39,941	+248	+4,784	+1,951
Chesterfield	+24,678	+11,715	-	+13,166	-203
Clarendon	+28,420	+7,144	+712	+6,439	+14,215
Colleton	+58,900	+38,893	+1,910	+5,535	+12,562
Darlington	+5,905	+1,301	+1,365	+6,242	-3,003
Dillon	+12,893	-3,118	+1,015	+12,783	+2,213
Dorchester	+47,870	+22,707	+2,925	+10,284	+11,954
Edgefield	+44,328	+30,446	+118	+8,220	+5,544
Fairfield	+38,682	+35,201	-123	-2,314	+5,918
Florence	+61,121	+31,194	+3,213	+16,215	+10,499
Georgetown	+4,727	-95	-1,360	+6,878	-696
Greenville	+43,569	+27,665	+234	+11,807	+3,863
Greenwood	+4,969	+1,363	+115	+6,484	-2,993
Hampton	+63,165	+22,707	+3,417	+19,454	+17,587
Horry	+95,383	+40,841	+5,334	+33,496	+15,712
Jasper	+26,769	+5,523	+3,728	+5,804	+11,714
Kershaw	+33,995	+27,018	+260	+3,144	+3,573
Lancaster	+18,678	+6,165	+554	+7,339	+4,620
Laurens	+55,627	+40,198	+430	+4,715	+10,284
Lee	+11,765	+6,358	+19	+2,306	+3,082
Lexington	+42,186	+32,901	+153	+6,242	+2,890
McCormick	+33,885	+25,381	+657	+2,777	+5,070
Marion	+30,300	+6,056	-571	+20,373	+4,442
Marlboro	+9,934	-3,741	+1,481	+8,907	+3,287
Newberry	+57,679	+40,561	+453	+6,400	+10,265
Oconee	+29,824	+15,269	+3,017	+3,639	+7,899
Orangeburg	+31,994	+12,472	-705	+10,202	+10,025
Pickens	+11,493	-9,287	+427	+14,268	+6,085
Richland	+30,398	+19,531	+974	+12,505	-2,612
Saluda	+33,089	+26,442	+44	+1,797	+4,806
Spartanburg	+68,492	+32,081	+296	+12,798	+23,317
Sumter	+23,725	+4,352	-296	+12,827	+6,842
Union	+50,412	+26,047	+196	+9,227	+14,942
Williamsburg	+46,307	+25,998	+1,857	+11,909	+6,543
York	+48,656	+21,137	+848	+8,939	+17,732
<b>Total</b>	<b>+1,686,878</b>	<b>+906,842</b>	<b>+40,153</b>	<b>+416,995</b>	<b>+322,888</b>





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1979. South Carolina's forests. U.S. Dep. Agric. For. Serv., Resour. Bull. SE-51,  
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The fifth inventory of South Carolina's forests was expanded to accommodate both timber and nontimber evaluations. This report presents the principal findings of the timber evaluation. Between 1968 and 1978, area of commercial forest land increased from 12.4 to 12.5 million acres, or less than 1 percent. Volume of growing-stock timber increased from 13.3 to 17.2 billion cubic feet, or by 29 percent. Net annual growth increased to an average of 77 cubic feet per acre, a record high in the Southeast. Annual removal of softwood timber was up 25 percent; annual removal of hardwood was down 12 percent.

**Keywords:** Commercial forest area, forest ownership, timber volume, timber growth, timber removals.

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