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Resource Bulletin
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Florida's Forests, 1987

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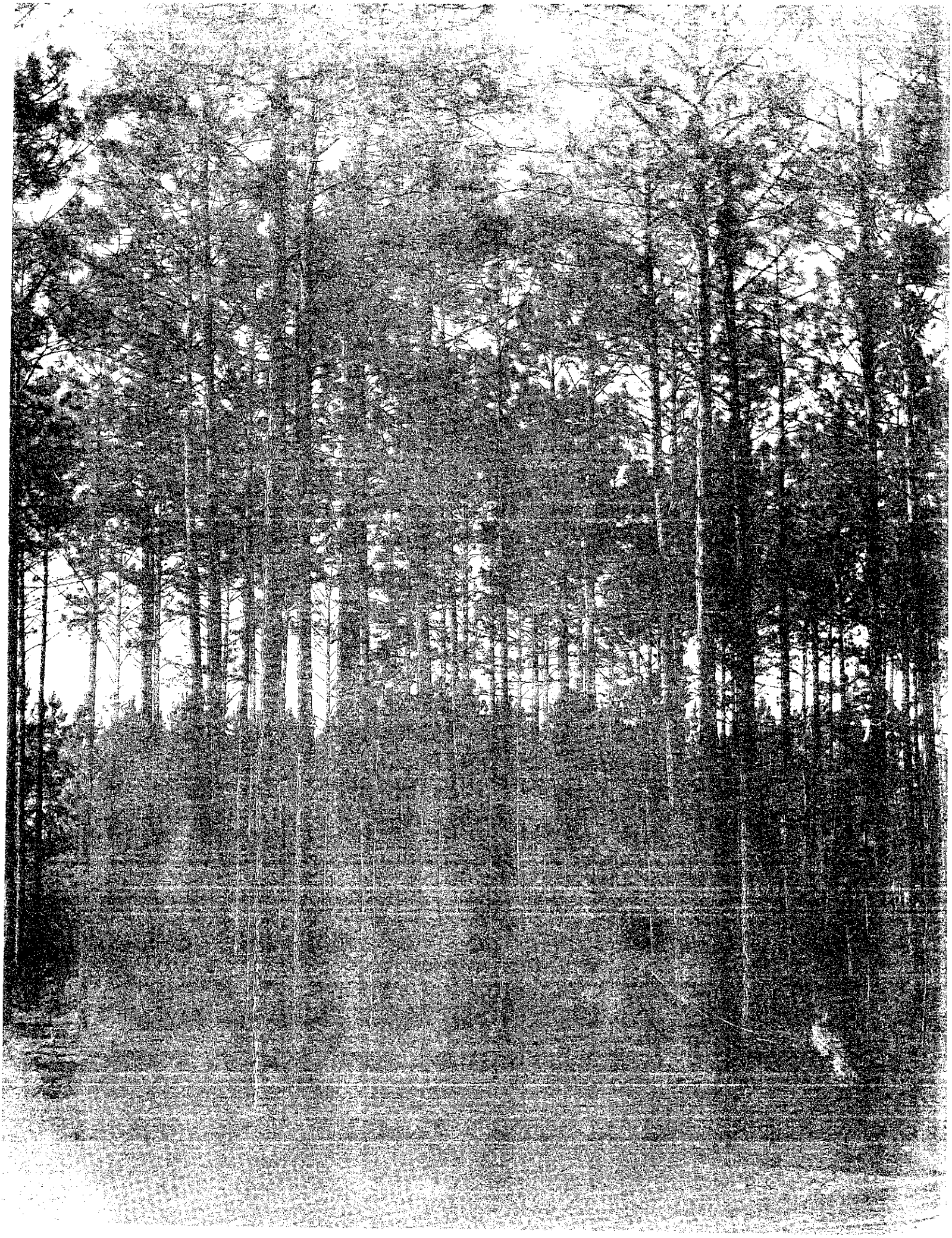

Florida's Forests, 1987

Photos courtesy of the Florida Division of Forestry

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Asheville, North Carolina

February 1990

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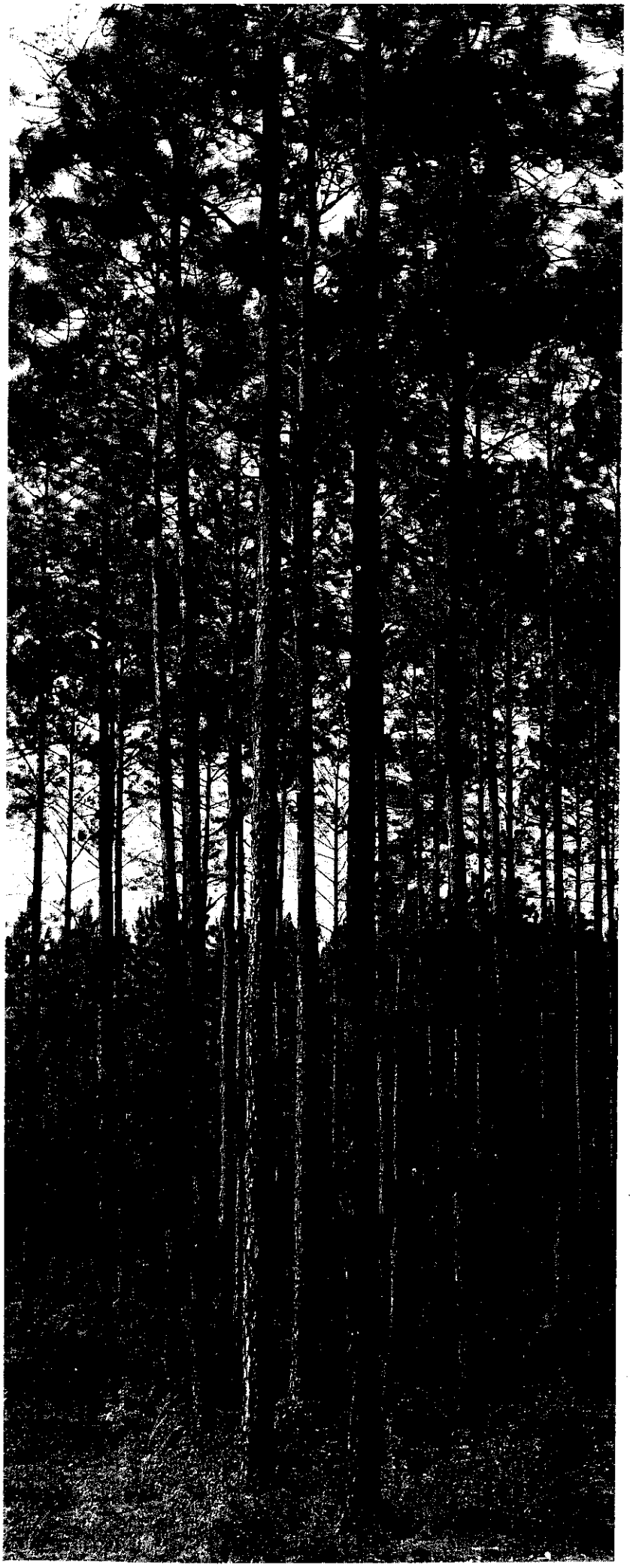

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Foreword

This Resource Bulletin describes the principal findings of the sixth inventory of Florida's forest resources. Data concerning the extent and condition of forest land, as well as associated timber inventory, growth, and removal volumes are presented and analyzed. In accordance with the Forest and Rangeland Renewable Resources Planning Act of 1974, information on nontimber commodities was also collected, but evaluations of these data will be conducted separately.

The inventory of Florida's forests, authorized by the Forest and Rangeland Renewable Resources Research Act of 1978, is part of a continuing nationwide undertaking by the USDA Forest Service. In the five Southeastern States (Florida, Georgia, North Carolina, South Carolina, and Virginia), these surveys are conducted by the Forest Inventory and Analysis (FIA) Work Unit of the Southeastern Forest Experiment Station, one of seven FIA Work Units in the United States. The primary objective of these periodic appraisals is to develop and maintain the resource information needed to formulate sound forest policies and programs.

Field work for the sixth survey of Florida began in September 1986 and was completed in October 1987. Five previous surveys, completed in 1936, 1949, 1959, 1970, and 1980, provide statistics for measuring changes and trends over the past 51 years. This analysis focuses mainly on changes and trends since 1980. Previously reported figures have been adjusted in some cases to provide the best estimates of change. Normally, such adjustments are necessary to compensate for improvements in volume equations, but a recent review of processing procedures uncovered a computer programming error involving resource statistics reported in 1980. This error inflated the fifth survey estimates of three resource items: annual timber removals, net annual growth, and annual mortality. Other resource items such as timberland acreage and inventory volumes were unaffected. The inflated values have since been adjusted, and all comparisons in this report involving fifth survey growth, removal, or mortality statistics utilize the corrected estimates.

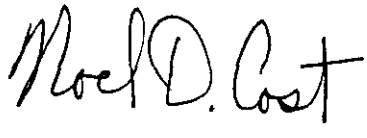
The combined efforts of many people have gone into this evaluation of Florida's forest resources. Appreciation is expressed to all Work Unit and Station personnel who participated in the field and office work, and to the Forest Service economists at Research Triangle Park, who provided the area projections. In addition, the assistance provided by the Florida Division of Forestry, Department of Agriculture and Consumer Services, is gratefully acknowledged. Appreciation is also expressed for the excellent cooperation of other public agencies, forest industries, and private landowners in providing information and allowing access to the sample locations.

To facilitate both inventory and analysis, FIA has traditionally divided Florida into four Survey Units. Summary statistics and highlights of inventory results for each Survey Unit have already been published. Copies of these reports can be obtained from the Southeastern Forest Experiment Station.

Tabular data included in standard FIA reports are designed to provide a comprehensive array of forest resource statistics, but additional data can often be obtained for those who require more specialized information. A Forest Information Retrieval (FIR) service is available for custom compilation of forest resource data for any area within the Southeastern States. However, a processing fee is required for custom compilations, and costs may range from less than $100 for a relatively simple retrieval, to several thousand dollars for a complex request that involves special programming. Although such requests are usually serviced promptly, attention to special requests is sometimes delayed by our regular duties.

Information concerning any aspect of this survey may be obtained from:

Forest Inventory and Analysis
Southeastern Forest Experiment Station
P.O. Box 2680
Asheville, NC 28802
Phone: 704-257-4350



Noel D. Cost
Project Leader

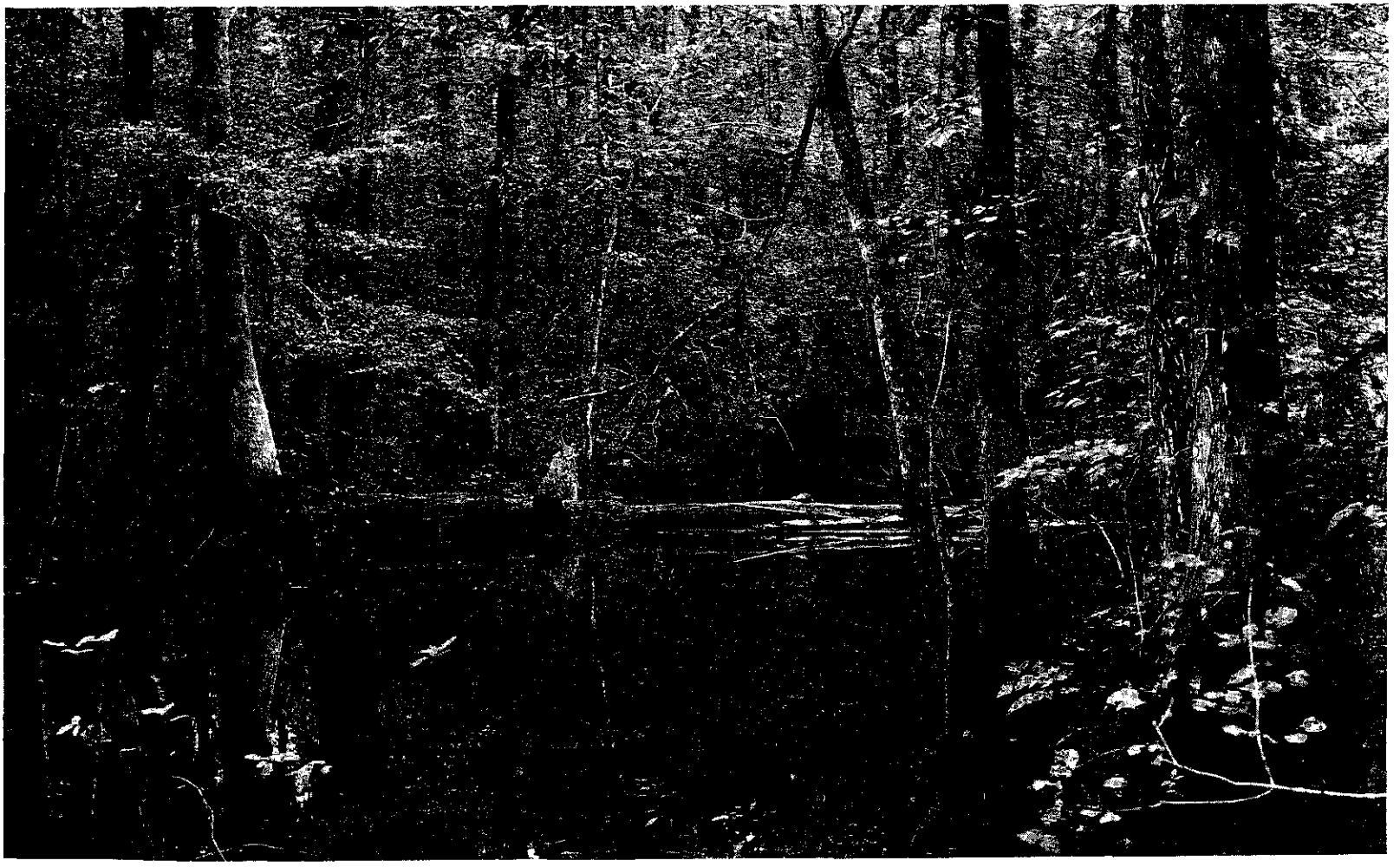
Highlights

Since the fifth inventory of Florida's forest resources was completed in 1980—

• *area of timberland decreased by 4 percent to 15.0 million acres.* More than 0.6 million acres were added to the timberland base, but 1.3 million acres of timberland were diverted to noncommercial forest and nonforest uses. Development of timberland for urban and related uses was the chief reason for the net loss. Reduction of timberland would have been greater, but was moderated by higher rates of tree planting and natural reversion to forest on land that had previously been used for agriculture. Timberland now accounts for 43 percent of Florida's land area.

• *area of nonindustrial private forest (NIPF) land dropped by 12 percent to 7.1 million acres.* NIPF was the only ownership category to show a substantial loss of timberland. The area managed by forest industry remained almost unchanged at 5.4 million acres, and public timberland increased by 12 percent to 2.4 million acres. Behind the loss within the NIPF group was a 43-percent reduction in forested acreage held by farmers, and a 15-percent decline in timberland owned by cooperations (other than forest industry). These losses were partially offset by a 9-percent gain in acreage owned by other individuals.

• *loss of timberland reduced the total acreage in pine, oak–pine, and hardwood types.* A 0.7-million-acre gain in the area of pine plantations was countered by a 1.0-million-acre reduction in natural pine acreage. The combined area of planted and natural pines thus fell from 7.8 to 7.5 million acres—down by 3 percent. At 4.0 million acres, the area in pine plantations has surpassed the area in natural pine stands; Florida is currently the only State in the country to have a majority of its pine resource in planted stands. The total acreages in oak–pine and hardwood stands have declined by 15 percent and 3 percent, to 1.2 and 6.2 million acres, respectively. All of the hardwood loss was centered in upland hardwood stands; acreage in lowland hardwoods remained about the same.



• *loss of timberland acreage, increased removals, and a reduction in net annual growth have caused softwood inventory volume to stabilize after several decades of consecutive increases.* At 9.3 billion cubic feet, the current volume of softwood growing stock is only 1 percent above the volume reported for 1980. This minor gain was actually supported by a moderate increase in the volume of cypress; the combined volume of all yellow pine species fell by about 2 percent. The slight gain in softwood inventory can further be attributed to relatively large trees. Except for a small increase in the 8-inch class, reductions were measured in all diameter classes below 14 inches. Softwood inventory volume was down by 7 percent on NIPF land. Loss of softwood volume was confined to the NIPF category, though, as gains of 4 and 15 percent were recorded for forest industry and public land.

• *hardwood growing-stock volume increased from 5.1 to 5.7 billion cubic feet, despite the loss of hardwood acreage.* A wide margin of growth over removals was responsible for the continuing buildup in hardwood inventory. Hardwood volume on public land nearly doubled to 1.0 billion cubic feet, due largely to acquisitions of hardwood acreage by the State. Hardwood volume was up by 5 percent to 3.1 billion cubic feet on NIPF land, but down by 3 percent on forest industry land.

• *net annual growth of softwoods fell by 3 percent to 488 million cubic feet per year.* Annual softwood removals simultaneously increased by 48 percent from 320 to 474 million cubic feet, nearly bringing softwood growth and removals into balance. Although softwood growth exceeded removals overall, the yellow pine portion of the resource experienced an overcut. Yellow pine growth slipped by 5 percent to 427 million cubic feet, while pine removals climbed from 301 to 441 million cubic feet. By ownership, the combined growth of all softwood species was down by 13 percent on NIPF land and 7 percent on public land, but up by 10 percent on forest industry land. Softwood growth still exceeds removals on forest industry and public land, but removals now exceed growth by 8 percent on NIPF timberland.

• *net annual growth of hardwoods declined by 15 percent to 141 million cubic feet.* Even though hardwood growth was down, a removal rate that averaged just 66 million cubic feet per year allowed the 11-percent increase in hardwood inventory volume. Demand for hardwoods in Florida has historically been soft, and there is little evidence of a change in this situation, as hardwood removals are down by 18 percent from the previous rate of 81 million cubic feet per year.

• *annual output of all timber products averaged 552 million cubic feet per year, a gain of 47 percent.* About 13 percent of the total output was produced from mill by-products generated during the primary processing of timber, and 87 percent from roundwood. Of the total production from both roundwood and mill byproducts, pulpwood accounts for 57 percent, saw logs for 26 percent, veneer logs for 5 percent, and fuelwood for 5 percent. The remaining 7 percent is divided among poles, pilings, posts, and other miscellaneous industrial products.

• *rates of artificial regeneration were up sharply—from 129,000 to 196,000 acres per year.* The largest gain occurred on NIPF land, where planting jumped from an average of 20,000 to 63,000 acres each year. The area planted on forest industry land climbed from 97,000 to 117,000 acres per year. Public owners increased their average annual planting rate from 13,000 to 16,000 acres. Of the total area planted, 187,000 acres were successfully regenerated to a pine forest type. Most of the remaining acreage with evidence of artificial regeneration was planted to pine, but is presently classified as a hardwood or oak–pine type due to excessive hardwood stocking. Besides the 187,000 acres of artificially regenerated pine stands, another 32,000 acres naturally regenerated to pine each year, thus boosting the total area of successful pine regeneration to an annual average of 219,000 acres. In addition to the area regenerated to pine, a total of 53,000 acres regenerated to oak–pine and hardwood stands each year.

• *although the gap has narrowed, intensified regeneration efforts could not keep up with rates of harvesting and diversions of timberland to nonforest.* An average of 226,000 acres of pine stands were harvested each year and retained in forest. Another 42,000 acres of manageable pine stands were diverted to nonforest. Considering the 219,000 acres of pine regeneration, the equivalent of only 82 percent of all pine stands harvested and/or diverted each year were replaced by newly regenerated stands of pine. The gap between hardwood harvesting and regeneration was much wider. About 70,000 acres of oak–pine and hardwood stands were harvested and retained in forest each year, while an additional 25,000 acres of manageable hardwoods were diverted to nonforest. The 53,000 acres of hardwood regeneration effectively replaced only 56 percent of the hardwood stands harvested and/or diverted to nonforest.

• *regeneration continues to be the predominant opportunity to improve future supplies.* This is true for both pine and hardwood forest types. About one-third of Florida's timberland (4.7 million acres) presently lacks a manageable stand and is in need of regeneration. Nearly one-third of these poorly stocked acres are pine forest types. About 59 percent of all regeneration opportunities exist on NIPF land.

Forest Trends

Florida's boundaries encompass 34.5 million acres of land area, plus some 3.0 million acres of inland water. Almost 48 percent of the land (16.5 million acres) is classified as forest. Another 18 percent is pasture or natural range, 13 percent is urban, 12 percent is cropland or other farmland, and 9 percent is marsh. Of the forest land, 15.0 million acres are categorized as timberland (formerly termed commercial forest), an additional 0.4 million acres are classified as reserved, and 1.2 million acres are considered woodland (formerly unproductive forest). Reserved forest is composed of areas such as wilderness, parks, and historic sites where commercial timber harvesting is prohibited by law. Woodland generally consists of areas that do have some existing tree cover, but occur on sites too severe for commercial timber production. Stands of hatrack cypress on marl flats in South Florida are typical examples of woodland.

From the heart of the slash pine ecosystem to the Everglades, the climate topography, land use patterns, and vegetative cover of Florida change dramatically from north to south. Commercial timber production is most prevalent in the northern half of the State. More than four-fifths of the timberland is concentrated in the two northern Survey Units (fig. 1). The Northwest Unit is the most heavily

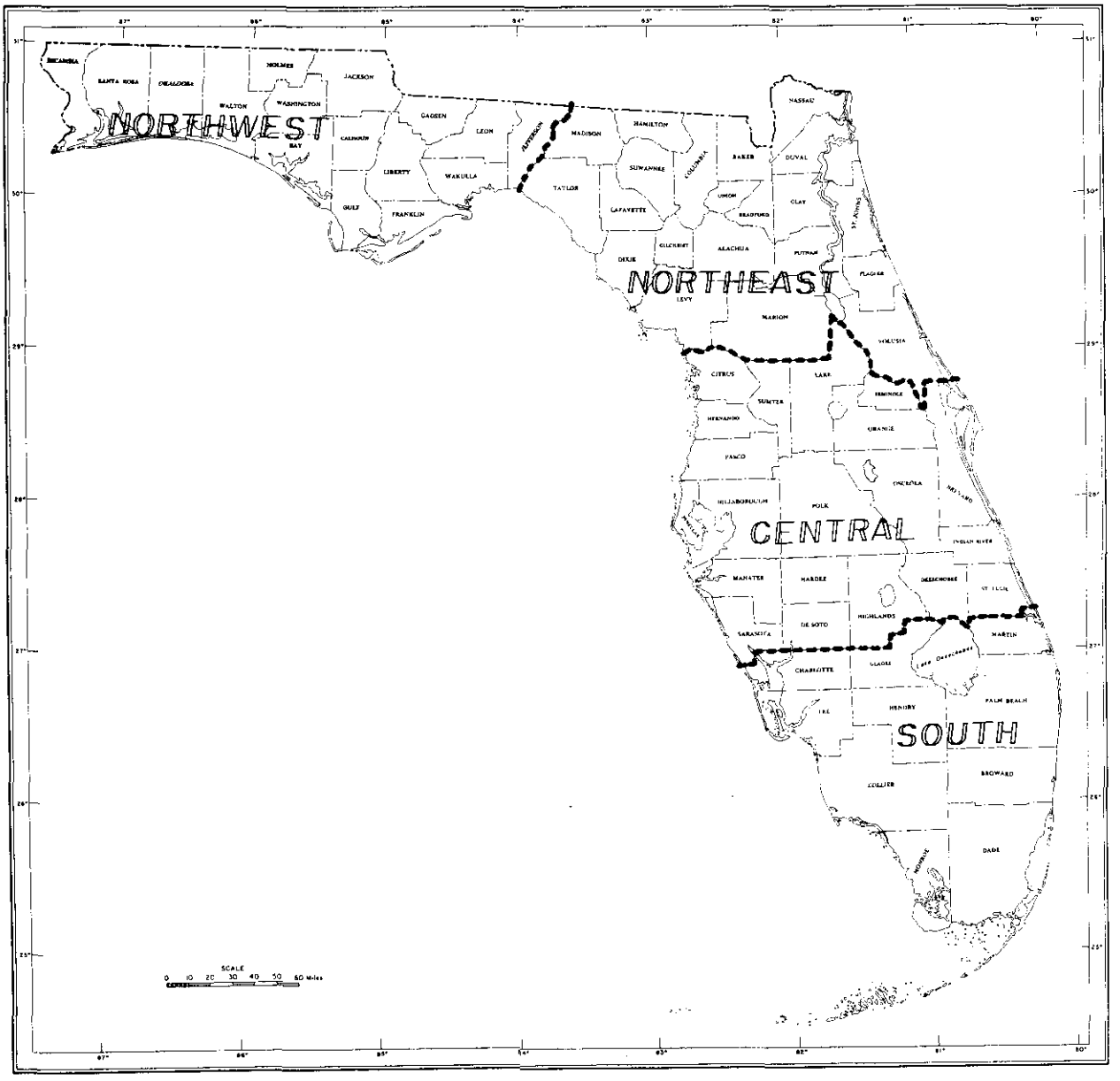


Figure 1.—Forest Survey Units in Florida.

forested, with 73 percent of the total land area in timberland. Northeast Florida, where timberland occupies 69 percent of the land, is more intensively managed for pine timber production than any other region in the Southeast. Farther south, the portion of land classified as timberland dwindles to 23 percent in Central Florida, and only 8 percent in South Florida, where the landscape is dominated by marsh, natural range, cropland, and urban buildup. Suitability of the land for other endeavors such as vegetable, citrus, and cane production has limited the establishment of timberland in the southern half of the State.

Land Use Trends

Successive inventories of Florida's forest resources document a continuous decline in the area of timberland—from 19.7 million acres in 1936 to the present 15.0 million acres. The most rapid rate of net timberland loss occurred during the 1950's, when more than 200,000 acres were diverted to other land uses every year. Since then, the rate of decline has moderated and remained somewhat stable. Between 1980 and 1987, the net area of timberland lost to other land uses totaled 0.7 million acres, averaging about 88,000 acres per year.

Behind the reduction of timberland during the latest remeasurement period are land use changes involving 1.9 million acres (table I). Statewide, almost 1.3 million acres of timberland were diverted to other land uses, while only 0.6 million acres were added from acreage that was previously nonforest, reserved forest, or woodland. A high rate of urban development sustained by the continued influx of people tops the list of reasons for loss of forest acreage. Once timberland is switched to an urban land use, which includes residential and industrial developments, highways, and utility rights-of-way, the change is usually permanent. Although 704,000 acres of timberland were diverted to urban between 1980 and 1987, hardly any land previously classed as urban reverted to forest. The highest rate of forest urbanization occurred in Central Florida, followed by the two northern Units. Urban development claimed relatively little timberland in South Florida; most of the urbanization in this region took place on natural range and other nonforest land.

Forest classification changes were responsible for the remainder of the timberland reduction. Most recategorization took place in South Florida, where reassignment of acreage from timberland to woodland was the chief reason for loss of timberland. Differences between timberland and woodland in South Florida can be subtle, however, and the movement of acreage between these two categories in this region sometimes involves little noticeable change in vegetative cover.

Reductions of timberland in Florida would have been greater if exchanges of land between agriculture and forest had not balanced slightly in favor of timberland. Of the 438,000 acres added to the timberland base from nonforest sources since 1980, about 373,000 acres were previously in crop, pasture, range, or idle farmland. The combined rate of natural reversion and tree planting on agricultural land has more than doubled, and most of these newly forested acres are located in the two northern Units. The primary reason for this increase is abandonment of farmland due to unfavorable economic conditions for agriculture. In addition to agricultural land that has already reverted to forest, area of idle farmland has risen from 593,000 to 869,000 acres since 1980. Expansion of idle farmland indicates that shifting of acreage from agriculture to timberland will probably continue in the future. Another factor moving acreage from farmland to timberland is the Conservation Reserve Program authorized by the 1985 Farm Bill. During the first

Table I.—Changes in area of Florida's timberland between 1980-1987, by Survey Unit

Survey Unit	Area of timberland in—		Net change	Changes							
					Additions from—			Diversions to—			
	1980	1987		Total gain	Nonforest	Other forest land	Total loss	Other forest land	Agriculture	Urban and other	Water
	Thousand acres										
Northeast	6,844.5	6,662.1	−182.4	208.7	196.0	12.7	391.1	26.3	159.6	205.2	—
Northwest	5,512.0	5,346.5	−165.6	165.7	155.4	10.3	331.3	8.4	93.7	229.2	—
Central	2,473.7	2,315.3	−158.3	135.4	75.9	59.5	293.8	17.4	31.8	235.4	9.1
South	834.0	658.7	−175.3	99.6	10.6	89.0	274.8	200.7	39.9	34.2	—
State	15,664.2	14,982.6	−681.6	609.4	437.9	171.5	1,291.0	252.8	325.0	704.0	9.1

3 years of the program, 84,000 of the 389,000 acres that originally met the criteria for marginal farmland in Florida were planted to pine.

Timberland Acreage by Ownership

Recent patterns of timberland ownership in Florida are detailed in figure 2. The total lengths of the bars to the right of the zero reference line show the current distribution of timberland acreage by ownership. The open segment of each bar represents change between 1980 and 1987. Open portions to the left of the reference line indicate loss of timberland acres; open sections to the right indicate gains.

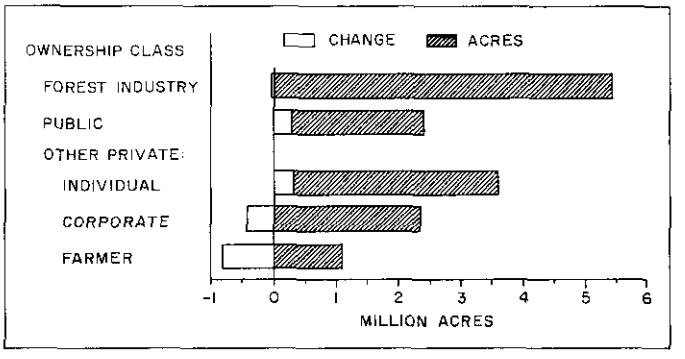


Figure 2.—Timberland acreage in 1987, and change in timberland acreage between 1980 and 1987, by ownership class.

The NIPF, or "other private" owner category, which includes farmers, other individuals, and corporations (other than forest industry) controls 7.1 million acres, or 47 percent of the timberland in Florida. Since 1980, the collective area of timberland held by these owners has declined by about 12 percent. Virtually all the net loss of timberland in the State was confined to this owner group. Within the NIPF category, farmers and corporations lost 0.8 and 0.4 million acres of timberland, respectively, while other individuals gained about 0.3 million acres. This latest loss of timberland by farmers perpetuates a trend spanning at least three decades. A substantial transfer of timberland from farmers to other individuals is behind the most recent trends involving these two NIPF categories. Land transactions were responsible for part of the shift, but change in owner occupation also played a significant role. Recent losses of timberland held by corporate owners come on the heels of major gains between 1970 and 1980. About half the gain in corporate timberland realized during the previous remeasurement period has now been offset by transfers to various other owners and diversions to nonforest land uses.

Companies with primary wood-using mills (forest industry) own or lease 5.4 million acres, about 36 percent of Florida's timberland area. Reports from previous surveys usually counted land under long-term lease to forest industry with the owners holding title to the land. This analysis and its associated tables either combine the 0.7 million acres of leased timberland with forest industry fee-simple land, or list the leased category separately. The total acreage managed by forest industry has remained virtually unchanged since 1980. Almost 98 percent of all forest industry holdings are located in the two northern Survey Units.

Public agencies control 2.4 million acres, or 16 percent of Florida's timberland. Nearly 1.6 million acres are federally owned. Most of the balance is held by a variety of State agencies. The largest Federal holdings include 1.0 million acres in three National Forests (the Apalachicola, Osceola, and Ocala) and another 0.4 million acres on Eglin Air Force Base. Much of the State-owned timberland falls under the jurisdiction of several Water Management Districts and various State forests, parks, and recreation areas administered by the Florida Department of Agriculture and Consumer Services and the Florida Department of Natural Resources. Public ownership has increased by about 12 percent since 1980. Acquisitions of timberland by the State, particularly the Water Management Districts, are largely responsible.

Timberland Acreage by Broad Management Class

Changes in timberland acreage by broad management class are highlighted in figure 3. Between 1980 and 1987, a 0.7-million-acre increase in the area of pine plantations partially offset a 1.0-million-acre loss of natural pine stands. The combined area of planted and natural pine stands fell by 243,000 acres, or 3 percent. Pine stands now occupy 7.5 million acres, about half of Florida's timberland. The current 4.0 million acres of pine plantations now exceed the area in natural pine stands by over 0.5 million acres. This is the first inventory of any State in the South to show a preponderance of pine acreage in artificially regenerated stands.

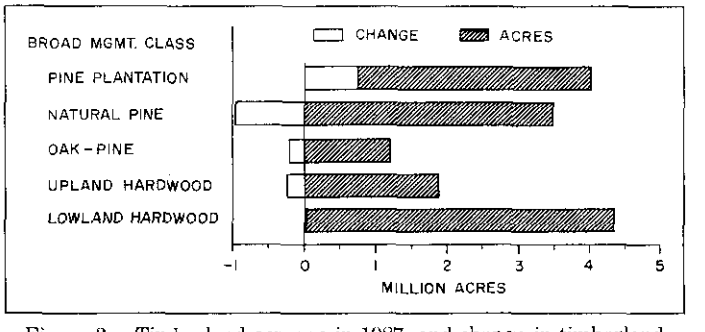


Figure 3.—Timberland acreage in 1987, and change in timberland acreage between 1980 and 1987, by broad management class.

Slash pine is by far the dominant pine type in the State, accounting for more than two-thirds of the pine acreage and one-third of the total timberland acreage. Ordered by

frequency of occurrence, Florida's pine timberlands are composed mainly of slash pine, longleaf pine, sand pine, loblolly pine, and a scattering of pond pine and shortleaf pine forest types. With the exception of moderate gains for loblolly and sand pines, all pine forest types lost ground during the latest remeasurement period. Area of slash pine fell slightly from 5.3 to 5.2 million acres. Area of longleaf pine has declined by 292,000 acres, or 23 percent. At 1.0 million acres, the longleaf resource now occupies only a fragment of its former range. Only 6 percent of the total timberland area presently supports a longleaf type—down from 45 percent in 1936. Fire control and a preference for slash pine for artificial regeneration have greatly contributed to the replacement of longleaf with slash pine.

Although slash pine is most often favored by Florida forest managers, there has lately been an inclination toward planting other species. The total acreage of slash pine plantations rose along with the general increase of pine plantations since 1980, but the proportion of planted stands occupied by slash pine dropped from 87 to 82 percent. Loblolly and sand pines made up most of the difference; each now contributes 8 percent to the current plantation acreage—up from 4 and 6 percent of the 1980 total. While there is a growing interest in artificial regeneration of longleaf pine, not much progress has been made. Only 2 percent of all plantations (90,000 acres) are in longleaf pine.

In conjunction with the 3-percent overall loss of pine timberland, oak–pine acreage dropped by 15 percent. These mixed stands, where pines make up 25 to 50 percent of the stocking, now cover 1.2 million acres. Another 6.2 million acres are occupied by various hardwood types, about one-third of which are categorized as upland hardwood based on species composition and physiography. The cumulative acreage of hardwoods has declined by 3 percent since 1980, but the entire reduction was centered in upland hardwood stands; the area of lowland hardwood stands has remained almost unchanged.

The underlying gains and losses of acreage by broad management class were actually much more complex than the net changes depicted in figure 3. Major factors influencing exchanges of acreage among these broad timber types include land clearing, harvesting, and regeneration practices. Clearing of timberland to nonforest was the primary reason for net loss of natural pine, oak–pine, and upland hardwood stands. Lowland hardwood stands were less affected by land use changes because of drainage problems and environmental concerns that complicate and restrict the development of forested wetlands. In addition to land clearing, conversion of harvested natural stands to pine plantations exaggerated reductions in the area of natural pine stands, and to a lesser degree, oak–pine and hardwood stands. Such conversions were the main impetus behind the buildup in pine plantations, and were responsible for about three-fourths of the new plantation acreage. The rest of the gain in pine plantations resulted from artificial regeneration of nonforest land. Although annual rates of artificial regeneration have risen dramatically when compared with the previous remeasurement period, more than a half million acres of natural pine stands harvested between 1980 and 1987 have not yet been replanted. This too is drawing acreage away from natural pine stands, as nearly half of these stands are now dominated by hardwoods. Much of this acreage has only recently been harvested, however, and is presumably awaiting site preparation and replanting.

Essentially all of these general trends among broad management classes were governed by events in the northern half of the State. About 95 percent of all pine plantations, 79 percent of natural pine stands, 82 percent of oak–pine stands, 75 percent of upland hardwood, and 69 percent of all lowland hardwood stands are located in the two northern Survey Units.

The Softwood Inventory

The aboveground volume of solid wood in all live trees 1.0 inch d.b.h. and larger totals 23.9 billion cubic feet (app. table 22). Discounting for saplings, stumps, tops, and limbs, about 16.8 million cubic feet of this volume occur in the merchantable portions of live trees 5.0 inches d.b.h. and larger. Softwood species make up 56 percent of the merchantable volume—about 9.4 billion cubic feet. Almost 99 percent of the merchantable softwood volume (9.3 billion cubic feet) qualifies as growing stock. The remaining 1 percent is associated with trees culled because of poor form, excessive rot, or breakage.

Slash pine is the most prevalent softwood species in the State, responsible for 43 percent of the softwood growing-stock volume (fig. 4). Cypress also forms a major component of the softwood inventory, accounting for 29 percent. Longleaf, loblolly, and sand pines are also important, collectively contributing another 25 percent.

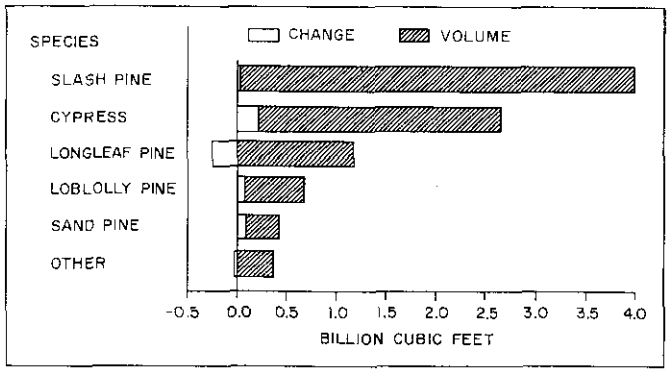


Figure 4.—Volume of softwood growing stock in 1987, and change in volume of softwood growing stock between 1980 and 1987, by species.

By broad management class, 37 percent of the softwood inventory is situated in natural pine stands, and 22 percent in pine plantations. Compared with other Southeastern States, an unusually high proportion of softwood volume (mostly cypress) is concentrated in lowland hardwood stands—about 31 percent. The remaining 10 percent consists chiefly of occasional pines in upland hardwood and oak–pine stands.

Breakdowns of softwood volume by ownership follow the general pattern of timberland ownership across the State. About 45 percent of the softwood inventory occurs on NIPF land, 33 percent on forest industry land, and 22 percent on public land.

Included as part of the softwood growing-stock inventory are 28.4 billion board feet of sawtimber. Like the overall softwood growing-stock inventory, about 70 percent of softwood sawtimber consists of yellow pine species. Because of short rotations, only about 7 percent of all softwood sawtimber is found in pine plantations, as opposed to 46 percent located in natural pine stands. Compared with the softwood growing-stock inventory, slightly less softwood sawtimber occurs on forest industry land due to a high ratio of planted stands, and slightly less sawtimber is attributed to slash pine because the mixture of species in natural stands on longer rotations includes more longleaf and loblolly.

Since 1980, the inventory of softwood growing stock has remained almost stationary, increasing by only 1 percent (fig. 5). Softwood inventory volume in Florida has apparently peaked, inasmuch as each of the three previous surveys (1959, 1970, and 1980) revealed consecutive increases of 8, 26, and 20 percent. The end of this prolonged buildup in softwood volume has been brought about by several factors, among which are the continued loss of timberland acreage, a reduction of net annual growth, and an increase in softwood removals. All of these factors were most pronounced on

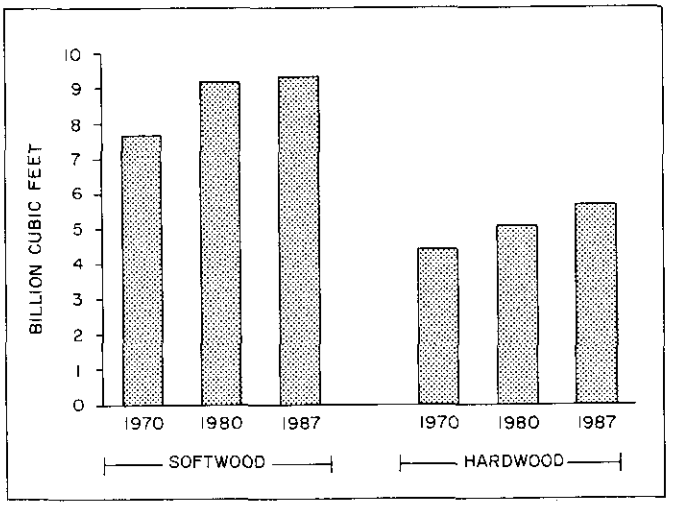


Figure 5.—Volume of growing stock by softwood and hardwood, 1970, 1980, and 1987.

NIPF land, where the aggregate softwood growing-stock inventory actually declined by 7 percent, and the yellow pine segment dropped by 10 percent. Loss of softwood inventory volume was confined to the NIPF ownership group, however; gains of 4 percent and 15 percent were recorded for forest industry and public owners.

Between 1980 and 1987, the inventory of softwood growing stock was largely stabilized by a 10-percent expansion of cypress volume (fig. 4). The combined volume of all yellow pine species fell by 2 percent, as slight to moderate increases in the volume of slash pine, loblolly pine, and sand pine were not enough to offset a 19-percent reduction in longleaf pine volume. The gain in cypress volume had an even more acute effect on the softwood sawtimber inventory, which increased by about 6 percent. Cypress was responsible for about four-fifths of the net gain in softwood sawtimber.

By tree size class, softwood growing-stock volume reductions ranging from 4 to 7 percent were measured in the 6-, 10-, and 12-inch diameter classes (fig. 6). Volume in the 8-inch diameter class remained about the same. Growing-stock volume in the 14-inch and larger classes increased by an average of 14 percent. Trends by diameter class involving just the yellow pine portion of softwood growing stock were very similar.

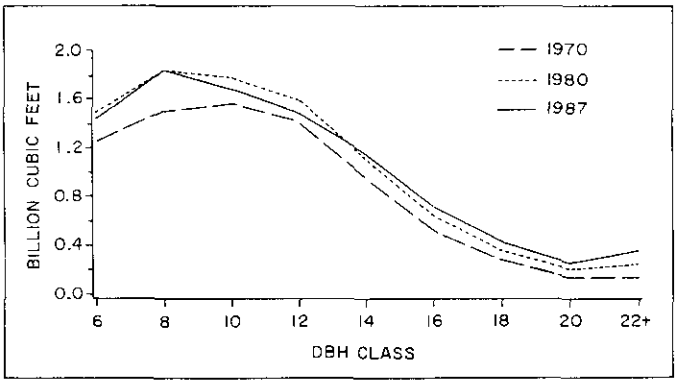


Figure 6.—Volume of softwood growing stock by tree d.b.h. class, 1970, 1980, and 1987.

The current loss of volume in the 6-inch class is the result of declines in numbers of 2- and 4-inch softwoods first identified at the time of the 1980 survey. Between 1980 and 1987, fewer trees were available to grow into the 6-inch class. Stagnation of the 8-inch class and reductions in the 10- and 12-inch classes are the results of heavy cutting in these size classes. In the absence of either a slowdown in cutting or mortality rates, further loss of softwood inventory volume in these and larger size classes is inevitable, since there are now fewer 6-inch trees feeding into the larger diameters. Many of the stands from which these 8- to 12-inch softwoods are being cut originated during the Soil Bank era of the late

1950's, when vast areas of abandoned farmland either reverted naturally or were planted to pine. Generally lower rates of pine regeneration during the following two decades have resulted in the present inability to replace these "Soil Bank stands" as they are harvested.

Changes in numbers of live softwoods by ownership and diameter class are posted in table II. Similar to the trends in growing-stock volume by diameter class, overall reductions in numbers of softwoods extend from the 2- through the 12-inch classes. Both forest industry and NIPF owners sustained losses in almost every diameter class below 16 inches. Public owners gained trees in a majority of size classes due to timberland acquisitions.

Trends involving numbers of saplings are particularly revealing because they foreshadow future changes in inventory volume. Continuing declines in numbers of 2- and 4-inch softwoods indicate that additional loss of softwood volume in the 6-inch diameter class is probable. Again, if there are no adjustments in cutting or mortality rates, this impending further loss of inventory volume in the 6-inch class will eventually work its way into the larger diameters.

The magnitude of prospective softwood volume reductions will be heavily influenced by the situation on NIPF land. Ongoing declines of 2- and 4-inch softwoods on NIPF land have more serious implications than reductions of similar magnitude on forest industry land. In the case of forest

Table II.—Number of live softwood and hardwood trees on Florida's timberland, by diameter and ownership classes, 1987, and change between 1980-1987

Diameter class	All ownerships		Public		Forest industry[a]		Other private	
	Inventory 1987	Change 1980-1987	Inventory 1987	Change 1980-1987	Inventory 1987	Change 1980-1987	Inventory 1987	Change 1980-1987
				SOFTWOODS (million trees)				
2	1,150.4	−78.8	217.2	+47.1	453.0	−73.2	480.2	−52.7
4	830.5	−139.2	109.0	−19.4	402.7	−54.1	318.8	−65.7
6	540.3	−68.3	69.0	−6.6	277.3	−9.4	193.9	−52.3
8	293.3	−15.3	42.8	+.6	130.9	+20.6	119.5	−36.5
10	144.6	−15.3	28.8	−3.0	44.6	+.6	71.2	−12.9
12	80.6	−6.5	21.0	+.4	19.0	−4.8	40.7	−2.1
14	43.3	+.6	12.1	+1.5	9.6	−.9	21.6	—
16+	37.7	+4.4	9.9	+3.2	8.5	+.4	19.3	+.8
				HARDWOODS (million trees)				
2	2,793.8	−443.6	476.1	+14.0	893.3	−142.7	1,424.4	−314.9
4	843.7	−37.4	145.9	+16.4	262.6	−24.8	435.2	−29.0
6	332.5	−12.8	58.7	+14.9	96.1	−7.4	177.7	−20.2
8	167.8	−4.6	26.9	+8.7	48.5	−2.3	92.5	−11.1
10	99.9	−.1	16.1	+4.0	25.8	−2.9	58.0	−1.2
12	61.6	+.8	10.2	+3.9	16.3	−2.1	35.1	−1.0
14	35.7	−1.0	6.2	+2.8	9.3	−2.7	20.3	−1.1
16+	56.1	+6.3	11.3	+5.8	13.3	−1.3	31.4	+1.8

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

industry, much of the sapling loss can be traced to recent conversion of natural pine stands to plantations. Like most natural stands, the pine stands converted to plantations on industry land contained a substantial number of saplings that were overtopped or located in pockets beneath small openings in the canopy. Such trees have a high rate of mortality from competition and suppression, and many never would have survived to contribute to future inventory volume anyway. In addition, most of the stands that were harvested and replanted during the past 2 or 3 years are not included in the sapling counts because the trees have not yet reached sapling size. Although conversion of natural stands to plantations is likewise contributing to reduced numbers of softwood saplings on NIPF land, diversion of timberland to nonforest is mainly responsible. Loss of saplings caused by land use changes will have a much greater impact on future inventories than loss of understory saplings in natural pine stands.

The Hardwood Inventory

The merchantable volume of live hardwoods in Florida totals 7.3 billion cubic feet. Compared with 99 percent for softwoods, only 77 percent of the hardwood volume (5.7 billion cubic feet) qualifies as growing stock. About 61 percent of the hardwood growing-stock inventory is made up of soft-textured species (fig. 7). Blackgum, sweetbay, sweetgum, and red maple are the most prevalent soft-textured species. Together, these four species represent 48 percent of the total hardwood growing-stock inventory. The dominant hard-textured species include laurel oak, water oak, ash, and live oak, collectively responsible for another 34 percent.

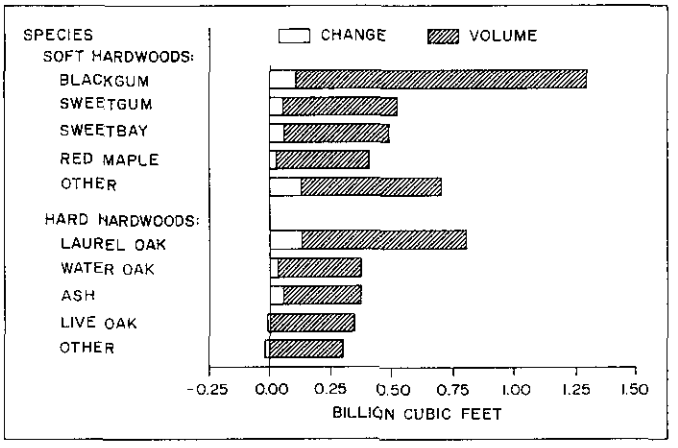


Figure 7.—Volume of hardwood growing stock in 1987, and change in volume of hardwood growing stock between 1980 and 1987, by species.

About 75 percent of the hardwood inventory is located in lowland hardwood stands, 14 percent in upland hardwood stands, and 7 percent in oak–pine stands. Since NIPF owners possess the highest proportions of all three of these broad management classes, the bulk of the hardwood growing-stock volume (55 percent) occurs on NIPF land. Forest industry and public agencies own 28 and 17 percent. The 5.7 billion cubic feet of hardwood growing stock include 16.5 billion board feet of sawtimber.

Hardwood growing-stock volume increased by 11 percent between 1980 and 1987 (fig. 5). This latest gain marks the fourth consecutive increase measured since the second survey in 1949, and is attributed primarily to a low rate of hardwood removals that has permitted a buildup of inventory volume in aging hardwood stands. Growing-stock volume was up for nearly all major hardwood species (fig. 7) and across most diameter classes (fig. 8). In line with the aging of the hardwood resource, the sawtimber portion of hardwood growing stock has increased by more than 16 percent.

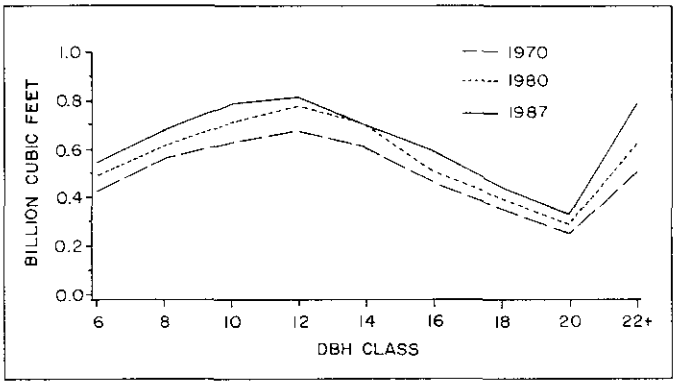


Figure 8.—Volume of hardwood growing stock by tree d.b.h. class, 1970, 1980, and 1987.

Contrary to trends in growing-stock volume, numbers of all live hardwoods are down slightly in most diameter classes (table II). The inconsistency between numbers of trees and volume trends originates from two sources. Compared with the 1980 inventory, a higher proportion of hardwoods were classified as growing-stock trees in 1987; also, the average volume per tree in a majority of diameter classes was slightly higher.

Diversion of hardwood stands to nonforest by NIPF owners was the leading reason for loss of hardwood tree numbers within this ownership class, as well as the comprehensive reduction across all ownerships. Purchases of hardwood timberland by public agencies magnified the loss on NIPF lands and explain the gains in numbers of hardwoods on publicly owned land. Forest industry retained about the same acreage in hardwood forest types, but still experienced small net losses of hardwoods in all diameter classes because of increasing hardwood removal and mortality rates.

Softwood Growth, Removals, and Mortality

All the various components of growth are summarized in table III. Gross growth is the sum of survivor growth, ingrowth, growth on ingrowth, growth on removals, and growth on mortality. Survivor growth, the average annual volume increment of surviving growing-stock trees at least 5.0 inches d.b.h. at the time of initial inventory, accounted for 82 percent of the total gross growth of all species combined. Ingrowth, the volume of growing-stock trees that grew to 5.0 inches d.b.h. each year during the remeasurement period, plus the average annual volume increment on these trees after they attained 5.0 inches (growth on ingrowth) accounted for another 16 percent of gross growth. Growth on removals and growth on mortality, the average annual volume increment on trees prior to harvest or death, contributed the remaining 2 percent. Net growth is gross growth minus mortality. Mortality reduced the average annual gross growth of all species by 16 percent.

After climbing for several decades, net annual growth of softwoods dropped by 3 percent during the latest remeasurement period—from 501 million cubic feet between 1970 and 1979 to an average of 488 million cubic feet per year between 1980 and 1986 (fig. 9). During the same period, softwood growing-stock removals increased from 320 to 474 million cubic feet annually, thereby shrinking the gap between softwood growth and removals close to equilibrium. The slim margin growth over removals is responsible for halting the buildup of softwood inventory, and has produced overcut situations in parts of the State. In Northeast Florida, softwood removals exceed net annual growth by 9 percent.

Table III.—Average annual components of change in the volume of growing stock on Florida's timberland, by Survey Unit and species group, 1980-1986

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									
Northeast										
Softwood	292.2	233.0	43.9	5.1	9.4	0.8	26.3	265.9	290.3	−24.4
Hardwood	87.5	72.2	13.4	.9	.6	.4	26.6	60.9	39.7	+21.2
Total	379.7	305.2	57.3	6.0	10.0	1.2	52.9	326.8	330.0	−3.2
Northwest										
Softwood	162.5	128.2	27.6	2.4	3.8	.5	19.6	142.9	141.4	+1.5
Hardwood	65.1	56.8	7.1	.5	.4	.3	20.2	44.9	21.4	+23.5
Total	227.6	185.0	34.7	2.9	4.2	.8	39.8	187.8	162.8	+25.0
Central										
Softwood	73.0	63.0	8.1	.7	.9	.3	10.4	62.6	38.2	+24.4
Hardwood	45.4	40.0	4.7	.4	.1	.2	12.3	33.1	5.3	+27.8
Total	118.4	103.0	12.8	1.1	1.0	.5	22.7	95.7	43.5	+52.2
South										
Softwood	22.1	18.9	2.7	.2	.2	.1	6.0	16.1	4.3	+11.8
Hardwood	2.6	2.4	.2	—	—	—	.7	1.9	.1	+1.8
Total	24.7	21.3	2.9	.2	.2	.1	6.7	18.0	4.4	+13.6
State										
Softwood	549.8	443.1	82.3	8.4	14.3	1.7	62.3	487.5	474.2	+13.3
Hardwood	200.6	171.4	25.4	1.8	1.1	.9	59.8	140.8	66.5	+74.3
Total	750.4	614.5	107.7	10.2	15.4	2.6	122.1	628.3	540.7	+87.6

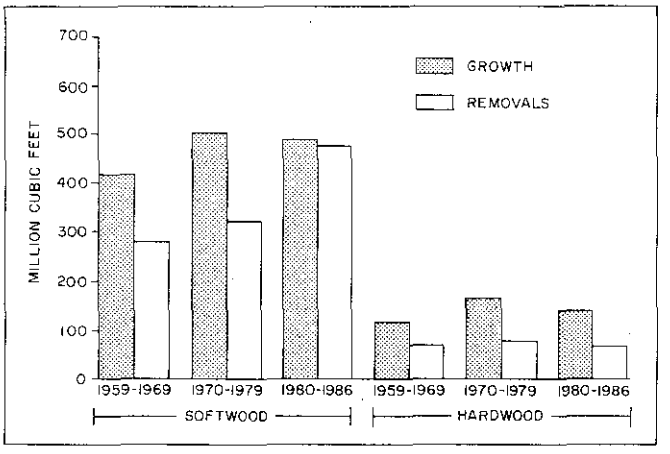


Figure 9.—Average net annual growth and annual timber removals of growing stock by softwood and hardwood, 1959–1969, 1970–1979, 1980–1986.

Heavy loss of timberland contributed to a pronounced reduction in softwood growth in NIPF land, where net annual growth fell by 13 percent to 186 million cubic feet. At 202 million cubic feet, the annual rate of softwood removals on NIPF land surpassed growth by 8 percent (fig. 10). On NIPF land in Northeast Florida, softwood removals were 45 percent higher than growth. On public land, a buildup of older stands was largely responsible for a 7-percent decline in softwood growth. However, unlike the deficit situation on NIPF land, the growth:removals ratio on public land (74:49 million cubic feet) displayed a considerable growth surplus. On forest industry land, a favorable growth:removals ratio (228:224 million cubic feet) was sustained by a 10-percent increase in softwood growth. The boost in growth on industry land was driven by conversion of natural pine stands to faster growing pine plantations.

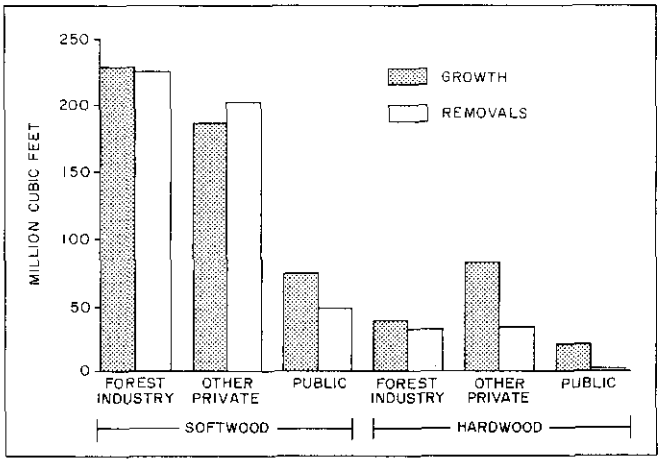


Figure 10.—Average net annual growth and annual timber removals of growing stock by softwood and hardwood, by ownership class, 1980–1986.

In contrast to the near balance growth and removals when all softwood species are grouped, the yellow pine portion of the softwood resource experienced an overcut that resulted in the 2-percent reduction of pine inventory volume. Since the previous survey, yellow pine growth has dropped by 5 percent to 427 million cubic feet, while pine removals climbed from 301 to 441 million cubic feet. Nearly all the pine overcut took place on NIPF land.

Viewed at the population level, growth rates are influenced by changes in the amount of timberland acreage that can mask meaningful changes in productivity. Conversion of growth to a per-acre basis allows comparison of growth rates in the absence of land-base changes. During the latest remeasurement period, net growth of softwood growing stock averaged 32.5 cubic feet per acre per year. The comparable figure from the previous survey, 32.0 cubic feet, indicates that per-acre softwood growth rates have remained about the same. By region, per-acre growth rates were nearly unchanged in the two northern Survey Units, and up slightly in Central and South Florida.

A steadily increasing proportion of plantations accounts for a 10-percent gain in per-acre softwood growth on forest industry land. Although the ratio of planted stands on NIPF land has also increased, per-acre softwood growth has remained about the same. Many of the trees in these recently planted NIPF stands have not yet reached volume size and are therefore not contributing to the growth estimates. More than half the plantations on NIPF land are between 0 and 10 years old. In contrast, average per-acre growth of softwoods on public timberland has dropped by 17 percent during the latest remeasurement period. Recent acquisitions of hardwood stands are at least partially responsible for this decline because a smaller percentage of public land now supports softwood species. Also, a higher ratio of the softwood volume on public land consists of slower growing cypress in aging stands.

Combining all ownerships, softwood growth in pine plantations has increased by 5 percent, from an average of 58.2 to 61.4 cubic feet per acre. This is likely the result of genetic improvement and broader application of highly intensive management techniques, such as the use of fertilizer. On the other hand, softwood growth in natural pine stands fell from 47.3 to 38.6 cubic feet per acre, a decline of 18 percent. Conversion of the better managed and more productive natural stands to pine plantations could be depressing the average growth rate of the remaining natural stands.

At the population level, softwood growing-stock mortality has jumped from an annual average of 45 to 62 million cubic feet, an increase of 39 percent. The leading identifiable causes of death were fire and insects, which accounted for 16 and 10 million cubic feet of annual mortality, respectively. A more meaningful comparison of mortality rates is achieved by expressing them as a proportion of the inventory volume existing at the beginning of each measurement period. On this basis, relative softwood mortality rates are still found to be increasing, but not nearly at the rate suggested by the above figures. Adjustment for differences in inventory volume shows that annual mortality claimed 0.65 percent of starting inventory each year between 1970 and 1979, and 0.71 percent between 1980 and 1986.

Hardwood Growth, Removals, and Mortality

Hardwood species account for 22 percent of total growing-stock growth in Florida, and about 12 percent of growing-stock removals. Average annual net growth of hardwood growing stock totaled 141 million cubic feet during the latest survey period, down by 15 percent. Still, hardwood growth was more than twice the rate of hardwood removals, which averaged 66 million cubic feet annually (fig. 9). In contrast to the balance between softwood growth and removals, a considerable excess of hardwood growth over removals has promoted the continuing buildup of hardwood inventory volume. Demand for hardwoods in Florida has historically been soft. Moreover, there is no evidence of a turnaround, as the average rate of hardwood growing-stock removals has fallen by 18 percent since 1980.

Net growth of hardwood growing stock has declined by 29 percent on forest industry land and 16 percent on NIPF land, due in part to higher proportions of pine plantations in both ownership categories, and compounded by the general loss of timberland in the case of NIPF owners. Procurement of hardwood acreage by the State boosted average annual hardwood growth on public land by 38 percent. Hardwood removals were down on NIPF and public land, and large disparities between growth and removals still persist in these two owner categories (fig. 10). The average annual hardwood growth:removal ratios on NIPF and public land now stand at 82:33 and 21:1 million cubic feet, respectively. On forest industry land, a slight upturn in removals combined with 29-percent reduction in growth has nearly brought the hardwood growth:removal ratio into balance at 39:32 million cubic feet.

At the per-acre level, average growth of hardwood growing stock has fallen by 11 percent to the current 9.4 cubic feet per year. Hardwood growth rates were down in all Survey Units except Central Florida. By ownership, per-acre hardwood growth slowed by 29 percent on forest industry land and 5 percent on NIPF land. Again, because a greater proportion of public timberland now supports hardwood species, the average growth of hardwoods on public land has increased by 24 percent—from 6.8 to 8.4 cubic feet per acre per year.

Mortality of hardwood growing stock climbed by 53 percent to an average of 60 million cubic feet per year since 1980. Weather damage and disease were the leading identifiable causes of hardwood mortality. As with softwood mortality, expressing hardwood mortality as a percentage of inventory volume reveals a moderate increase in relative mortality rates. Between 1970 and 1979, mortality claimed 0.98 percent of the initial inventory each year. Since then, the average annual mortality toll has risen to 1.22 percent.

Timber Products Output

In addition to providing wildlife habitat, outdoor recreation, and esthetic values, Florida's forests cleanse the soil, water, and air. As a renewable resource, they also yield a continuing supply of timber products. The aim of this chapter is to describe the utilization of timber harvested from Florida's timberland. Industries dependent on this resource form a major part of the State's economy. In 1985, more than 1,700 firms were involved in some form of timber products manufacturing (U.S. Department of Commerce 1987). These companies employed more than 41,000 workers and generated an annual payroll in excess of $744 million.

Sources of Timber Removals Data

Average annual volumes of timber removals and product output between 1980 and 1986, listed in appendix tables 36-40, were derived from a combination of sources. The total volume of trees removed from timberland each year, as well as the volume associated with diversions of timberland to nonforest, was calculated from the remeasurement of FIA permanent ground samples. Over- and under-utilization of these removals to FIA merchantability standards was determined by applying utilization factors obtained from a sample of active logging operations throughout the State.

Estimates of industrial products from timber cut in Florida, mill residues generated during processing, and the subsequent disposal of these residues were acquired by canvassing all primary wood-using mills in the State. Pulpmill surveys were conducted every year during the remeasurement period; other wood-using mills were canvassed in 1981, 1983, 1984, 1985, and 1986. In previous Florida reports, annual product output figures were adjusted to represent the single year prior to the date of the timber inventory. In

this report, annual product output figures represent the average of all years within the measurement period. To establish valid trends in product output, data from the previous survey were reprocessed to obtain average annual product output data for the period between 1970–1979. Results of industrial canvasses for available years during the latest two survey periods are displayed in figure 11 to highlight annual fluctuations in industrial output.

Estimates of total domestic fuelwood (firewood) production are derived from consumption data reported by Skog and Waterson (1986). The portion of this total cut from timberland is based on the FIA plot remeasurement data.

Timber Utilization and Product Output From Roundwood

At 541 million cubic feet, the combined volume of all species cut from Florida's forests each year has increased by 35 percent since 1980. All of this gain was fueled by a 48-percent increase in softwood removals, which now account for 88 percent of the total removals from growing stock. Upturns in softwood removals were evident in all owner categories, increasing by 48 percent on forest industry land, 50 percent on NIPF land, and 41 percent on public land to 224, 202, and 49 million cubic feet per year, respectively.

The gain in softwood removals was countered by an 18-percent decline in hardwood removals. This reduction was led by a notable curtailment of hardwood cutting rates on public land—down from an average of 14 million cubic feet each year between 1970 and 1979, to the present level of about 1 million cubic feet. Hardwood removals were also down on NIPF land—from 38 to 33 million cubic feet.

Contrary to the trends on public and NIPF land, the volume of hardwoods removed annually from forest industry land increased slightly—from 30 to 32 million cubic feet.

Of the 541 million cubic feet of growing stock removed each year between 1980 and 1986, 436 million cubic feet (81 percent) were used for timber products (app. table 38). Logging residues, the unused merchantable portions of growing-stock trees harvested for products, account for another 6 percent. The remaining 13 percent are associated with "other removals" (cultural operations and land use changes where whole trees were not utilized for any product). Some of the trees on land cleared to nonforest are still standing, but are now in an urban or agricultural setting.

In conjunction with the 35-percent increase in growing-stock removals, product output from roundwood harvested in Florida rose from 326 to 481 million cubic feet (app. table 37), a gain of 48 percent. This was accomplished through better utilization of harvested growing-stock trees, as well as increased usage of non-growing-stock volume. Since 1980, the proportion of growing-stock removals used for roundwood products (including domestic fuelwood) has increased from 76 to 81 percent, and the volume of unutilized "other removals" fell from 19 to 13 percent (app. table 38). Coincident with this, utilization of non-growing-stock roundwood (cull trees, salvable dead trees, saplings, stumps, tops, limbs, and trees from nonforest sources) increased from 7 to 9 percent of the total product output from roundwood (app. table 37).

Improved utilization of harvested roundwood was apparent only for the hardwoods. Product output from softwood

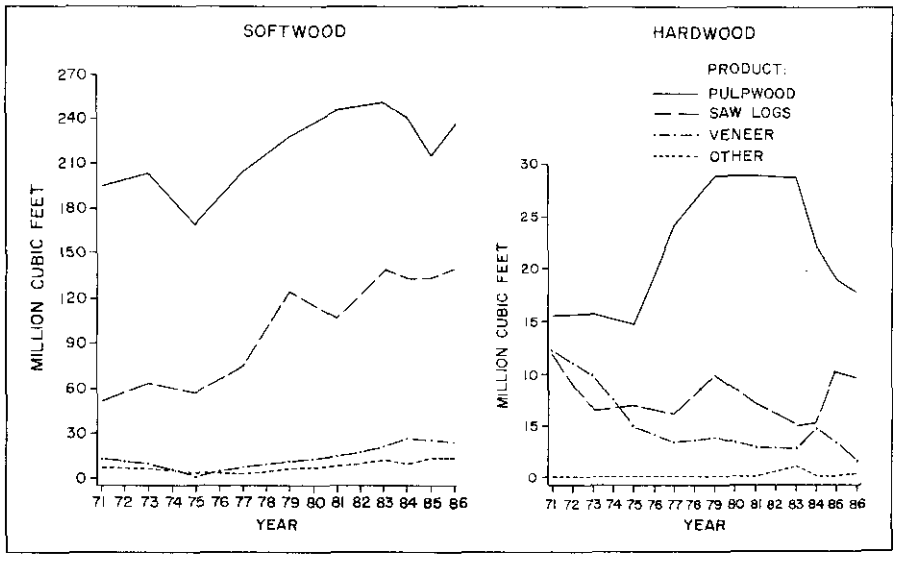


Figure 11.—Industrial timber product output from roundwood harvested in Florida, by softwood and hardwood, product, and year of mill canvass.

roundwood was up by 47 percent, about the same magnitude as the rise in softwood growing-stock removals (48 percent). Hardwood product output increased by 55 percent (from 38 to 58 million cubic feet) despite the 18-percent drop in hardwood growing-stock removals. Most of this improvement in utilization stems from a reduction of "other removals," meaning that a much higher proportion of hardwoods associated with TSI operations and timberland diversions were used for a product. As a result, the portion of hardwood growing-stock removals used for roundwood products increased from 37 to 54 percent. In addition, the ratio of hardwood roundwood products from non-growing-stock sources has increased from 20 to 39 percent since 1980.

Industrial timber products account for 95 percent of Florida's 481 million cubic feet of product output from roundwood. Domestic fuelwood constitutes the remaining 5 percent. Since 1980, output of industrial products from roundwood has increased by 41 percent, from 322 to 455 million cubic feet. Softwood species, which make up 92 percent of the current total, are responsible for nearly all of the gain. The combined industrial output from hardwood roundwood remained almost unchanged at 35 million cubic feet. Cuts in the production of hardwood saw logs and veneer were offset by increased use of hardwoods for pulp and other fiber products. Although domestic fuelwood constitutes only a minute portion of the total output from roundwood, a marked increase in domestic fuelwood production is responsible for almost all the increase in overall hardwood timber products output. It also explains the higher percentage of hardwood growing-stock removals utilized for timber products, and the increased usage of hardwoods from non-growing-stock sources.

Mill Byproducts

In conjunction with the manufacture of industrial timber products from roundwood, more than 155 million cubic feet of residues were generated at mills in Florida each year. Included in this figure were 55 million cubic feet of bark, 58 million cubic feet of coarse residues (chips, slabs, edgings, cores), and 42 million cubic feet of fine residues (shavings and sawdust). Nearly all mill residues were recovered, since only about 3 million cubic feet of wood and bark—less than 2 percent of the total generated—went unused (app. table 40). Almost 82 million cubic feet were burned for industrial fuel, another 1 million cubic feet were burned for domestic fuel, and 70 million cubic feet were used for industrial timber products (app. table 36). Added to the industrial products and domestic fuelwood production from roundwood, the output of mill byproducts from residues raised the total output of timber products from 481 to 552 million cubic feet.

Along with the gain in roundwood production, the volume of residues increased markedly from the 97 million cubic feet produced annually between 1970 and 1979. However, little change is evident in the distribution pattern of mill residues. The percentage of residues allocated to industrial fuel, domestic fuel, and industrial timber products, as well as the proportion that went unused, has remained about the same.

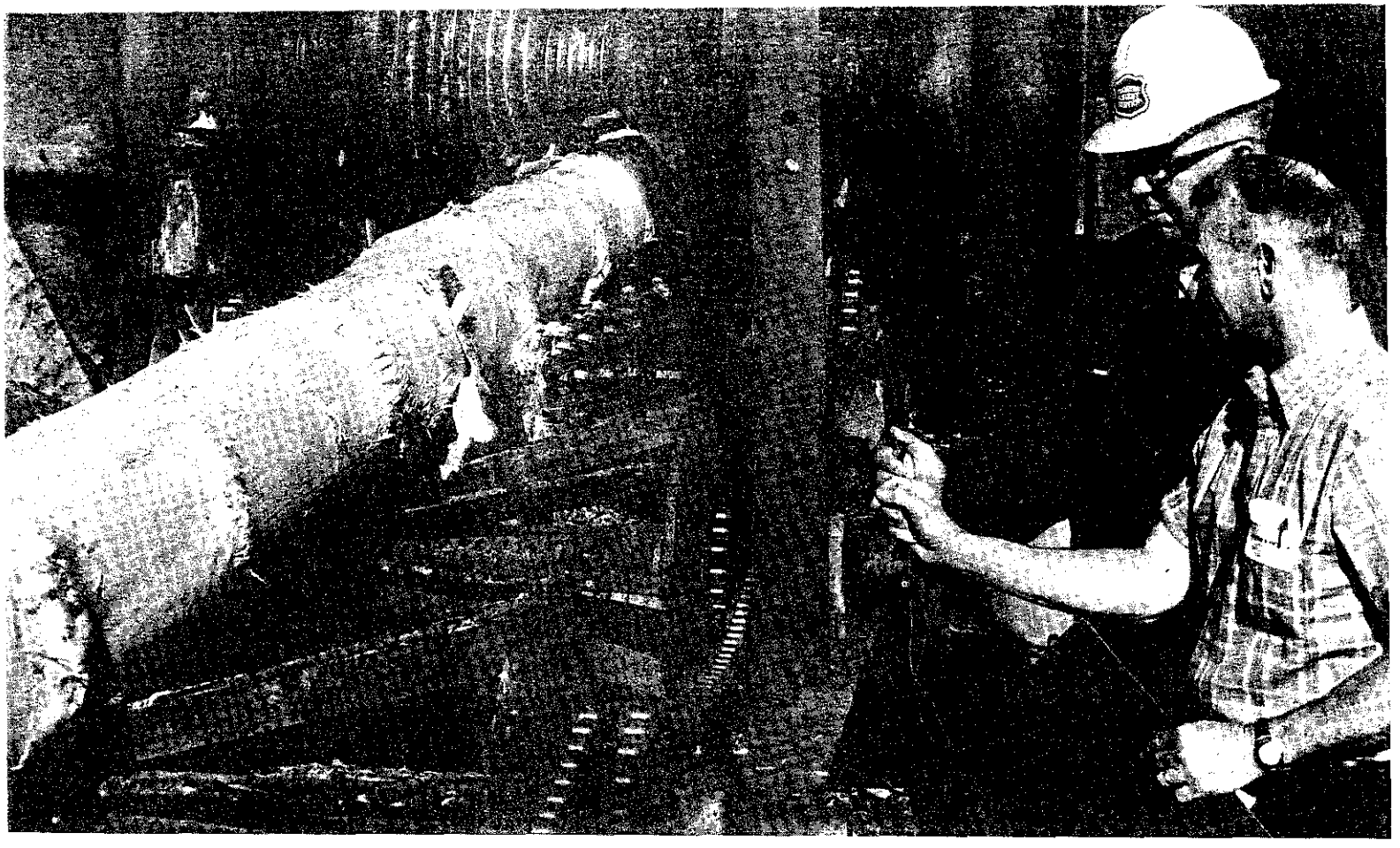
Pulpwood Production

Pulpwood is by far the leading timber product in Florida, responsible for 57 percent of the entire product output (app. table 36). Of the total volume of pulpwood produced, 77 percent originated from growing-stock roundwood, 8 percent from non-growing-stock roundwood, and 15 percent from mill residues. Between 1980 and 1986, annual production from all sources averaged 314 million cubic feet (4.2 million cords), an increase of 26 percent. Hardwood species account for only 8 percent of the total, about the same as in the previous period.

More use of non-growing-stock roundwood and mill residues attests to improved utilization by the industry. Prior to 1980, 7 and 12 percent of the pulpwood production was composed of non-growing-stock roundwood and mill residues. Since then, the 26-percent gain in total pulpwood production was accompanied by just a 20-percent increase in growing-stock removals destined for pulp products. The rest came from non-growing-stock roundwood and mill residues.

Annual pulpwood production from roundwood (both growing-stock and non-growing-stock) averaged close to 268 million cubic feet between 1980 and 1986, but ranged from a high of 280 million cubic feet in 1983, to a low of 234 million cubic feet in 1985. As shown in figure 11, softwood roundwood production vacillated somewhat during the remeasurement period, but generally trended upward. Hardwood pulp production, more susceptible to dramatic swings because these species make up such a small percentage of the total, has recently dropped sharply from a plateau reached in the early 1980's. However, the 1987 pulpwood data suggest that the dip in hardwood pulp production may currently be rebounding.

One of the more striking trends involving pulpwood is the radical decline in use of sawtimber for pulp production. In 1958, 87 percent of the growing-stock roundwood harvested for pulpwood came from sawtimber-size trees. This proportion declined steadily over the following two decades, averaging about 45 percent between 1970 and 1979. Since 1980, only 15 percent of the growing-stock roundwood cut for pulpwood came from sawtimber-size trees (app. table 37).



This change is consistent with the conversion of Florida's older natural pine stands to young pine plantations over the past 30 years. It also indicates that more producers are merchandizing the highest value products from timber removals. Only 49 percent of the sawtimber volume cut for roundwood products went for saw logs or veneer between 1970 and 1979. Since then, the percentage of sawtimber volume utilized for these more valuable products has climbed to 75 percent.

Of the 268 million cubic feet of roundwood cut for pulp each year in Florida during the latest remeasurement period, 228 million cubic feet were retained within the State. The other 40 million cubic feet were exported to other States for processing. Also during the same period, an average of 86 million cubic feet of roundwood pulp were annually imported from other States, making Florida a net importer of pulpwood. Adding residues utilized for pulp production to the volume of roundwood retained within the State and roundwood imported from other States, pulpmills in Florida processed an average of 360 million cubic feet of wood each year between 1980 and 1986. Although several mills changed hands, 10 pulpmills remained operational throughout most of the 7-year period.

Saw-Log Production

Saw logs are the second leading timber product from Florida's forests, accounting for 26 percent of the total product output. Annual saw-log output now averages 144 million cubic feet (751 million board feet), up by 74 percent. Of the saw logs produced, 96 percent came from growing-stock roundwood, 3 percent from non-growing-stock roundwood, and 1 percent from mill byproducts such as veneer cores. Prior to 1980, hardwoods contributed about 10 percent to total saw-log production. Since then, the hardwood proportion has fallen to less than 5 percent.

After increasing from 108 to 139 million cubic feet between 1981 and 1982, softwood saw-log production stabilized throughout the rest of the current survey cycle, wavering between 133 and 140 million cubic feet (fig. 11). Hardwood production was much more erratic, ranging from 5 million cubic feet in 1983 to 10 million cubic feet in 1985.

About 3 million of the 143 million cubic feet of saw logs harvested in Florida each year were exported to other States. Almost 14 million cubic feet were imported to Florida mills each year from other States. Including the 1 million cubic feet of sawn products from mill residues, an average of 155 million cubic feet were processed in Florida sawmills. In 1986, there were 97 sawmills operating in Florida—down from 112 in 1979.

Veneer-Log Production

Since 1980, the annual production of veneer logs has averaged 25.9 million cubic feet (134 million board feet)—about 5 percent of the total product output. This represents an increase of 69 percent over the 15.3 million cubic feet of veneer produced each year during the previous period. Essentially all veneer logs originated from growing-stock roundwood of sawtimber size.

As with saw logs, all the net gain in veneer production was due to softwood species. Softwood production gained steadily each year during the latest survey cycle (fig. 11), averaging 23.2 million cubic feet annually during the 7-year period. Hardwood veneer-log production generally trended downward between 1980 and 1986, averaging only 2.7 million cubic feet each year. In comparison, annual softwood and hardwood veneer production between 1970 and 1979 averaged 8.6 and 6.6 million cubic feet, respectively.

The latest trends in veneer production extend a pattern that started soon after pine plywood production began to boom in the mid-1960's. Softwood peeler logs, virtually unheard of in the South prior to 1960, had captured almost a third of the total veneer market by 1969. After surpassing hardwood production in the mid-1970's, softwoods have constituted an ever-increasing share of the total, and are now responsible for 90 percent of all peeler-log production. In contrast, hardwood veneer production has been falling since reaching a high of 12.0 million cubic feet in 1971.

Almost 3 million cubic feet of peeler logs produced in Florida were exported to other States, while 4 million cubic feet were imported. Total consumption of veneer logs by Florida mills approached 27 million cubic feet.

Other Industrial Timber Products

The combined output of all additional industrial products averaged 40 million cubic feet per year between 1980 and 1986—about 7 percent of the total product output. These include poles, pilings, and posts, as well as miscellaneous specialty products grouped under the "other" category in appendix tables 36–39. Volume listed as "other" in these tables includes such products as litter, mulch, composition board, and charcoal.

Pole and piling production has increased from 3.6 to 6.6 million cubic feet since 1980. Annual output of fenceposts has more than tripled, rising from 1.0 to 3.8 million cubic feet. All poles and pilings, and 80 percent of the posts, were produced from growing-stock roundwood. The rest of the posts originated from non-growing-stock roundwood. All poles and pilings, and 96 percent of the posts, were made from softwood species.

Output of other miscellaneous products, including litter and mulch, averaged 29.9 million cubic feet each year—up from 18.2 million cubic feet. About 24 percent of these products originated from growing-stock roundwood, 1 percent from non-growing-stock roundwood, and 75 percent from mill byproducts. The amount of roundwood used for other industrial products has increased from virtually none to about 7.5 million cubic feet per year since 1980. Nearly all of this roundwood was chipped to supply a flourishing market for landscaping mulch. Most of the roundwood chipped for mulch was cypress, preferred for its silver coloration and resistance to rot.

In addition to the 7.5 million cubic feet of roundwood, 22.4 million cubic feet of mill residues were used for miscellaneous industrial products. About 68 percent was utilized as litter or mulch, 20 percent for composition board products, and 12 percent for charcoal.

Domestic Fuelwood Production

Although the use of firewood has certainly increased markedly during the latest remeasurement period, it should be noted that the actual magnitude of gain is uncertain, as past estimates of firewood production may have been low. Trends in domestic fuelwood production are particularly difficult to track because producers and markets are so widely dispersed.

The current annual output of domestic fuelwood is estimated at 27.2 million cubic feet, about 5 percent of the total product output. Of the fuelwood production, 45 percent originated from growing-stock roundwood, and 52 percent from non-growing-stock roundwood; the remaining 3 percent was produced from mill residues. Hardwood species account for 86 percent of the total domestic fuelwood output. As previously discussed, the increase in hardwood firewood production was the chief reason for the net gain in total hardwood output.

Timber Supply Outlook

In the first section we examined the latest trends involving growth, removals, and inventory volume. We now build on this and other information about Florida's timber resources to develop a 30-year estimate of prospective timber supplies. Since prospective supplies for the next three decades are already somewhat constrained by the current structure of the resource, these projections are prefaced with an overview of resource structure in terms of acreage distributions by forest type, stand age, and management potential. We also examine recent harvesting, regeneration, and other practices that have played instrumental roles in shaping the resource.

To simplify the discussion of resource structure, the five broad forest types have been collapsed into just two categories (pine and hardwood) throughout much of the text that follows. The "pine type" designation encompasses both natural pine stands and pine plantations unless otherwise noted. The "hardwood type" designation includes oak–pine, upland hardwood, and lowland hardwood stands.

Rates of Treatment and Disturbance

Of all the activities responsible for shaping the resource and affecting future supplies, harvesting and regeneration are among the most important. Along with changes in the forest land base, the balance between harvesting and regeneration heavily influences the amount of acreage occupied by manageable stands—the primary source of future supplies. Manageable stands are at least 50 percent stocked with growing-stock trees similar enough in size to be managed together until the stand reaches maturity.

Between 1980 and 1987, more timberland acres in Florida were harvested than regenerated. During this time, an average of 296,000 acres underwent a final harvest each year and were retained in forest (table IV). Another 67,000 acres of manageable stands were harvested and subsequently diverted to urban, agricultural, or other nonforest uses. In contrast, only 272,000 acres annually regenerated to

Table IV.—Area of Florida's timberland treated or disturbed annually, by broad management and ownership classes, 1980 to 1987

Broad management[a] and ownership classes[b]	Major stand treatments				Natural disturbance
	Final harvest	Partial harvest[c]	Commercial thinning	Other cutting	
			Acres		
Pine plantation					
Public	3,107	—	2,784	—	1,056
Forest industry	62,854	683	16,689	1,132	22,026
Other private	27,358	1,068	8,539	956	7,674
Total	93,319	1,751	28,012	2,088	30,756
Natural pine					
Public	21,623	4,848	10,372	2,764	7,267
Forest industry	64,832	1,943	2,252	1,769	5,783
Other private	46,118	5,074	3,207	3,718	20,713
Total	132,573	11,865	15,831	8,251	33,763
Oak-pine					
Public	909	378	—	325	453
Forest industry	7,739	2,379	322	—	2,933
Other private	12,919	2,261	—	1,547	4,570
Total	21,567	5,018	322	1,872	7,956
Upland hardwood					
Public	2,548	—	—	—	1,333
Forest industry	8,059	664	—	—	690
Other private	8,570	1,036	299	3,834	6,627
Total	19,177	1,700	299	3,834	8,650
Lowland hardwood					
Public	296	800	—	400	2,598
Forest industry	17,012	7,270	990	736	5,892
Other private	12,108	8,777	—	2,819	23,551
Total	29,416	16,847	990	3,955	32,041
All classes					
Public	28,483	6,026	13,156	3,489	12,707
Forest industry	160,496	12,939	20,253	3,637	37,324
Other private	107,073	18,216	12,045	12,874	63,135
Total	296,052	37,181	45,454	20,000	113,166

[a] Broad management class before treatment or disturbance.
[b] Ownership class in 1987. Forest industry includes lands under long-term lease.
[c] Includes high-grading and some selective cutting.

Table V.—Area of timberland regenerated annually, by broad management and ownership classes, Florida, 1980 to 1987

Broad management[a] and ownership classes[b]	Total regeneration	Type of regeneration					
		Artificial regeneration after a harvest	Natural regeneration after a harvest	Other artificial regeneration on forest land	Other natural regeneration on forest land	Artificial regeneration on nonforest land	Natural reversion on nonforest land
				Acres			
Pine plantation							
Public	15,364	10,347	—	5,017	—	—	—
Forest industry	110,663	76,743	322	31,791	—	1,807	—
Other private	60,956	26,950	—	9,484	—	24,522	—
Total	186,983	114,040	322	46,292	—	26,329	—
Natural pine							
Public	6,530	—	2,311	—	2,695	—	1,524
Forest industry	4,217	—	2,448	—	1,498	—	271
Other private	21,398	—	4,320	—	9,788	—	7,290
Total	32,145	—	9,079	—	13,981	—	9,085
Oak–pine							
Public	1,013	279	378	356	—	—	—
Forest industry	6,539	2,301	1,144	3,094	—	—	—
Other private	9,160	673	1,376	400	4,673	669	1,369
Total	16,712	3,253	2,898	3,850	4,673	669	1,369
Upland hardwood							
Public	756	—	378	—	378	—	—
Forest industry	4,092	372	2,786	592	342	—	—
Other private	9,279	345	6,213	—	1,430	—	1,291
Total	14,127	717	9,377	592	2,150	—	1,291
Lowland hardwood							
Public	326	—	326	—	—	—	—
Forest industry	7,229	364	5,383	364	1,118	—	—
Other private	14,537	—	9,091	—	3,974	—	1,472
Total	22,092	364	14,800	364	5,092	—	1,472
All classes							
Public	23,989	10,626	3,393	5,373	3,073	—	1,524
Forest industry	132,740	79,780	12,083	35,841	2,958	1,807	271
Other private	115,330	27,968	21,000	9,884	19,865	25,191	11,422
Total	272,059	118,374	36,476	51,098	25,896	26,998	13,217

[a] Broad management class after regeneration.
[b] Ownership class in 1987. Forest industry includes lands under long-term lease.

manageable stands of timber (table V). This total includes successful regeneration (both planted and natural) on existing timberland, as well as 40,000 acres that were previously nonforest. In effect, only 75 percent of all manageable stands that were harvested and/or diverted since 1980 have been replaced by newly regenerated stands of timber. Due largely to the imbalance among rates of harvesting, land clearing, and regeneration, the total number of manageable timber stands in Florida has dropped from 10.3 to 10.0 million acres. This loss would have been greater, but a higher growing-stock to total volume ratio caused more borderline stands to classify as manageable.

Harvesting outpaced regeneration for both pine and hardwood forest types. Considering the 226,000 acres of harvested pine stands retained in forest, another 42,000 acres of manageable pine stands diverted to nonforest, and the 219,000 acres successfully regenerated to pine, only 82 percent of all manageable pine stands harvested and/or diverted each year were replaced. Because of the large number of NIPF acres diverted to nonforest, the greatest pine regeneration deficit occurred within this ownership category (fig. 12). Only 75 percent of the manageable pine stands on NIPF land harvested or diverted to nonforest since 1980 have been replaced by new manageable stands of pine. The corresponding value for forest industry and public owners is 87 and 85 percent, respectively.

Although the pine regeneration deficit is alarming, it must be viewed within the context of several other factors. If harvesting, regeneration, and land clearing had been the only factors involved, there would have been some reduction of manageable pine acreage. However, a loss was averted by shifting of manageable acreage among forest types, some of which was brought about by cultural treatments designed to favor the pine component of existing oak–pine and hardwood stands. The total acreage of manageable pine stands thus remains nearly unchanged at 6.1 million acres. Also, if diversions to nonforest are written off and viewed as outside the reach of forestry-related activities, over 97 percent of the pine acreage harvested and retained in forest was replaced by newly regenerated pine stands.

Although not enough to compensate for the added encumbrance of pine stand diversions to nonforest, rates of artificial regeneration were up sharply during the latest survey interval. Of the 219,000 acres successfully regenerated to pine each year, 187,000 acres, or 85 percent, were planted. Another 10,000 acres showed evidence of artificial regeneration but at present are classified as oak–pine or hardwood forest types due to excessive hardwood competition. Through selective management, many of these stands eventually will be dominated by the planted pines. In all, an average of 197,000 acres were planted each year. Current planting rates are now approaching the amount of acreage planted during the peak years of the Soil Bank era. However, there is a difference in that much of the present planting is correlated with a high rate of harvesting. The Soil Bank plantings came in response to excessive quantities of abandoned farmland, and thus augmented the forest land base. Compared with the period between 1970 and 1980, planting rates were higher for all three owner groups. The

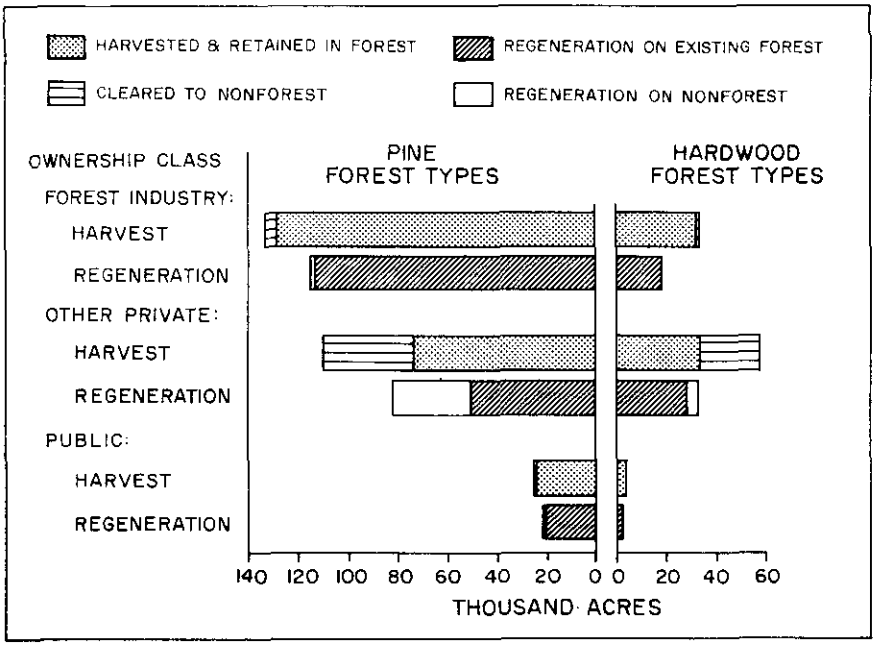


Figure 12.—Average annual rates of harvesting and regeneration by ownership class, pine and hardwood forest type, and land-use status, 1980–1987.

largest gain occurred on NIPF land, where annual planting rates more than tripled—climbing from 20,000 to 63,000 acres per year. The area planted on land managed by forest industry rose by 21 percent from 97,000 to 117,000 acres per year. Annual planting on public timberland increased from 13,000 to 16,000 acres.

Hardwood harvesting was much less prevalent than pine harvesting. Only 24 percent of the total timberland area harvested since 1980, or 70,000 acres per year, supported a hardwood timber type prior to harvest. Nearly 42 percent occurred in lowland hardwood stands, 31 percent in oak–pine stands, and 27 percent in upland hardwood stands. Alternately, just 53,000 acres successfully regenerated to manageable hardwood stands each year, replacing the equivalent of 75 percent of the hardwood stands harvested and retained in forest. Adding in diversions of manageable hardwood stands to nonforest, only 56 percent of all hardwood stands harvested or diverted were replaced by adequately stocked stands of young hardwoods. By ownership, the effective replacement rate of harvested or diverted manageable hardwood stands was 57 percent on NIPF land, 56 percent on public land, and 53 percent on forest industry land (fig. 12). At least part of the low hardwood replacement rate is due to a higher incidence of conversion to pine plantations. Since 1980, the total number of manageable hardwood stands in Florida has dropped by 8 percent, from 4.3 to 4.0 million acres.

In addition to the 296,000 acres that underwent final harvest, timber was removed from another 103,000 acres each year in the form of commercial thinnings, partial harvests, and other miscellaneous cutting (table IV). About 45,000 acres were commercially thinned each year, and virtually all the thinning (96 percent) occurred in pine stands. Partial harvests took place on an average of 37,000 acres annually. In hardwood stands, which account for 63 percent of all partial harvests, most of the partial cutting is better characterized as either highgrading or pine selection, with very few true selection cuts designed to improve the quality of the residual stand. In pine stands, much of the partial harvesting would better be described as diameter-limit cutting. Timber was removed from another 20,000 acres each year for timber stand improvement and other miscellaneous purposes.

Structure of the Pine Resource

The age structure and broad forest type composition of Florida's pine forests reveal a level of management intensity unmatched elsewhere in the Southeast. In all, 3.9 million acres, or 64 percent of the State's manageable pine stands, are currently in pine plantations. Three-fourths of these plantations have been established in the past 20 years. Already a significant source of softwood timber, these planted stands will soon become the primary source of softwood supplies. Between 1980 and 1987, 40 percent of all softwood growing-stock removals came from pine plantations.

In general, the age distribution of the pine resource depicts a stable situation for future supplies. The amount of pine acreage in every 10-year age class is followed by more acreage in the next younger age class (fig. 13). This relationship is particularly meaningful for the first three age classes (0–30 years), because the majority of pine stands are on rotations of 30 years or less. Insofar as the acreage in each of the two youngest classes is greater than the acreage

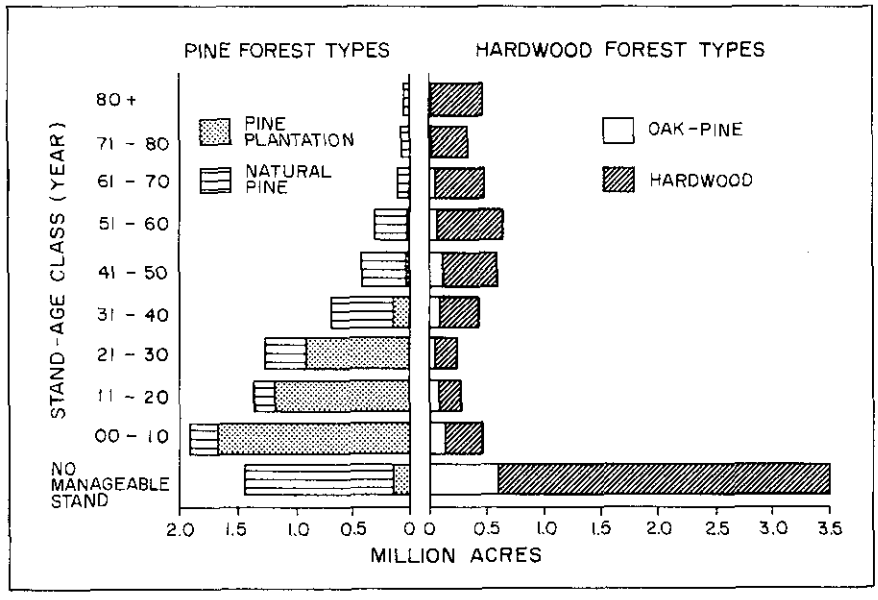


Figure 13.–Profile of timberland in Florida by stand-age and broad management class, 1987.

in the 21–30 class, no shortages of harvestable acreage are on the horizon, and the acreage available for harvest may even increase over the next two decades. However, bear in mind that more acreage available for harvest in the 21–30 class will not necessarily translate into more harvestable volume. As older pine stands with substantial volume accumulations are harvested and placed on shorter rotations, the average volume per acre of timber removals will drop accordingly.

The diversity of management patterns and objectives among the owner groups has resulted in some notable differences in the structure of their pine timberlands. NIPF and forestry industry stand-age profiles are similar to the combined profile for all owners. The broad base of young stands on these two ownerships is a reflection of the heavy demand for poletimber-size pines generated by the pulp and paper industry over the last 40 years. Meeting the enormous demand for softwood fiber requires a large concentration of young stands on short rotations in order to maximize growth rates. As this demand continues, even more of the total pine acreage will tend to accumulate in stands between 0 and 30 years old on these two ownerships. Public timberland is less subject to the economic forces that influence private land. In contrast to the pyramid-shaped age structure on NIPF and forest industry timberland, the distribution of pine acreage on public timberland is approximately equal in all age classes between 0 and 60 years. This is indicative of a multiple-use management strategy designed to maintain a balanced diversity of stand conditions.

Although the general shape of NIPF and forest industry age profiles are similar, there are other differences between these two owner groups that involve important structural attributes. About 27 percent of the 2.8 million acres of natural and planted pine stands on NIPF land are not considered manageable by FIA standards. Only 11 percent of the 3.3 million acres of pine on forest industry land is not manageable, and most of this acreage represents a backlog of stands awaiting regeneration after a recent harvest. Of the pine acres that are considered manageable, more than half are occupied by natural stands on NIPF land, as compared with only 15 percent on forest industry land. Related to their higher percentage of natural stands, NIPF owners have more acreage in older stands. Over 566,000 acres, or 28 percent of all manageable pine stands on NIPF land, are more than 30 years old. Forest industry has 358,000 acres, about 12 percent of its manageable pine resource, in stands older than 30. Finally, there is a shortage of pine stands between 11 and 20 years old on NIPF land, brought about by depressed planting rates during the late 1960's and early 1970's. The acreage now in stands 11–20 years old on NIPF land is 32 percent less than stands in the 21–30 year class. Nonetheless, this should not have any undue bearing on future supplies, and will be of relatively short duration, because there is an abundance of 11- to 20-year-old stands on forest industry land, and planting rates on NIPF land have improved immensely since 1980.

Taken together, all the differences in pine resource structure among the various owners suggest that during the coming decade forest industry will rely more heavily on its own land for pine poletimber. This reliance will be amplified to the extent that NIPF owners continue to divert pine timberland to nonforest. NIPF owners will probably fulfill a larger share of the demand for pine sawtimber since they have the largest concentration of older stands. In all likelihood, public owners will maintain pine supplies near current levels.

Structure of the Hardwood Resource

The most striking feature about Florida's hardwood resource is the large number of stands with insufficient stocking. Almost 3.5 million acres, 47 percent of the entire hardwood resource, lack a manageable stand of timber (fig. 13). Far too many hardwood stands are in such poor condition, and no obvious sign of improvement is in sight. The percentage of nonmanageable hardwood stands in existence now is about the same as in 1980. These stands cover a wide variety of physiographic conditions and productivity classes. About one-third are located on xeric sites (mostly sandhills), one-third on mesic sites (rolling uplands and flatwoods), and one-third on hydric sites (bays, stream margins, and swamps). The average base 50 site index of these stands is 65 feet; 93 percent fall between 50 and 79 feet. The distribution by ownership reveals no particular owner category responsible for an inordinate amount of this acreage. Proportions of nonmanageable stands range from 41 percent of the total hardwood acreage on forest industry land to 49 percent of the hardwood resource on NIPF and public land. As emphasized by the poor hardwood harvest:regeneration ratios, a good many of these stands are the result of failure to provide for adequate regeneration after harvest. One-fifth of the stands now in this condition experienced a final harvest between 1980 and 1987.

Other notable characteristics of the hardwood age profile are a buildup of stands in the older age classes and a scant supply of acreage in young stands. Older stands are accumulating because hardwood removals have historically been low—about half the hardwood growth rate for the past three or four decades. This accumulation, combined with conversion of harvested hardwood stands to pine plantations, has contributed to the depletion of hardwood stands 0–30 years old.

Past emphasis on pine management in Florida has yielded a highly productive pine resource capable of sustaining the high levels of growth required to supply the pulpwood industry with softwood fiber. In the coming years, as the sites most suitable for pine production continue to be planted to pine, a higher proportion of the remaining stands will be unsuitable for pine production. Eventually, a point of diminishing returns will be reached with respect to conversion of hardwood stands to pine plantations. It therefore stands to reason that the greatest gains in overall forest productivity can be accomplished through improved management of the hardwood resource. One pathway to a more balanced and vigorous hardwood resource is through improved markets for small and poor-quality hardwoods. In the past, efficient management of the hardwood resource has been hampered by specialized markets able to absorb only a limited range of species and tree sizes. This situation has encouraged high-grading and contributed to the large number of nonmanageable hardwood stands. Perhaps recent advances in hardwood utilization technology offer some hope that an expansion of hardwood markets is on the horizon.

Timber Supply Projections

In this section we depart from the generalized assessment of Florida's prospective forest resources in favor of more specific, model-based estimates of future supplies. Timber inventory, growth, and removal volumes are projected at 10-year intervals for the next 30 years in an effort to identify developing trends and expose potential problems. Obviously, these estimates should not be interpreted as absolute forecasts, but as a reasonable appraisal of future supplies given our knowledge of the resource as it exists today.

These projections are essentially derived from two models. Prospective changes in Florida's timberland base were simulated by the Southern Acreage Model (SAM) (Alig 1985). SAM estimates future acreage distributions by merging timberland area trend data with related demographic and economic trend data. Estimates of inventory volume and growth were generated by the Timber Resource Inventory Model (TRIM) (Tedder and others 1987). TRIM is an area based yield table system that tracks acreage through an array of strata defined by various combinations of ownership, forest type, site quality, stocking level, and management intensity. Starting with the current inventory, the model moves numbers of acres through time and accounts for shifts among the various strata. Inventory volume and growth estimates are derived from empirical yield tables specific to each stratum.

Three yield tables (pine plantations, natural pine stands, and hardwood stands) were developed from the latest inventory data to drive the projections. These yields represent the average per-acre volumes of yellow pines and hardwoods by 5-year age classes for stands ranging from 0 to 90 years old. In a departure from normal convention, cypress was included with the volume of hardwoods. To keep the projections relatively simple, we decided to forgo additional stratification of yields by site and stocking classes. The yield tables employed for these TRIM projections thus represent yields observed for fully stocked stands averaged across all site classes. An "approach-to-normality" function (Tedder and others 1987) was invoked for stands not fully stocked.

Estimates of timber removals used by TRIM are normally obtained from a third model, the Timber Assessment Market Model (TAMM) (Adams and Haynes 1980). TAMM is a market equilibrium model designed to run iteratively with TRIM to develop estimates of the demand for timber products. However, since demand for timber products is most appropriately associated with regional and national economies rather than local economies, we opted to bypass the TAMM estimates for the State-level projections presented here. To provide a meaningful baseline point of reference, volumes of timber removals were held constant at levels measured between 1980 and 1987.

Minimum harvest ages were set at 20 years for pine plantations, 25 years for natural pine stands, and 40 years for hardwood stands. These same restrictions were maintained for all three owner categories with the exception of public lands, where the minimum harvest age for pine plantations was increased to 25 years. In the early phase of the projections, harvest volumes were taken from age classes consistent with the removal rates experienced between 1980–1987. If shortages developed in any age class for a given owner category, the model defaulted to harvesting the oldest stands first. Reallocation of harvested acreage by forest type conformed to the acreage shifts and area projections output by the SAM model.

Results of the projections are summarized in appendix table 41. Area of timberland is expected to decline from the current 15.0 million acres to about 14.6 million acres in 2017. Although timberland area falls steadily throughout the projection period, the annual rate of decline is somewhat less than the 88,000-acre rate measured between 1980 and 1987. The abbreviated rate of decline may be conservative in the face of continued urbanization, but much of the urban buildup will be located in the southern and coastal regions, which are not heavily forested. Continued abandonment of agricultural lands in the two northern Units could help keep the forest land base stable.

All of the anticipated reduction in timberland area is confined to the other private ownership class. Forest industry and public owners are projected to maintain or increase their holdings slightly. The gain in public land is the result of additional acquisition of forested wetlands by the various Water Management Districts. Across all ownerships, acreage in hardwood stands declines by 12 percent by the end of the simulation, while the combined area of planted and natural pine stands increases by 7 percent. The area of pine plantations is expected to continue gaining at the expense of both natural pine and hardwood stands. The percentage of all timberland occupied by planted pines increases from 27 percent in 1987 to 40 percent in 2017.

The inventory projections bear out the observation that pine inventory volume in Florida has temporarily peaked. Holding pine removals steady at the current rate, pine inventory volume declines from 6.5 to 6.1 billion cubic feet by 1997. The yellow pine inventory is pulled downward because the current annual rate of removals (441 million cubic feet) exceeds pine growth (427 million cubic feet). The benefits of the recent planting boom during the 1980's are not fully realized by 1997, so pine growth rates continue to fall—from 427 to 409 million cubic feet. This extends the existing overcut situation until shortly after the year 2000, when the majority of recently planted pine stands reach volume size. At this time, the pine growth rate overtakes removals and the pine inventory begins to turn back up, finishing out the 30-year projection at 7.1 billion cubic feet—9 percent above the current level.

These simulation results underscore several important points. First, Florida is at least temporarily locked into a situation where pine inventories must decline if the current removal rate is to be maintained. Second, the increased rate of plantation establishment during the 1980's has averted potentially serious future shortages. These new plantations should allow the declining pine inventory to recover in about 10 to 15 years. Third, pine removals cannot be increased much above current levels without severely depleting the inventory. In fact, the simulation was unable to meet even the current demand beyond 1997, and a minor shortage ensued for the remainder of the projection period. This means there was not enough inventory volume above the minimum harvest age to support the present rate of removals. In reality, such a shortage would probably not occur because some stands are harvested at ages younger than those required by the simulation, and thinning would also help make up some of the difference. In any case, these projections illustrate that Florida is approaching the maximum rate of pine removals that can be sustained indefinitely.

The scenario anticipated for the pine resource on forest industry and NIPF land is similar to the one just described for the pine resource as a whole. Growth is expected to exceed removals for at least part of the projection period in both owner categories, resulting in temporary inventory reductions. The situation is more critical on NIPF land, though, because this is where the shortages are centered. Forest industry is capable of maintaining the present rate of cutting from its own land, but there is little margin for increase. Public owners will likely retain a comfortable surplus of pine growth over removals, allowing the pine inventory to continue increasing over the next 30 years. However, the growth surplus and inventory buildup on public land will not likely provide much of a cushion if removal rates on NIPF and forest industry land accelerate too quickly, since public land has historically supplied only a fraction of the State's total pine removals.

Despite the loss of hardwood acreage, Florida's hardwood inventory continues expanding over the 30-year simulation. By 2017, the hardwood growing-stock inventory totals nearly 13.0 million cubic feet, topping the current inventory by 54 percent. The increase is caused by the considerable excess of hardwood growth over removals, resulting in the continuing buildup of volume in aging stands. The accumulation of older hardwood stands begins to take its toll on hardwood growth shortly after 1997, as the growth rate peaks and begins to drop.

The most noteworthy aspect of the hardwood projections is the continuing gap between hardwood growth and removals. On the surface, the contrast between projected tight pine supplies and apparent underutilization of the hardwood resource presents a significant opportunity to shift a portion of future demand from pine to hardwood. If accompanied by improved management practices, an increase in hardwood removals would no doubt benefit the resource by balancing the hardwood age distribution, increasing diversity, and stimulating growth. However, as underscored by the recent decline in hardwood removals, this is an unlikely prospect. The bulk of this volume is located in lowland hardwood stands where physical and regulatory constraints reduce the available volume to only a fraction of the total hardwood inventory.

Management Opportunities

Demand for southern timber is expected to continue rising well into the next century (USDA Forest Service 1988). As the TRIM projections in the previous section indicate, Florida is already approaching the maximum rate of removals that can be sustained in the foreseeable future. Increased demands on a shrinking forest land base intensify the need to improve the quantity and quality of the resource on as many acres as possible. Use of genetically improved seedlings, site modification, and fertilization will increase the productivity of acres already managed for timber production, but a much greater return could be gained by improving stands that presently receive little or no management. The purpose of this section is to identify such opportunities. Although these actions are recommended from the standpoint of timber production, they would also enhance many of the nontimber benefits by promoting healthier stand conditions on forest acreage that is currently nonstocked, overstocked, overmature, or damaged.

The treatment opportunities discussed here are necessarily generic in nature and broad in perspective. They are based on conditions encountered by field crews at each sample location, and describe the single most important action that could be undertaken to improve the general growth and quality of the sampled stand, although other actions could also be taken. Summaries of the major treatment opportunities are provided in table VI.

Adverse Sites

Difficult operating conditions on adverse sites limit timber management opportunities on 1.1 million acres. Because management for timber production is usually impractical, and since little management activity is observed on these sites, they are excluded from the opportunities discussed below. However, less intensive management practices are possible and should be considered on some of these acres.

Less than 1 percent of adverse sites experienced timber cutting each year during the latest survey period. The cutting rate on sites not classified as adverse is three times higher. Net annual growth of all species on adverse sites is almost triple the rate of removals. On operable sites, growth exceeds removals by only 10 percent. As a result, adverse sites contain an average of 2,388 cubic feet of growing-stock volume per acre—about three times the average volume on operable sites.

Table VI.—Area of Florida's idle cropland and timberland, by broad management, ownership, and treatment opportunity classes, 1987

Broad management and ownership classes[a]	Total area	Broad treatment opportunity class							
		Salvage	Harvest	Commercial thinning	Other stand improvement	Stand conversion[b]	Regeneration[c]	Stands in relatively good condition	Adverse sites or conditions[d]
	Thousands acres								
Idle cropland									
Public	—	—	—	—	—	—	—	—	—
Forest industry	—	—	—	—	—	—	—	—	—
Other private	868.8	—	—	—	—	—	868.8	—	—
Total	868.8	—	—	—	—	—	868.8	—	—
Pine plantations									
Public	401.1	—	—	10.2	26.1	—	17.7	347.1	—
Forest industry	2,593.7	5.4	2.6	276.1	21.2	2.8	76.3	2,206.3	3.0
Other private	1,031.0	—	—	112.1	16.0	7.8	39.7	855.4	—
Total	4,025.8	5.4	2.6	398.4	63.3	10.6	133.7	3,408.8	3.0
Natural pine stands									
Public	1,042.2	3.2	43.0	7.8	36.0	6.3	308.0	635.2	2.7
Forest industry	729.7	6.7	16.5	18.8	27.3	—	283.0	371.5	5.9
Other private	1,728.8	6.4	29.5	22.8	111.1	2.6	709.9	839.0	7.5
Total	3,500.7	16.3	89.0	49.4	174.3	8.9	1,300.9	1,845.7	16.1
Oak–pine stands									
Public	199.5	3.1	5.5	—	5.0	4.8	135.1	46.0	—
Forest industry	334.7	—	16.7	—	21.6	12.7	111.0	148.6	24.1
Other private	676.6	—	17.7	2.8	51.0	4.9	336.4	248.3	15.5
Total	1,210.8	3.1	39.9	2.8	77.6	22.4	582.5	442.9	39.6
Upland hardwood stands									
Public	212.0	—	4.6	—	8.2	2.0	174.1	23.1	—
Forest industry	310.1	—	—	—	8.6	5.0	212.4	81.2	2.9
Other private	1,368.3	—	53.1	—	60.1	26.9	966.7	261.5	—
Total	1,890.4	—	57.7	—	76.9	33.9	1,353.2	365.8	2.9
Lowland hardwood stands									
Public	588.3	—	70.3	—	14.4	2.5	145.8	160.6	194.7
Forest industry	1,478.2	—	92.6	2.6	102.7	29.0	454.0	469.7	327.6
Other private	2,288.4	8.7	193.2	15.3	96.6	34.2	728.7	743.1	468.6
Total	4,354.9	8.7	356.1	17.9	213.7	65.7	1,328.5	1,373.4	990.9
All classes									
Public	2,443.1	6.3	123.4	18.0	89.7	15.6	780.7	1,212.0	197.4
Forest industry	5,446.4	12.1	128.4	297.5	181.4	49.5	1,136.7	3,277.3	363.5
Other private	7,961.9	15.1	293.5	153.0	334.8	76.4	3,650.2	2,947.3	491.6
Total	15,851.4	33.5	545.3	468.5	605.9	141.5	5,567.6	7,436.6	1,052.5

[a] Forest industry includes lands under long-term lease.
[b] Areas occupied with species unsuitable for the site from the standpoint of timber production.
[c] Includes 67.5 thousand acres where good-quality hardwood regeneration could be accomplished by felling residual trees to release advance understory hardwood reproduction and promote stump sprouting.
[d] Areas where management opportunities are severely limited because of steep slopes or poor drainage.

In Florida, virtually all sites with difficult operating conditions are classified as such because of year-round water problems. About 94 percent of the acres classified as adverse support lowland hardwood stands, a category that includes cypress. Almost half of all adverse sites are located on NIPF land, about one-third on forest industry, and the remaining 19 percent on public timberland. All owner categories have nearly the same proportion of adverse sites—about 7 percent.

Stands in Good Condition

More than 7.4 million acres, half of Florida's timberland, support manageable stands in good condition on operable sites. Current volume of growing stock on these acres averages 1,055 cubic feet per acre. These stands harbor a substantial portion of the State's present and future timber supplies. Adequate protection and prompt regeneration after harvest will ensure their continued productivity.

Almost two-thirds of the timberland controlled by forest industry is in relatively good condition. In comparison, 54 percent of public land and only 45 percent of NIPF timberland are in good shape. As expected, the proportion of pine stands in good condition is much higher than the corresponding ratio for hardwoods. About 70 percent of all pine stands have been judged acceptably productive on operable sites, while only 29 percent of the hardwood resource is so classified (fig. 14). The proportions of pine plantations and natural pine stands in good shape are 85 and 53 percent, respectively. In contrast, 38 percent of oak–pine, 41 percent of lowland hardwood, and only 19 percent of upland hardwood stands are in relatively good condition.

Treatment Opportunities

Timber stands on 6.5 million operable acres would benefit substantially from one of the six corrective actions outlined below. In the absence of treatment, they will remain far less productive than their potential. Realizing that the total acreage in each of these categories encompasses a mixture of tract sizes, ownerships, accessibilities, management objectives, and environmental constraints, it is impractical to expect full implementation of the opportunities recognized here. Nevertheless, it is obvious that ample opportunities exist.

1. *Salvage and regenerate seriously damaged stands on 34,000 acres.* These stands have been damaged excessively by fire, insects, disease, weather, or other destructive agents and are in imminent danger of catastrophic mortality. They average 42 years of age and contain 1,770 cubic feet of growing stock per acre. Natural pine stands account for nearly half of the acres in this category; lowland hardwood stands make up another one-fourth. Although the number of stands requiring salvage is small, it should be noted that stands which have already experienced enough mortality to drop them below 50-percent stocking are included under the regeneration opportunity.

2. *Harvest and regenerate mature stands on 545,000 acres.* On the average, these stands are 78 years old with 2,876 cubic feet of growing-stock volume. Stands in this condition typically exhibit slow growth and high mortality rates. Almost two-thirds are found in the lowland hardwood category. Over half the harvest opportunity occurs on NIPF land. In addition, 222,000 acres on adverse sites are classed as overmature.

3. *Thin young, overstocked stands on 468,000 acres.* These stands are so densely stocked that crop trees are receiving excessive competition from each other. These acres would benefit from commercial thinning to prevent stagnation and enhance the growth of the highest quality trees. Stands in need of thinning average 24 years old and support 1,982 cubic feet of growing stock per acre. Pine plantations account for 85 percent of all thinning opportunities. Natural pine

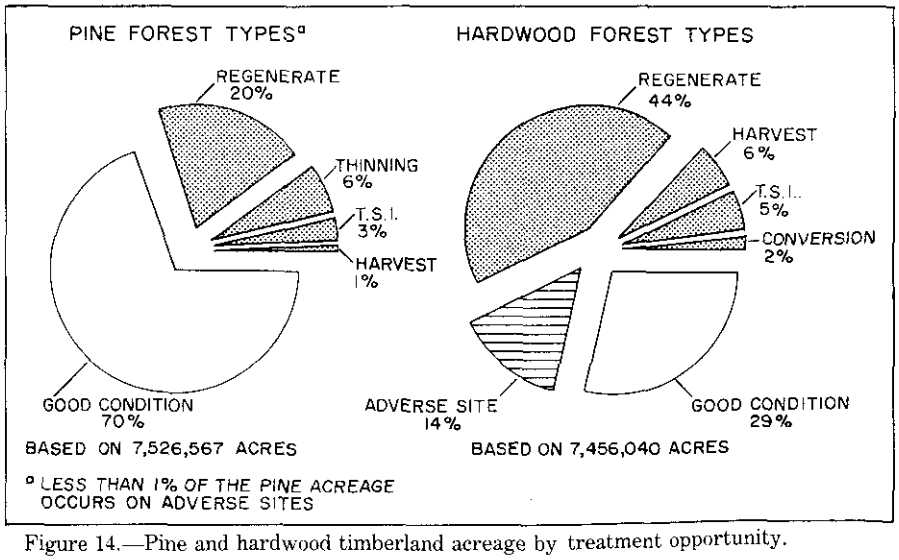


Figure 14.—Pine and hardwood timberland acreage by treatment opportunity.

stands constitute most of the balance. By ownership, about two-thirds of stands recommended for thinning occur on forest industry land, with the majority of the remainder on NIPF land.

4. *Remove competing vegetation from immature stands on 606,000 acres.* Potential crop trees in these immature stands are receiving serious competition from rough trees and other vegetation. Some type of timber stand improvement (TSI) operation such as cleaning or release would enhance their future quality and growth. Stands that would benefit from TSI average 16 years of age with 662 cubic feet of volume per acre. Lowland hardwood stands account for 35 percent of this acreage, natural pine stands for 29 percent, oak–pine and upland hardwood stands for 13 percent each, and pine plantations for 10 percent.

5. *Convert stands on 141,000 acres to different species.* These are offsite or diseased stands where growth and quality are obviously well below potential. Replacement of the existing stands with species more indigenous to the site would improve productivity. Stands on these acres average 23 years old and support 665 cubic feet of growing stock per acre. About 86 percent of these acres are currently dominated by hardwoods. Over half are classed as lowland hardwood stands. In most cases, conversion to high-quality hardwoods appears to be the most viable opportunity for improvement.

6. *Regenerate 4.7 million acres of timberland.* These acres are so poorly stocked that a manageable stand is non-existent. Growing-stock volume averages only 343 cubic feet per acre. Remnant trees from previous harvests, inferior seedlings, and inhibiting vegetation dominate these stands. Given enough time, they will eventually restock naturally, but without intervention the process could take decades.

Regeneration is by far the most significant treatment opportunity for both pine and hardwood acreage (fig. 14). In too many cases, the source of this problem is failure to provide for regeneration at the time of harvest. As such, efforts to correct the problem should focus on the immediate regeneration of stands following harvest. As long as harvested stands are not promptly regenerated, poorly stocked stands will proliferate. Corrective actions taken years later are extremely expensive and fail to address the cause of the problem.

Favorably, there is some evidence of improvement in the past 7 years, as the portion of all stands in need of regeneration has declined from 36 percent of the timberland area in 1980 to 34 percent in 1987. The increased planting efforts observed in recent years are undoubtedly paying off. Still, far too many acres are in such poor condition, and efforts to improve the situation would best be directed toward NIPF landowners. Adding 869,000 acres of idle cropland to the 4.7 million acres of existing timberland in need of regeneration, NIPF owners control two-thirds of the land area presenting a regeneration opportunity. If Florida is to meet the projected demand for timber products in the next century, more of this acreage must be brought into production.

Professional advice and economic assistance designed to assist NIPF owners is readily available. The Forestry Incentives Program, the Agricultural Conservation Program, and the Conservation Reserve Program all provide cost-share opportunities. The Florida Forestry Association will also reimburse for seedling costs. Many forest products companies offer cooperative agreements and lease arrangements with private landowners. Professional advice and services are also available from private forestry consultants, as well as from the Florida Division of Forestry.

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Appendix

Procedure

The procedures used in the sixth statewide inventory and evaluation of Florida's forest resources include these basic steps:

1. In the Northwest, Northeast, and Central Units, initial estimates of forest and nonforest areas were based on the classification of 90,378 sample clusters systematically spaced on the latest aerial photographs available. A subsample of 10,746 of these 16-point clusters was ground checked, and a linear regression was fitted to the data to develop the relationship between the photo and ground classification of the subsample. This procedure provides a means for adjusting the initial estimates of area for change in land use since date of photography and for photo misclassification.

In South Florida a different method of land use classification was employed. There, estimates of forest and nonforest areas were determined from direct aerial observations along 27 east–west flight lines spaced at 5-mile intervals. The flight lines were selected systematically from a random start and flown perpendicular to the direction of primary drainage. From an altitude of 500 feet above the ground, observers classified the land use at 28,299 sample points along the flight lines. An interval timer was used to locate the sample points. This direct aerial method was not used in the Keys because of their unique geographical layout. In the Keys, gross area estimates were made by planimeter of the U.S. Geological Survey boundaries as transferred from maps onto aerial photographs. The breakdown of gross acreage into detailed land use was based upon the ground classification of 45 sample locations.

2. Estimates of timber volume and forest classifications were determined from measurements recorded at 5,487 ground sample locations systematically distributed within timberland. The plot design at each location was based on a cluster of 10 points. In most cases, variable plots, delineated with basal-area factor of 37.5 square feet per acre, were systematically spaced within a single forest condition at 5 of the 10 cluster points. Trees less than 5.0 inches d.b.h. were tallied on fixed-radius plots around the point centers.

3. Seedlings, shrubs, vines, grasses, forbs, and other lesser vegetation occurring within a 35-foot radius of selected point centers were identified and recorded at each forest sample location. Each distinctive zone of lesser vegetation was classified based on its height, density, and species composition. When merged with the tree tally, this information provided a vegetative profile of each forest

condition sampled. Additional nontimber attributes measured or classified included land use, terrain features, soils, erosion, litter, water, snags, tree cavities, livestock grazing, and recreational use.

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

5. Growth, removals, and mortality were estimated from the remeasurement of 4,803 permanent sample plots established at the time of the 1980 inventory. Periodic surveys of timber products output, conducted in cooperation with the Florida Division of Forestry, along with the annual pulpwood production study for the South, provided additional information for breakdowns of removals by product.

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

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

Reliability of the Data

Statistical analysis of the data indicates a sampling error of ±0.42 percent for the estimate of timberland, 1.69 percent for the total growing-stock volume, 1.66 percent for total growing-stock volume growth, and 3.86 percent for total growing-stock removals. As the totals are broken down by forest type, species, tree diameter, and other subdivisions, the sampling error increases. If homogeneity of variances is assumed, the order of this increase is suggested in the following tabulation showing the sampling errors in terms of one standard error, or two chances out of three.

Sampling errors for selected areas and volumes[a]

Sampling error[b] (percent)	Timberland	Volume of growing stock		
		Inventory	Net growth	Removals
	M acres	*Million cubic feet*		
1	2,642.9	42,754.6	—	—
2	660.7	10,688.6	432.8	—
3	293.7	4,750.5	192.4	—
4	165.2	2,672.2	108.2	503.5
5	105.7	1,710.2	69.3	322.2
10	26.4	427.5	17.3	80.6
15	11.7	190.0	7.7	35.8
20	6.6	106.9	4.3	20.1
25	4.2	68.4	2.8	12.9

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

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

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

SE = Specified sampling error in table.

[b] By random-sampling formula.

Definitions of Terms

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

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

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

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

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

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

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

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

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

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

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

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

Commercial forest land. (see: Timberland).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Industrial wood. All roundwood products except fuelwood.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Class 1. 165 or more cubic feet per acre.

Class 2. 120 to 164 cubic feet per acre.

Class 3. 85 to 119 cubic feet per acre.

Class 4. 50 to 84 cubic feet per acre.

Class 5. 20 to 49 cubic feet per acre.

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

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

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

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

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

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

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

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

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

Fully stocked. 100 percent or more stocking.

Medium stocked. 60 to 99 percent stocking.

Poorly stocked. Less than 60 percent stocking.

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

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

Timber products. Roundwood products and byproducts.

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

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

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

Tree grade. A classification of sawtimber trees based on the log grade of the butt log in the tree.

Unproductive forest land. (see: Woodland).

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

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

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

Stocking Standard

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

Conversion Factors

Cubic feet of wood per average cord (excluding bark)

D.b.h. class	All species	Pine	Other softwood	Hardwood
6	61.6	61.0	68.2	60.0
8	69.5	68.1	76.0	68.4
10	74.7	73.1	81.4	73.4
12	77.9	76.7	85.2	76.4
14	80.4	79.4	88.2	78.4
16	82.0	81.6	90.4	79.8
18	83.2	83.3	92.3	80.8
20	84.0	84.8	93.8	81.5
22	84.3	86.0	95.1	82.1
24+	85.7	87.7	98.2	83.2
Average	74.8	72.2	82.5	74.6

Rough cords per M cubic feet (without bark) =

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

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

Metric equivalents of units used in this report

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

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Table 1.--Area, by land class, Florida, 1987

Land class	Area
	Acres
Forest land	
Timberland	14,982,607
Reserved timberland	403,569
Woodland	1,162,836
Total	16,549,012
Nonforest land	
Cropland	3,937,202
Pasture and range	6,324,067
Other[a]	7,842,560
Total	18,103,829
All land[b]	34,652,841

[a]Includes swampland, industrial, and urban areas, other nonforest land, and 121,108 acres classed as water by Forest Survey standards but defined by Bureau of Census as land.
[b]From the U.S. Bureau of Census, 1980.

Table 2.--Area of timberland, by ownership class, Florida, 1987

Ownership class	Area
	Acres
National forest	990,155
Other Federal	
Bureau of Land Management	--
Indian	9,014
Miscellaneous Federal	570,896
Total	579,910
State	813,602
County and municipal	59,432
Forest industry	4,769,624
Forest industry-leased	676,795
Other private	
Farmer	1,114,908
Other individual	3,618,026
Other corporate	2,360,155
Total	7,093,089
All ownerships	14,982,607

Table 3.--Area of timberland, by stand-size and ownership classes, Florida, 1987

Stand-size class	All ownerships	National forest	Other public	Forest industry	Forest industry-leased	Other private
			Acres			
Sawtimber	4,926,575	426,667	778,991	1,036,873	89,241	2,594,803
Poletimber	3,882,798	202,574	248,970	1,495,608	284,440	1,651,206
Sapling and seedling	4,401,599	266,849	273,841	1,801,378	260,269	1,799,262
Nonstocked	1,771,635	94,065	151,142	435,765	42,845	1,047,818
All classes	14,982,607	990,155	1,452,944	4,769,624	676,795	7,093,089

Table 4.--Area of timberland, by stand-volume and ownership classes, Florida, 1987

Stand volume class (board feet/acre[a])	All ownerships	National forest	Other public	Forest industry	Forest industry-leased	Other private
			Acres			
Less than 2,000	9,090,917	513,668	605,854	3,398,441	494,388	4,078,566
2,000-3,999	1,904,090	148,414	228,006	418,161	82,234	1,027,275
4,000-5,999	1,299,261	109,990	158,752	310,993	41,717	677,809
6,000-7,999	939,290	90,737	138,430	236,939	33,158	440,026
8,000-9,999	561,450	48,654	105,607	129,547	3,984	273,658
10,000 or more	1,187,599	78,692	216,295	275,543	21,314	595,755
All classes	14,982,607	990,155	1,452,944	4,769,624	676,795	7,093,089

[a]International 1/4-inch rule.

Table 5.--Area of timberland, by stocking class of growing-stock trees and ownership class, Florida, 1987

Stocking class	All ownerships	National forest	Other public	Forest industry	Forest industry-leased	Other private
			Acres			
Overstocked	786,603	31,098	105,223	275,116	36,332	338,834
Fully stocked	3,652,983	200,020	260,960	1,469,078	265,354	1,457,571
Moderately stocked	5,037,643	367,325	476,252	1,654,816	260,516	2,278,734
Poorly stocked	3,733,743	297,647	459,367	934,849	71,748	1,970,132
Nonstocked	1,771,635	94,065	151,142	435,765	42,845	1,047,818
All classes	14,982,607	990,155	1,452,944	4,769,624	676,795	7,093,089

Table 6.--Area of timberland, by site and ownership classes, Florida, 1987

Site class (ft^3/acre/year)	All ownerships	National forest	Other public	Forest industry	Forest industry-leased	Other private
			Acres			
>164	25,559	6,169	5,210	--	--	14,180
120-164	181,261	20,224	29,249	41,361	3,537	86,890
85-119	1,825,187	131,750	125,225	634,564	118,529	815,119
50-84	8,725,993	539,733	801,521	3,018,789	495,136	3,870,814
20-49	4,224,607	292,279	491,739	1,074,910	59,593	2,306,086
All classes	14,982,607	990,155	1,452,944	4,769,624	676,795	7,093,089

Table 7.--Area of timberland, by forest type and site index class, Florida, 1987

Forest type	All classes	Site index class[a]							
		<50	50-59	60-69	70-79	80-89	90-99	100-109	110-119	>119
					Acres					
Softwood types										
White pine-hemlock	--	--	--	--	--	--	--	--	--	--
Spruce-fir	--	--	--	--	--	--	--	--	--	--
Longleaf pine	950,946	8,266	279,711	326,689	237,905	85,226	10,419	2,730	--	--
Slash pine	5,198,978	63,055	575,494	1,550,844	2,031,871	797,544	167,504	7,456	5,210	--
Loblolly pine	578,472	5,401	23,137	129,720	229,976	123,409	37,608	26,126	3,095	--
Shortleaf pine	30,061	--	--	2,678	16,165	7,422	2,859	937	--	--
Virginia pine	--	--	--	--	--	--	--	--	--	--
Sand pine	610,277	11,633	172,613	233,386	148,372	30,353	13,920	--	--	--
Eastern redcedar	--	--	--	--	--	--	--	--	--	--
Pond pine	157,833	2,603	48,741	51,023	50,679	4,787	--	--	--	--
Spruce pine	--	--	--	--	--	--	--	--	--	--
Pitch pine	--	--	--	--	--	--	--	--	--	--
Table Mountain pine	--	--	--	--	--	--	--	--	--	--
Total	7,526,567	90,958	1,099,696	2,294,340	2,714,968	1,048,741	232,310	37,249	8,305	--
Hardwood types										
Oak-pine	1,210,769	11,991	326,253	351,329	306,398	140,394	55,774	18,630	--	--
Oak-hickory	1,053,868	11,534	90,360	295,422	408,200	213,729	29,316	2,760	2,547	--
Chestnut oak	--	--	--	--	--	--	--	--	--	--
Southern scrub oak	836,507	18,084	524,919	249,321	38,635	5,548	--	--	--	--
Oak-gum-cypress	4,271,134	36,456	773,819	1,546,710	1,446,810	342,854	107,579	14,640	2,266	--
Elm-ash-cottonwood	83,762	--	5,548	18,283	36,947	14,979	8,005	--	--	--
Maple-beech-birch	--	--	--	--	--	--	--	--	--	--
Total	7,456,040	78,065	1,720,899	2,461,065	2,236,990	717,504	200,674	36,030	4,813	--
All types	14,982,607	169,023	2,820,595	4,755,405	4,951,958	1,766,245	432,984	73,279	13,118	--

[a]50-year base.

Table 8.--Area of timberland, by forest type and ownership class, Florida, 1987

Forest type	All ownerships	Ownership class				
		National forest	Other public	Forest industry	Forest industry-leased	Other private
				Acres		
Softwood types						
White pine-hemlock	--	--	--	--	--	--
Spruce-fir	--	--	--	--	--	--
Longleaf pine	950,946	178,595	239,202	144,353	5,607	383,189
Slash pine	5,198,978	315,002	332,016	2,276,953	432,229	1,842,778
Loblolly pine	578,472	4,667	28,965	253,749	32,537	258,554
Shortleaf pine	30,061	--	937	8,691	--	20,433
Virginia pine	--	--	--	--	--	--
Sand pine	610,277	192,574	96,304	138,507	--	182,892
Eastern redcedar	--	--	--	--	--	--
Pond pine	157,833	34,308	20,796	25,466	5,269	71,994
Spruce pine	--	--	--	--	--	--
Pitch pine	--	--	--	--	--	--
Table Mountain pine	--	--	--	--	--	--
Total	7,526,567	725,146	718,220	2,847,719	475,642	2,759,840
Hardwood types						
Oak-pine	1,210,769	71,762	127,719	311,009	23,707	676,572
Oak-hickory	1,053,868	8,225	68,123	202,232	15,772	759,516
Chestnut oak	--	--	--	--	--	--
Southern scrub oak	836,507	36,334	99,323	83,049	9,070	608,731
Oak-gum-cypress	4,271,134	148,688	430,761	1,306,927	152,604	2,232,154
Elm-ash-cottonwood	83,762	--	8,798	18,688	--	56,276
Maple-beech-birch	--	--	--	--	--	--
Total	7,456,040	265,009	734,724	1,921,905	201,153	4,333,249
All types	14,982,607	990,155	1,452,944	4,769,624	676,795	7,093,089

Table 9.--Area of timberland, by forest type and stand-size class, Florida, 1987

Forest type	All stands	Stand-size class			Nonstocked areas
		Sawtimber	Poletimber	Sapling-seedling	
			Acres		
Softwood types					
White pine-hemlock	--	--	--	--	--
Spruce-fir	--	--	--	--	--
Longleaf pine	950,946	552,924	99,298	203,847	94,877
Slash pine	5,198,978	927,836	1,837,511	2,121,158	312,473
Loblolly pine	578,472	149,967	125,602	295,706	7,197
Shortleaf pine	30,061	21,370	8,691	--	--
Virginia pine	--	--	--	--	--
Sand pine	610,277	119,848	191,863	275,432	23,134
Eastern redcedar	--	--	--	--	--
Pond pine	157,833	61,138	66,900	13,187	16,608
Spruce pine	--	--	--	--	--
Pitch pine	--	--	--	--	--
Table Mountain pine	--	--	--	--	--
Total	7,526,567	1,833,083	2,329,865	2,909,330	454,289
Hardwood types					
Oak-pine	1,210,769	491,341	211,570	412,570	95,288
Oak-hickory	1,053,868	430,776	193,926	285,151	144,015
Chestnut oak	--	--	--	--	--
Southern scrub oak	836,507	42,678	29,445	131,623	632,761
Oak-gum-cypress	4,271,134	2,065,437	1,105,722	654,693	445,282
Elm-ash-cottonwood	83,762	63,260	12,270	8,232	--
Maple-beech-birch	--	--	--	--	--
Total	7,456,040	3,093,492	1,552,933	1,492,269	1,317,346
All types	14,982,607	4,926,575	3,882,798	4,401,599	1,771,635

Table 10.--Area of timberland, by stand-age and broad management classes, all ownerships, Florida, 1987

Stand-age class (years)	All classes	Broad management class				
		Pine plantation	Natural pine	Oak-pine	Upland hardwood	Lowland hardwood
			Acres			
0-10	2,373,358	1,677,281	244,741	129,747	143,971	177,618
11-20	1,647,856	1,170,375	197,563	75,831	70,737	133,350
21-30	1,487,976	900,138	349,998	45,336	27,853	164,651
31-40	1,102,383	124,180	551,483	80,917	61,884	283,919
41-50	1,004,559	10,496	395,879	128,097	74,655	395,432
51-60	931,097	4,112	279,044	71,722	56,765	519,454
61-70	581,173	2,617	93,847	36,335	35,475	412,899
71-80	406,826	--	57,937	28,701	25,321	294,867
81+	503,086	--	18,188	16,458	37,631	430,809
No manageable stand	4,944,293	136,613	1,312,075	597,625	1,356,083	1,541,897
All classes	14,982,607	4,025,812	3,500,755	1,210,769	1,890,375	4,354,896

Table 11.--Area of timberland, by stand-age and broad management classes, public ownerships, Florida, 1987

Stand-age class (years)	All classes	Broad management class				
		Pine plantation	Natural pine	Oak-pine	Upland hardwood	Lowland hardwood
			Acres			
0-10	221,798	145,496	48,491	8,051	17,155	2,605
11-20	167,846	115,961	35,644	4,768	1,227	10,246
21-30	179,501	93,506	62,993	7,043	--	15,959
31-40	193,980	19,759	136,669	18,655	3,526	15,371
41-50	206,323	4,661	162,654	--	4,086	34,922
51-60	272,405	4,112	175,777	14,866	2,056	75,594
61-70	157,796	--	54,399	5,547	3,188	94,662
71-80	112,297	--	39,197	--	6,669	66,431
81+	114,429	--	15,644	5,457	--	93,328
No manageable stand	816,724	17,673	310,730	135,094	174,098	179,129
All classes	2,443,099	401,168	1,042,198	199,481	212,005	588,247

Table 12.--Area of timberland, by stand-age and broad management classes, forest industry,[a] Florida, 1987

Stand-age class (years)	All classes	Broad management class				
		Pine plantation	Natural pine	Oak-pine	Upland hardwood	Lowland hardwood
			Acres			
0-10	1,213,770	1,012,763	40,530	56,388	37,272	66,817
11-20	1,017,870	871,707	33,079	40,338	11,360	61,386
21-30	712,445	567,473	71,259	14,754	--	58,959
31-40	331,712	56,757	148,955	12,045	10,543	103,412
41-50	293,049	3,132	74,934	48,130	11,283	155,570
51-60	284,598	--	47,349	20,133	16,417	200,699
61-70	123,615	2,617	16,624	9,700	7,932	86,742
71-80	92,615	--	8,077	5,394	--	79,144
81+	145,694	--	--	11,001	--	134,693
No manageable stand	1,231,051	79,209	288,896	116,833	215,316	530,797
All classes	5,446,419	2,593,658	729,703	334,716	310,123	1,478,219

[a]Includes 676,795 acres of other private land under long-term lease.

Table 13.--Area of timberland, by stand-age and broad management classes, other private ownerships,[a] Florida, 1987

Stand-age class (years)	All classes	Broad management class				
		Pine plantation	Natural pine	Oak-pine	Upland hardwood	Lowland hardwood
			Acres			
0-10	937,790	519,022	155,720	65,308	89,544	108,196
11-20	462,140	182,707	128,840	30,725	58,150	61,718
21-30	596,030	239,159	215,746	23,539	27,853	89,733
31-40	576,691	47,664	265,859	50,217	47,815	165,136
41-50	505,187	2,703	158,291	79,967	59,286	204,940
51-60	374,094	--	55,918	36,723	38,292	243,161
61-70	299,762	--	22,824	21,088	24,355	231,495
71-80	201,914	--	10,663	23,307	18,652	149,292
81+	242,963	--	2,544	--	37,631	202,788
No manageable stand	2,896,518	39,731	712,449	345,698	966,669	831,971
All classes	7,093,089	1,030,986	1,728,854	676,572	1,368,247	2,288,430

[a]Excludes 676,795 acres of other private land under long-term lease to forest industry.

Table 14.--Basal area per acre of live trees 5.0 inches d.b.h. and larger, by broad management class, species group, and ownership class, Florida, 1987

Broad management class and species group	All ownerships	National forest	Other public	Forest industry	Forest industry-leased	Other private
			Square feet			
Pine plantation						
Softwood	30.4	13.4	30.7	31.6	40.2	29.0
Hardwood	1.0	1.0	1.6	.8	1.1	1.3
Total	31.4	14.4	32.3	32.4	41.3	30.3
Natural pine						
Softwood	43.0	48.6	48.8	41.6	56.4	39.5
Hardwood	4.7	3.7	7.4	3.5	8.7	4.5
Total	47.7	52.3	56.2	45.1	65.1	44.0
Oak-pine						
Softwood	27.7	18.9	31.2	32.0	22.5	26.2
Hardwood	23.0	8.8	20.4	18.5	11.2	27.6
Total	50.7	27.7	51.6	50.5	33.7	53.8
Upland hardwood						
Softwood	3.1	3.8	3.3	1.9	10.5	3.2
Hardwood	32.4	10.1	28.7	20.0	43.5	36.2
Total	35.5	13.9	32.0	21.9	54.0	39.4
Lowland hardwood						
Softwood	31.2	44.7	33.0	26.9	29.4	32.6
Hardwood	61.5	74.8	89.8	57.6	42.9	58.3
Total	92.7	119.5	122.8	84.5	72.3	90.9
All classes						
Softwood	29.9	35.4	34.6	29.9	38.0	27.4
Hardwood	25.0	14.0	34.6	19.4	12.9	29.2
Total	54.9	49.4	69.2	49.3	50.9	56.6

Table 15.--Area of reserved timberland and woodland, by forest-type group, Florida, 1987

Forest-type group	All areas	Reserved timberland	Woodland
		Acres	
Longleaf-slash pine	65,889	65,889	--
Loblolly-shortleaf pine	100,389	82,361	18,028
Oak-pine	16,472	16,472	--
Oak-hickory	93,710	57,653	36,057
Oak-gum-cypress	635,019	148,250	486,769
Elm-ash-cottonwood	52,529	16,472	36,057
Palm, other tropical	602,397	16,472	585,925
All types	1,566,405	403,569	1,162,836

Table 16.--Number of live trees on timberland, by species and diameter class, Florida, 1987

Species	All classes	Diameter class (inches at breast height)											
		1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Thousand trees												
Softwood													
Longleaf pine	171,291	56,832	28,985	18,452	17,403	19,211	16,585	9,229	3,316	908	257	110	3
Slash pine	1,624,998	497,005	507,133	342,978	165,846	61,040	27,537	13,271	6,082	2,653	948	494	11
Shortleaf pine	8,408	2,243	2,003	1,084	1,123	693	495	428	207	80	18	30	4
Loblolly pine	176,227	71,917	45,169	26,595	13,209	6,956	4,285	3,000	2,064	1,458	803	745	26
Pond pine	32,172	6,501	8,070	5,646	5,412	2,716	1,954	1,049	507	148	106	63	--
Virginia pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Pitch pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Table Mountain pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Spruce pine	6,198	2,582	1,308	1,165	208	273	221	141	111	89	46	54	--
Sand pine	257,939	140,856	54,662	33,217	17,113	6,569	3,671	1,090	525	171	65	--	--
Eastern white pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Eastern hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--
Spruce and fir	--	--	--	--	--	--	--	--	--	--	--	--	--
Baldcypress	75,131	20,821	14,386	11,680	8,782	6,948	4,108	2,843	1,963	1,321	928	1,080	271
Pondcypress	732,893	331,640	163,261	96,371	61,563	38,376	20,764	11,569	4,751	2,377	958	1,126	137
Cedars	35,396	20,010	5,506	3,094	2,595	1,799	1,012	681	428	133	80	58	--
Total softwoods	3,120,653	1,150,407	830,483	540,282	293,254	144,581	80,632	43,301	19,954	9,338	4,209	3,760	452
Hardwood													
Select white oaks[a]	9,581	4,242	2,463	1,102	548	416	274	250	118	82	46	36	4
Select red oaks[b]	551	331	--	--	127	41	--	18	--	11	18	5	--
Chestnut oak	--	--	--	--	--	--	--	--	--	--	--	--	--
Other white oaks	270,686	160,256	55,432	18,222	11,051	6,987	4,719	3,470	2,758	2,244	1,404	3,064	1,079
Other red oaks	714,394	478,258	110,807	50,241	26,767	17,998	12,164	6,722	4,630	2,375	1,661	2,289	482
Hickory	35,248	19,117	6,817	3,239	1,866	1,148	934	860	553	294	192	224	4
Yellow birch	--	--	--	--	--	--	--	--	--	--	--	--	--
Hard maple	5,588	3,567	523	528	420	133	197	77	49	33	21	40	--
Soft maple	280,310	177,765	49,106	19,455	12,828	8,285	5,437	3,151	2,103	1,227	432	491	30
Beech	1,703	324	824	111	133	--	102	60	29	36	48	32	4
Sweetgum	220,900	126,081	44,617	19,706	10,530	8,740	5,196	2,818	1,588	835	417	346	26
Tupelo and blackgum	758,315	410,531	173,910	72,407	41,386	22,542	14,823	9,382	5,281	3,167	1,932	2,589	365
Ash	293,039	172,962	63,747	28,265	11,038	7,234	4,265	2,134	1,584	844	498	410	58
Cottonwood	12	--	--	--	--	--	--	--	--	--	--	12	--
Basswood	4,584	3,285	322	224	249	107	88	163	66	36	36	8	--
Yellow-poplar	15,205	7,479	2,551	2,365	760	521	695	282	266	77	89	116	4
Bay and magnolia	584,896	348,081	126,739	52,090	26,053	14,297	8,737	4,026	2,223	1,307	632	665	46
Black cherry	21,344	14,446	4,499	1,214	673	201	160	102	15	34	--	--	--
Black walnut	162	162	--	--	--	--	--	--	--	--	--	--	--
Sycamore	394	--	156	--	51	--	81	19	14	47	8	14	4
Black locust	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm	45,147	23,887	10,064	4,861	2,332	1,711	884	640	421	154	106	83	4
Other eastern hardwoods	1,129,134	843,052	191,150	58,511	21,005	9,548	2,841	1,548	563	378	218	263	57
Total hardwoods	4,391,193	2,793,826	843,727	332,541	167,817	99,909	61,597	35,722	22,261	13,181	7,758	10,687	2,167
All species	7,511,846	3,944,233	1,674,210	872,823	461,071	244,490	142,229	79,023	42,215	22,519	11,967	14,447	2,619

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

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

Table 17.--Number of growing-stock trees on timberland, by species and diameter class, Florida, 1987

Species	All classes	Diameter class (inches at breast height)											
		1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Thousand trees												
Softwood													
Longleaf pine	166,215	52,697	28,673	18,120	17,339	19,131	16,486	9,211	3,291	897	257	110	3
Slash pine	1,590,867	472,325	499,889	341,533	165,484	60,750	27,505	13,250	6,053	2,642	938	487	11
Shortleaf pine	8,082	1,917	2,003	1,084	1,123	693	495	428	207	80	18	30	4
Loblolly pine	170,425	67,820	44,158	26,459	12,893	6,753	4,253	3,000	2,064	1,458	803	738	26
Pond pine	27,607	3,924	6,668	5,325	5,291	2,646	1,880	1,049	507	148	106	63	--
Virginia pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Pitch pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Table Mountain pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Spruce pine	5,191	1,613	1,308	1,165	208	273	221	118	96	89	46	54	--
Sand pine	249,304	134,466	53,721	32,814	16,622	6,309	3,570	1,070	496	171	65	--	--
Eastern white pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Eastern hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--
Spruce and fir	--	--	--	--	--	--	--	--	--	--	--	--	--
Baldcypress	68,381	16,536	12,769	11,577	8,613	6,727	4,057	2,806	1,912	1,272	901	1,004	207
Pondcypress	646,479	276,160	147,301	89,092	57,522	36,569	20,105	11,064	4,512	2,152	901	994	107
Cedars	30,546	17,710	4,293	2,545	2,085	1,722	864	645	411	133	80	58	--
Total softwoods	2,963,097	1,045,168	800,783	529,714	287,180	141,573	79,436	42,641	19,549	9,042	4,115	3,538	358
Hardwood													
Select white oaks[a]	8,177	3,266	2,151	1,102	472	416	242	250	118	82	46	28	4
Select red oaks[b]	380	160	--	--	127	41	--	18	--	11	18	5	--
Chestnut oak	--	--	--	--	--	--	--	--	--	--	--	--	--
Other white oaks	52,868	24,583	11,388	4,149	3,768	1,964	1,114	1,249	1,141	825	657	1,472	558
Other red oaks	489,056	304,155	82,582	40,449	22,188	14,969	10,147	5,517	3,765	1,989	1,319	1,661	315
Hickory	20,377	8,344	4,001	2,887	1,374	1,025	848	785	491	247	174	197	4
Yellow birch	--	--	--	--	--	--	--	--	--	--	--	--	--
Hard maple	1,588	338	352	223	298	133	31	77	49	33	21	33	--
Soft maple	136,378	72,619	28,766	11,648	8,471	5,673	3,905	2,295	1,437	891	342	309	22
Beech	958	161	334	111	133	--	74	60	13	12	38	18	4
Sweetgum	155,401	75,134	34,192	17,545	9,685	8,244	4,920	2,688	1,500	796	399	286	12
Tupelo and blackgum	439,990	172,073	124,485	59,048	34,017	19,100	12,240	8,021	4,549	2,639	1,630	1,981	207
Ash	106,068	50,155	22,606	14,256	6,540	4,874	3,373	1,555	1,220	725	412	319	33
Cottonwood	6	--	--	--	--	--	--	--	--	--	--	6	--
Basswood	2,232	1,299	160	224	109	107	56	143	66	24	36	8	--
Yellow-poplar	11,618	4,436	2,228	2,233	760	521	644	282	251	77	71	111	4
Bay and magnolia	360,576	190,792	83,821	39,469	20,096	11,814	7,078	3,312	1,986	1,097	508	561	42
Black cherry	13,355	7,926	3,355	1,102	498	201	133	102	15	23	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--	--	--
Sycamore	394	--	156	--	51	--	81	19	14	47	8	14	4
Black locust	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm	23,585	10,278	5,917	2,543	1,887	1,030	676	587	365	136	89	73	4
Other eastern hardwoods	28,758	18,686	5,043	2,144	1,222	725	334	313	121	119	35	16	--
Total hardwoods	1,851,765	944,405	411,537	199,133	111,696	70,837	45,896	27,273	17,101	9,773	5,803	7,098	1,213
All species	4,814,862	1,989,573	1,212,320	728,847	398,876	212,410	125,332	69,914	36,650	18,815	9,918	10,636	1,571

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

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

Table 18.--Merchantable volume of live trees on timberland, by species and diameter class, Florida, 1987

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Thousand cubic feet										
Softwood											
Longleaf pine	1,183,944	53,756	122,429	245,734	319,724	256,301	119,726	41,246	14,886	9,572	570
Slash pine	4,008,701	861,447	1,039,845	725,516	532,611	376,995	230,795	132,453	62,466	44,378	2,195
Shortleaf pine	59,797	3,484	8,171	9,078	9,362	12,723	8,233	3,927	1,592	2,519	708
Loblolly pine	679,440	58,720	72,844	75,605	84,638	87,933	85,049	77,705	56,296	75,910	4,740
Pond pine	172,714	13,847	29,949	29,685	35,068	26,448	18,125	7,224	6,833	5,535	--
Virginia pine	--	--	--	--	--	--	--	--	--	--	--
Pitch pine	--	--	--	--	--	--	--	--	--	--	--
Table Mountain pine	--	--	--	--	--	--	--	--	--	--	--
Spruce pine	38,533	4,302	1,697	3,494	4,359	4,187	4,962	5,486	3,430	6,616	--
Sand pine	434,049	109,578	117,455	83,238	67,091	27,976	17,834	7,158	3,719	--	--
Eastern white pine	--	--	--	--	--	--	--	--	--	--	--
Eastern hemlock	--	--	--	--	--	--	--	--	--	--	--
Spruce and fir	--	--	--	--	--	--	--	--	--	--	--
Baldcypress	614,401	36,642	57,459	76,898	70,433	67,798	65,128	57,259	50,753	84,839	47,192
Pondcypress	2,142,784	298,923	403,996	430,559	352,279	272,051	148,829	93,284	47,569	77,681	17,613
Cedars	104,302	8,433	13,633	19,344	16,317	16,313	14,362	6,783	4,508	4,609	--
Total softwoods	9,438,665	1,449,132	1,867,478	1,699,151	1,491,882	1,148,725	713,043	432,525	252,052	311,659	73,018
Hardwood											
Select white oaks[a]	36,049	2,826	2,884	4,641	4,549	6,597	4,656	3,690	3,233	2,203	770
Select red oaks[b]	4,161	--	682	333	--	541	--	481	1,275	849	--
Chestnut oak	--	--	--	--	--	--	--	--	--	--	--
Other white oaks	853,011	40,784	46,149	53,588	55,628	64,927	72,654	74,407	62,228	212,145	170,501
Other red oaks	1,443,987	136,098	159,595	194,282	202,669	160,572	147,258	101,392	88,349	179,635	74,137
Hickory	133,846	7,433	10,167	11,509	16,885	21,740	19,832	13,626	12,060	19,874	720
Yellow birch	--	--	--	--	--	--	--	--	--	--	--
Hard maple	17,020	1,231	2,038	1,679	2,953	2,051	1,799	1,397	1,090	2,782	--
Soft maple	554,291	54,932	73,146	83,811	90,457	74,282	64,832	47,995	24,781	35,996	4,059
Beech	12,574	205	1,086	--	1,606	1,507	790	855	2,834	2,867	824
Sweetgum	556,167	46,734	64,402	101,319	101,572	79,068	61,271	42,331	26,647	29,448	3,375
Tupelo and blackgum	1,737,715	193,344	237,736	233,676	241,940	224,595	168,095	126,279	94,596	170,989	46,465
Ash	483,151	63,352	61,888	75,840	74,526	50,405	51,419	38,727	27,409	32,196	7,389
Cottonwood	753	--	--	--	--	--	--	--	--	753	--
Basswood	14,098	600	1,392	1,289	1,342	3,411	2,185	1,055	2,192	632	--
Yellow-poplar	70,328	8,308	5,297	6,325	12,587	7,351	10,699	4,020	5,513	9,629	599
Bay and magnolia	904,101	140,444	149,095	150,908	147,263	97,608	73,869	55,684	33,891	49,315	6,024
Black cherry	16,874	3,479	4,173	2,068	2,881	2,445	474	1,354	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--
Sycamore	7,893	--	270	--	1,406	519	623	2,461	576	1,301	737
Black locust	--	--	--	--	--	--	--	--	--	--	--
Elm	108,660	11,181	12,390	17,044	14,840	16,028	14,506	7,313	6,698	7,917	743
Other eastern hardwoods	388,516	105,266	87,722	70,350	36,120	28,772	14,037	13,555	9,885	15,938	6,871
Total hardwoods	7,343,195	816,217	920,112	1,008,662	1,009,224	842,419	708,999	536,622	403,257	774,469	323,214
All species	16,781,860	2,265,349	2,787,590	2,707,813	2,501,106	1,991,144	1,422,042	969,147	655,309	1,086,128	396,232

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

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

Table 19.--Volume of growing stock on timberland, by species and diameter class, Florida, 1987

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Thousand cubic feet										
Softwood											
Longleaf pine	1,179,882	53,231	122,121	245,016	318,618	255,945	118,993	40,930	14,886	9,572	570
Slash pine	3,998,887	858,696	1,037,771	723,406	532,216	376,588	229,953	131,909	62,194	43,959	2,195
Shortleaf pine	59,797	3,484	8,171	9,078	9,362	12,723	8,233	3,927	1,592	2,519	708
Loblolly pine	674,808	58,599	71,483	73,525	84,343	87,933	85,049	77,705	56,296	75,135	4,740
Pond pine	170,091	13,250	29,461	28,980	34,235	26,448	18,125	7,224	6,833	5,535	--
Virginia pine	--	--	--	--	--	--	--	--	--	--	--
Pitch pine	--	--	--	--	--	--	--	--	--	--	--
Table Mountain pine	--	--	--	--	--	--	--	--	--	--	--
Spruce pine	37,398	4,302	1,697	3,494	4,359	3,665	4,349	5,486	3,430	6,616	--
Sand pine	425,595	108,095	114,939	81,256	65,724	27,687	17,017	7,158	3,719	--	--
Eastern white pine	--	--	--	--	--	--	--	--	--	--	--
Eastern hemlock	--	--	--	--	--	--	--	--	--	--	--
Spruce and fir	--	--	--	--	--	--	--	--	--	--	--
Baldcypress	593,824	36,394	56,639	75,083	69,957	67,407	64,129	56,011	50,011	81,623	36,570
Pondcypress	2,066,455	281,679	384,756	416,831	345,278	266,487	145,839	89,296	46,510	73,862	15,917
Cedars	98,118	7,353	11,613	18,898	14,723	15,677	13,954	6,783	4,508	4,609	--
Total softwoods	9,304,855	1,425,083	1,838,651	1,675,567	1,478,815	1,140,560	705,641	426,429	249,979	303,430	60,700
Hardwood											
Select white oaks[a]	35,359	2,826	2,725	4,641	4,140	6,597	4,656	3,690	3,233	2,081	770
Select red oaks[b]	4,161	--	682	333	--	541	--	481	1,275	849	--
Chestnut oak	--	--	--	--	--	--	--	--	--	--	--
Other white oaks	405,502	10,042	17,284	17,605	15,788	26,835	34,431	32,944	33,076	118,302	99,195
Other red oaks	1,233,329	112,710	138,746	169,592	176,570	140,069	129,351	90,222	75,023	144,603	56,443
Hickory	120,992	6,816	8,069	10,374	15,373	20,098	18,012	12,335	11,111	18,084	720
Yellow birch	--	--	--	--	--	--	--	--	--	--	--
Hard maple	13,260	491	1,456	1,679	584	2,051	1,799	1,397	1,090	2,713	--
Soft maple	412,419	34,298	52,633	61,645	69,725	57,251	48,681	38,779	20,473	25,504	3,430
Beech	10,705	205	1,086	--	1,416	1,507	551	406	2,565	2,145	824
Sweetgum	527,787	41,939	60,492	97,343	97,491	76,545	58,745	41,169	25,756	26,170	2,137
Tupelo and blackgum	1,519,532	161,995	204,158	206,760	211,479	203,047	151,731	113,017	85,168	146,941	35,236
Ash	378,894	36,678	43,942	56,133	64,361	42,409	43,433	35,008	24,494	27,898	4,538
Cottonwood	294	--	--	--	--	--	--	--	--	294	--
Basswood	12,967	600	832	1,289	1,133	3,142	2,185	962	2,192	632	--
Yellow-poplar	67,610	7,942	5,297	6,325	12,215	7,351	9,962	4,020	4,734	9,165	599
Bay and magnolia	765,094	109,405	120,015	130,465	123,811	83,619	68,635	49,443	29,645	44,268	5,788
Black cherry	14,395	3,246	3,035	2,068	2,371	2,445	474	756	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--
Sycamore	7,893	--	270	--	1,406	519	623	2,461	576	1,301	737
Black locust	--	--	--	--	--	--	--	--	--	--	--
Elm	88,113	5,861	10,545	11,535	12,173	15,129	12,808	6,631	5,728	6,960	743
Other eastern hardwoods	46,400	5,618	6,551	7,162	6,384	7,996	3,915	5,618	2,234	922	--
Total hardwoods	5,664,706	540,672	677,818	784,949	816,420	697,151	589,992	439,339	328,373	578,832	211,160
All species	14,969,561	1,965,755	2,516,469	2,460,516	2,295,235	1,837,711	1,295,633	865,768	578,352	882,262	271,860

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

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

Table 20.--Volume of sawtimber on timberland, by species and diameter class, Florida, 1987

Species	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Thousand board feet								
Softwood									
Longleaf pine	4,993,544	998,369	1,530,397	1,368,871	684,588	248,643	94,326	64,246	4,104
Slash pine	9,903,469	2,650,020	2,446,525	1,975,176	1,313,956	804,335	398,594	298,702	16,161
Shortleaf pine	243,028	34,536	42,086	65,430	46,191	23,407	9,993	16,315	5,070
Loblolly pine	2,945,172	262,263	381,799	453,428	481,714	468,386	356,309	506,643	34,630
Pond pine	627,033	110,591	157,832	136,282	101,567	42,621	42,416	35,724	--
Virginia pine	--	--	--	--	--	--	--	--	--
Pitch pine	--	--	--	--	--	--	--	--	--
Table Mountain pine	--	--	--	--	--	--	--	--	--
Spruce pine	173,171	14,162	20,412	18,981	24,437	31,974	20,763	42,442	--
Sand pine	938,993	318,363	308,659	147,265	97,728	43,428	23,550	--	--
Eastern white pine	--	--	--	--	--	--	--	--	--
Eastern hemlock	--	--	--	--	--	--	--	--	--
Spruce and fir	--	--	--	--	--	--	--	--	--
Baldcypress	2,354,560	222,717	266,556	294,096	305,955	287,211	269,198	473,591	235,236
Pondcypress	5,796,360	1,307,458	1,346,896	1,184,985	709,296	462,652	253,604	430,253	101,216
Cedars	393,877	73,362	67,381	80,022	76,628	39,820	27,219	29,445	--
Total softwoods	28,369,207	5,991,841	6,568,543	5,724,536	3,842,060	2,452,477	1,495,972	1,897,361	396,417
Hardwood									
Select white oaks[a]	113,697	--	14,100	26,368	21,047	18,258	16,946	11,830	5,148
Select red oaks[b]	16,234	--	--	2,299	--	2,591	6,532	4,812	--
Chestnut oak	--	--	--	--	--	--	--	--	--
Other white oaks	1,789,358	--	55,129	106,808	149,563	150,556	159,585	610,533	557,184
Other red oaks	3,938,280	--	672,725	610,448	615,715	457,601	399,295	828,441	354,055
Hickory	437,112	--	52,775	81,392	81,420	60,041	57,195	99,866	4,423
Yellow birch	--	--	--	--	--	--	--	--	--
Hard maple	43,354	--	1,899	8,097	7,801	6,487	5,248	13,822	--
Soft maple	1,077,967	--	230,100	218,186	205,329	175,433	98,307	131,358	19,254
Beech	37,411	--	5,205	5,664	2,157	1,600	10,370	8,927	3,488
Sweetgum	1,489,581	--	351,150	329,016	281,592	214,513	143,474	155,609	14,227
Tupelo and blackgum	4,170,473	--	700,095	801,203	664,449	539,207	429,643	811,806	224,070
Ash	1,026,821	--	209,068	165,916	188,140	164,385	121,696	150,758	26,858
Cottonwood	1,691	--	--	--	--	--	--	1,691	--
Basswood	43,916	--	3,913	12,228	9,213	4,467	10,857	3,238	--
Yellow-poplar	232,549	--	43,336	31,741	48,577	21,752	27,341	55,731	4,071
Bay and magnolia	1,653,103	--	414,630	321,894	291,217	223,252	142,042	226,713	33,355
Black cherry	23,927	--	8,139	9,852	2,156	3,780	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--
Sycamore	34,589	--	4,314	1,937	2,765	11,464	2,928	6,889	4,292
Black locust	--	--	--	--	--	--	--	--	--
Elm	252,309	--	41,605	59,210	54,499	30,123	27,365	35,414	4,093
Other eastern hardwoods	115,603	--	22,535	32,249	17,158	27,141	11,728	4,792	--
Total hardwoods	16,497,975	--	2,830,718	2,824,508	2,642,798	2,112,651	1,670,552	3,162,230	1,254,518
All species	44,867,182	5,991,841	9,399,261	8,549,044	6,484,858	4,565,128	3,166,524	5,059,591	1,650,935

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

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

Table 21.--Volume of sawtimber on timberland, by species, size class, and tree grade, Florida, 1987

Species	All size classes					Trees 15.0 inches d.b.h. and larger				
	All grades	Tree grade				All grades	Tree grade			
		1	2	3	4		1	2	3	4
	Thousand board feet									
Softwood										
Yellow pines[a]	19,824,410	5,594,330	4,247,287	9,982,793	--	6,382,963	2,734,715	1,510,540	2,137,708	--
Eastern white pine[b]	--	--	--	--	--	--	--	--	--	--
Spruce and fir[b]	--	--	--	--	--	--	--	--	--	--
Cypress[c]	8,150,920	1,989,756	2,139,992	3,950,811	70,361	3,528,212	1,989,756	1,149,796	369,330	19,330
Other eastern softwoods[b]	393,877	113,877	118,060	148,373	13,567	173,112	77,285	58,525	37,302	--
Total	28,369,207	7,697,963	6,505,339	14,081,977	83,928	10,084,287	4,801,756	2,718,861	2,544,340	19,330
Hardwood[c]										
Select white and red oaks	129,931	35,744	40,966	49,066	4,155	87,164	35,744	27,431	21,361	2,628
Other white and red oaks	5,727,638	1,108,903	1,603,279	2,448,811	566,645	4,282,528	1,108,903	1,413,381	1,443,165	317,079
Hickory	437,112	107,049	155,647	149,369	25,047	302,945	107,049	118,719	62,431	14,746
Yellow birch	--	--	--	--	--	--	--	--	--	--
Hard maple	43,354	--	10,826	18,200	14,328	33,358	--	8,427	15,906	9,025
Sweetgum	1,489,581	290,572	534,486	616,827	47,696	809,415	290,572	333,998	165,134	19,711
Ash, walnut, and black cherry	1,050,748	227,050	318,303	471,104	34,291	657,773	227,050	227,623	187,486	15,614
Yellow-poplar	232,549	56,010	67,634	102,796	6,109	157,472	56,010	56,140	45,322	--
Other eastern hardwoods	7,387,062	1,591,065	2,370,738	3,138,738	286,521	4,512,094	1,591,065	1,725,559	1,062,022	133,448
Total	16,497,975	3,416,393	5,101,879	6,994,911	984,792	10,842,749	3,416,393	3,911,278	3,002,827	512,251
All species	44,867,182	11,114,356	11,607,218	21,076,888	1,068,720	20,927,036	8,218,149	6,630,139	5,547,167	531,581

[a]For yellow pines, tree grade is based on "Southern Pine Tree Grades for Yard and Structural Lumber," Research Paper SE-40, published by the Southeastern Forest Experiment Station, Asheville, NC, 1968. Tree grade 4 does not apply to yellow pine.

[b]For other softwoods (excluding cypress), tree grade is based on "Tree Grades for Eastern White Pine," Research Paper NE-214, published by the Northeastern Forest Experiment Station, Broomall, PA, 1971.

[c]For hardwoods and cypress, tree grades 1, 2, and 3 are based on "Hardwood Tree Grades for Factory Lumber," Research Paper NE-333, published by the Northeastern Forest Experiment Station, Broomall, PA, 1976. Grade 4 trees are sawtimber trees not qualifying as tree Grades 1, 2, or 3. The butt log of these trees qualify as construction (tie and timber) logs based on "A Guide to Hardwood Log Grading (revised)," General Technical Report NE-1, published by the Northeastern Forest Experiment Station, Broomall, PA, 1971.

Table 22.--Volume of live timber and associated green weight of forest biomass on timberland, by class of material, softwood, and hardwood, Florida, 1987

Class of material	Volume[a]			Associated green weight[b]		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Thousand cubic feet			Hundred thousand pounds		
Sawtimber trees						
Saw-log portion	8,517,216	5,410,687	3,106,529	6,415,518	4,056,641	2,358,877
Upper stem	1,185,172	630,434	554,738	868,568	459,802	408,766
Total[c]	9,702,388	6,041,121	3,661,267	7,284,086	4,516,443	2,767,643
Poletimber trees[c]	5,267,173	3,263,734	2,003,439	3,595,148	2,239,641	1,355,507
All growing stock[c]	14,969,561	9,304,855	5,664,706	10,879,234	6,756,084	4,123,150
Rough trees[c]	1,601,250	99,630	1,501,620	1,297,186	64,852	1,232,334
Rotten trees[c]	211,049	34,180	176,869	170,669	27,178	143,491
Saplings[d]	2,957,925	1,278,603	1,679,322	2,226,021	993,921	1,232,100
Stumps, tops, and limbs[e]	4,170,772	2,244,480	1,926,292	2,974,843	1,545,211	1,429,632
Total, all classes	23,910,557	12,961,748	10,948,809	17,547,953	9,387,246	8,160,707

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

Table 23.--Total volume of live trees on timberland, by species and diameter class, Florida, 1987

Species	All classes	Diameter class (inches at breast height)											
		1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Thousand cubic feet												
Softwood													
Longleaf pine	1,414,696	11,797	36,143	74,043	147,247	284,142	363,785	289,086	134,358	46,176	16,626	10,660	633
Slash pine	5,541,851	130,267	549,145	1,207,978	1,258,370	839,624	604,837	424,205	258,361	147,779	69,563	49,290	2,432
Shortleaf pine	72,225	486	2,528	4,594	9,901	10,515	10,703	14,408	9,280	4,413	1,784	2,823	790
Loblolly pine	852,098	15,674	42,382	83,905	89,001	88,241	96,814	99,675	95,846	87,296	63,107	84,874	5,283
Pond pine	211,732	1,545	7,898	18,398	36,037	34,574	40,294	30,198	20,602	8,199	7,733	6,254	--
Virginia pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Pitch pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Table Mountain pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Spruce pine	46,710	533	1,610	5,693	2,026	4,062	4,990	4,751	5,596	6,178	3,856	7,415	--
Sand pine	642,907	32,374	67,767	158,846	145,253	97,475	77,038	31,782	20,141	8,057	4,174	--	--
Eastern white pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Eastern hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--
Spruce and fir	--	--	--	--	--	--	--	--	--	--	--	--	--
Baldcypress	788,870	6,612	21,565	54,012	74,060	95,518	85,878	82,067	78,590	68,804	60,876	101,840	59,048
Pondcypress	3,254,688	102,835	236,518	502,667	560,996	566,288	452,810	346,038	188,220	117,782	59,786	98,111	22,637
Cedars	135,971	3,994	6,930	11,485	16,894	23,034	19,177	19,176	16,749	7,944	5,231	5,357	--
Total softwoods	12,961,748	306,117	972,486	2,121,621	2,339,785	2,043,473	1,756,326	1,341,386	827,743	502,628	292,736	366,624	90,823
Hardwood													
Select white oaks[a]	50,371	1,175	3,286	4,184	3,764	5,881	5,705	8,223	5,765	4,568	3,993	2,873	954
Select red oaks[b]	5,215	43	--	--	883	423	--	668	--	591	1,569	1,038	--
Chestnut oak	--	--	--	--	--	--	--	--	--	--	--	--	--
Other white oaks	1,168,294	34,511	57,794	70,526	63,663	69,007	69,785	80,178	89,048	91,114	75,802	257,977	208,889
Other red oaks	2,117,993	97,920	141,428	210,883	213,999	250,203	257,242	202,534	185,409	126,920	110,888	226,283	94,284
Hickory	178,019	3,395	7,809	11,876	13,321	14,493	20,760	26,443	23,983	16,587	14,532	23,961	859
Yellow birch	--	--	--	--	--	--	--	--	--	--	--	--	--
Hard maple	22,753	780	792	1,807	2,624	2,064	3,601	2,485	2,165	1,680	1,308	3,447	--
Soft maple	799,816	41,925	71,355	78,388	92,819	102,829	109,602	89,298	78,207	57,681	29,501	43,307	4,904
Beech	16,798	108	659	313	1,446	--	2,076	1,871	1,004	1,141	3,522	3,650	1,008
Sweetgum	740,755	25,832	52,060	68,623	79,950	119,922	117,644	90,764	69,989	48,134	30,258	33,621	3,958
Tupelo and blackgum	2,589,028	124,474	249,885	290,268	309,031	292,051	297,778	274,693	205,916	154,901	116,787	213,289	59,955
Ash	709,395	45,732	80,230	90,668	76,398	90,057	86,757	58,502	59,366	44,395	31,484	37,140	8,666
Cottonwood	889	--	--	--	--	--	--	--	--	--	--	889	--
Basswood	17,538	680	413	806	1,655	1,494	1,558	3,929	2,501	1,268	2,514	720	--
Yellow-poplar	87,110	1,738	3,901	10,907	6,275	7,308	14,378	8,320	12,053	4,529	6,209	10,823	669
Bay and magnolia	1,388,584	84,889	173,205	207,099	188,634	183,603	176,253	115,987	87,405	65,887	40,223	58,310	7,089
Black cherry	31,750	5,154	5,905	4,678	5,104	2,477	3,410	2,880	556	1,586	--	--	--
Black walnut	79	79	--	--	--	--	--	--	--	--	--	--	--
Sycamore	9,599	--	431	--	325	--	1,649	605	723	2,848	666	1,503	849
Black locust	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm	150,095	5,398	12,152	16,193	15,533	20,654	17,675	18,916	17,077	8,558	7,822	9,254	863
Other eastern hardwoods	864,728	158,490	185,694	159,663	114,959	89,535	45,026	35,692	17,432	16,635	12,420	20,054	9,128
Total hardwoods	10,948,809	632,323	1,046,999	1,226,882	1,190,383	1,252,001	1,230,899	1,021,988	858,599	649,023	489,498	948,139	402,075
All species	23,910,557	938,440	2,019,485	3,348,503	3,530,168	3,295,474	2,987,225	2,363,374	1,686,342	1,151,651	782,234	1,314,763	492,898

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

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

Table 24.--Green weight of forest biomass on timberland, by species and diameter class, Florida, 1987

Species	All classes	Diameter class (inches at breast height)											
		1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Hundred thousand pounds												
Softwood													
Longleaf pine	1,108,675	9,311	30,673	52,439	111,907	220,343	287,125	229,706	107,584	37,130	13,388	8,566	503
Slash pine	4,305,888	96,003	508,830	883,169	961,003	647,856	469,350	329,618	201,105	114,932	53,920	38,245	1,857
Shortleaf pine	50,794	264	1,522	2,893	6,667	7,481	7,717	10,393	6,728	3,233	1,270	2,058	568
Loblolly pine	616,196	7,711	25,085	61,657	67,187	65,772	71,042	73,157	69,744	63,739	45,858	61,414	3,830
Pond pine	150,771	862	4,448	13,175	26,185	24,853	28,942	21,766	14,862	5,802	5,468	4,408	--
Virginia pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Pitch pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Table Mountain pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Spruce pine	32,302	398	1,465	3,282	1,331	2,755	3,471	3,332	3,976	4,340	2,721	5,231	--
Sand pine	438,088	22,953	55,423	97,373	96,856	66,748	53,783	22,294	14,118	5,684	2,856	--	--
Eastern white pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Eastern hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--
Spruce and fir	--	--	--	--	--	--	--	--	--	--	--	--	--
Baldcypress	591,619	3,729	13,615	27,740	46,171	65,597	63,767	63,683	62,111	55,697	50,062	86,443	53,004
Pondcypress	1,986,987	55,491	148,820	220,054	307,424	346,702	301,125	242,086	136,490	87,704	45,494	76,962	18,635
Cedars	105,926	2,828	4,490	8,773	13,035	17,685	15,380	15,229	13,656	6,175	4,288	4,387	--
Total softwoods	9,387,246	199,550	794,371	1,370,555	1,637,766	1,465,792	1,301,702	1,011,264	630,374	384,436	225,325	287,714	78,397
Hardwood													
Select white oaks[a]	41,639	947	2,481	2,859	3,098	4,877	4,810	6,876	4,845	4,011	3,391	2,591	853
Select red oaks[b]	4,469	33	--	--	687	369	--	581	--	548	1,358	893	--
Chestnut oak	--	--	--	--	--	--	--	--	--	--	--	--	--
Other white oaks	1,063,101	25,786	43,376	40,854	50,936	60,058	63,796	74,756	83,944	87,201	73,004	250,804	208,586
Other red oaks	1,712,209	86,321	107,127	161,076	176,847	204,123	210,508	166,122	152,717	103,946	90,287	180,254	72,881
Hickory	148,074	2,884	6,880	8,176	10,822	11,668	16,800	22,053	20,299	14,164	12,534	21,008	786
Yellow birch	--	--	--	--	--	--	--	--	--	--	--	--	--
Hard maple	20,335	639	655	1,455	2,376	1,825	3,254	2,201	1,939	1,575	1,233	3,183	--
Soft maple	594,062	31,872	50,852	55,601	71,655	78,300	82,071	66,895	58,179	42,806	21,255	31,175	3,401
Beech	13,837	96	582	227	937	--	1,711	1,525	886	1,088	2,952	3,023	810
Sweetgum	541,544	17,179	34,711	45,981	57,401	87,495	87,020	68,372	53,129	36,974	23,623	26,425	3,234
Tupelo and blackgum	1,741,221	82,011	166,720	148,125	188,316	188,237	198,161	191,121	148,592	114,996	90,193	172,158	52,591
Ash	462,395	27,961	50,832	72,732	55,951	60,350	54,618	36,271	35,628	25,609	17,850	20,126	4,467
Cottonwood	723	--	--	--	--	--	--	--	--	--	--	723	--
Basswood	12,354	442	287	459	1,133	1,022	1,113	2,881	1,762	923	1,820	512	--
Yellow-poplar	61,494	1,295	2,572	6,686	4,335	5,057	10,246	6,080	8,692	3,327	4,615	8,073	516
Bay and magnolia	865,150	52,545	105,041	110,825	116,999	116,031	113,616	76,329	57,958	44,108	27,028	39,693	4,977
Black cherry	20,231	2,586	3,944	2,793	3,380	1,652	2,301	2,004	399	1,172	--	--	--
Black walnut	71	71	--	--	--	--	--	--	--	--	--	--	--
Sycamore	7,094	--	285	--	245	--	1,149	434	528	2,124	513	1,154	662
Black locust	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm	100,235	3,954	8,563	9,931	10,484	13,516	11,622	12,694	11,493	5,833	5,263	6,289	593
Other eastern hardwoods	750,469	135,877	174,693	143,233	103,676	79,051	38,768	27,503	13,544	11,626	7,187	11,240	4,071
Total hardwoods	8,160,707	472,499	759,601	811,013	859,278	913,631	901,564	764,698	654,534	502,031	384,106	779,324	358,428
All species	17,547,953	672,049	1,553,972	2,181,568	2,497,044	2,379,423	2,203,266	1,775,962	1,284,908	886,467	609,431	1,067,038	436,825

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

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

Table 25.--Volume of growing stock on timberland, by species and forest-type group, Florida, 1987

Species	All types	Forest-type group								
		White pine-hemlock	Spruce-fir	Longleaf-slash	Loblolly-shortleaf	Oak-pine	Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Maple-beech-birch
	Thousand cubic feet									
Softwood										
Longleaf pine	1,179,882	--	--	960,648	32,673	116,711	56,432	13,418	--	--
Slash pine	3,998,887	--	--	3,411,525	43,211	315,697	11,905	216,549	--	--
Shortleaf pine	59,797	--	--	358	50,936	6,165	1,679	659	--	--
Loblolly pine	674,808	--	--	60,772	359,095	143,738	38,134	72,562	507	--
Pond pine	170,091	--	--	32,872	87,675	31,913	1,200	16,431	--	--
Virginia pine	--	--	--	--	--	--	--	--	--	--
Pitch pine	--	--	--	--	--	--	--	--	--	--
Table Mountain pine	--	--	--	--	--	--	--	--	--	--
Spruce pine	37,398	--	--	352	1,610	15,267	8,120	11,200	849	--
Sand pine	425,595	--	--	3,347	389,188	23,196	8,794	1,070	--	--
Eastern white pine	--	--	--	--	--	--	--	--	--	--
Eastern hemlock	--	--	--	--	--	--	--	--	--	--
Spruce and fir	--	--	--	--	--	--	--	--	--	--
Baldcypress	593,824	--	--	3,277	--	8,538	--	577,111	4,898	--
Pondcypress	2,066,455	--	--	49,244	597	95,915	--	1,915,089	5,610	--
Cedars	98,118	--	--	8,991	1,879	17,990	2,045	67,213	--	--
Total softwoods	9,304,855	--	--	4,531,386	966,864	775,130	128,309	2,891,302	11,864	--
Hardwood										
Select white oaks[a]	35,359	--	--	487	--	5,876	16,875	11,765	356	--
Select red oaks[b]	4,161	--	--	235	580	481	333	1,683	849	--
Chestnut oak	--	--	--	--	--	--	--	--	--	--
Other white oaks	405,502	--	--	11,678	8,548	28,816	162,056	190,323	4,081	--
Other red oaks	1,233,329	--	--	51,888	30,990	108,257	351,076	678,310	12,808	--
Hickory	120,992	--	--	--	1,119	14,348	66,008	36,596	2,921	--
Yellow birch	--	--	--	--	--	--	--	--	--	--
Hard maple	13,260	--	--	--	636	--	1,016	11,608	--	--
Soft maple	412,419	--	--	2,946	3,176	14,655	10,028	360,721	20,893	--
Beech	10,705	--	--	--	--	2,139	6,425	2,141	--	--
Sweetgum	527,787	--	--	7,840	10,750	36,441	97,023	359,628	16,105	--
Tupelo and blackgum	1,519,532	--	--	28,362	5,115	63,410	15,651	1,392,596	14,398	--
Ash	378,894	--	--	--	387	--	7,376	307,090	64,041	--
Cottonwood	294	--	--	--	--	--	--	--	294	--
Basswood	12,967	--	--	--	--	--	4,902	8,065	--	--
Yellow-poplar	67,610	--	--	4,917	1,572	7,730	11,743	41,648	--	--
Bay and magnolia	765,094	--	--	45,286	5,593	82,742	23,953	605,234	2,286	--
Black cherry	14,395	--	--	2,757	1,561	1,714	5,975	2,388	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--
Sycamore	7,893	--	--	--	--	--	--	2,154	5,739	--
Black locust	--	--	--	--	--	--	--	--	--	--
Elm	88,113	--	--	267	--	1,113	3,562	72,123	11,048	--
Other eastern hardwoods	46,400	--	--	--	558	1,261	7,542	26,212	10,827	--
Total hardwoods	5,664,706	--	--	156,663	70,585	368,983	791,544	4,110,285	166,646	--
All species	14,969,561	--	--	4,688,049	1,037,449	1,144,113	919,853	7,001,587	178,510	--

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

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

Table 26.--Volume of growing stock on timberland, by ownership class, species group, and diameter class, Florida, 1987

Ownership class and species group	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Thousand cubic feet										
National forest											
Softwood	873,091	103,920	135,085	168,171	190,972	135,051	77,906	32,338	13,618	14,313	1,717
Hardwood	213,966	28,464	27,248	28,569	29,425	19,249	23,430	20,067	16,113	19,656	1,745
Total	1,087,057	132,384	162,333	196,740	220,397	154,300	101,336	52,405	29,731	33,969	3,462
Other public											
Softwood	1,162,516	91,472	149,686	191,147	218,964	192,779	126,667	76,992	43,211	55,426	16,172
Hardwood	743,938	49,460	78,142	90,062	105,092	96,741	85,180	58,238	57,765	97,027	26,231
Total	1,906,454	140,932	227,828	281,209	324,056	289,520	211,847	135,230	100,976	152,453	42,403
Forest industry											
Softwood	2,686,743	612,775	676,680	457,713	329,360	238,409	149,077	86,728	59,491	60,705	15,805
Hardwood	1,476,847	159,129	195,437	207,957	214,237	185,366	150,401	115,418	84,198	126,055	38,649
Total	4,163,590	771,904	872,117	665,670	543,597	423,775	299,478	202,146	143,689	186,760	54,454
Forest industry-leased											
Softwood	385,892	103,122	135,068	61,223	28,250	19,761	9,769	9,612	5,706	13,381	--
Hardwood	114,233	16,860	21,498	16,259	12,749	13,990	9,082	3,994	4,346	10,607	4,848
Total	500,125	119,982	156,566	77,482	40,999	33,751	18,851	13,606	10,052	23,988	4,848
Other private											
Softwood	4,196,613	513,794	742,132	797,313	711,269	554,560	342,222	220,759	127,953	159,605	27,006
Hardwood	3,115,722	286,759	355,493	442,102	454,917	381,805	321,899	241,622	165,951	325,487	139,687
Total	7,312,335	800,553	1,097,625	1,239,415	1,166,186	936,365	664,121	462,381	293,904	485,092	166,693
All ownerships											
Softwood	9,304,855	1,425,083	1,838,651	1,675,567	1,478,815	1,140,560	705,641	426,429	249,979	303,430	60,700
Hardwood	5,664,706	540,672	677,818	784,949	816,420	697,151	589,992	439,339	328,373	578,832	211,160
Total	14,969,561	1,965,755	2,516,469	2,460,516	2,295,235	1,837,711	1,295,633	865,768	578,352	882,262	271,860

Table 27.--Volume of sawtimber on timberland, by ownership class, species group, and diameter class, Florida, 1987

Ownership class and species group	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Thousand board feet								
National forest									
Softwood	3,036,092	644,497	882,521	700,943	436,267	186,451	82,630	90,462	12,321
Hardwood	573,086	--	99,054	75,703	104,052	94,749	81,982	107,377	10,169
Total	3,609,178	644,497	981,575	776,646	540,319	281,200	164,612	197,839	22,490
Other public									
Softwood	4,539,998	700,147	999,276	988,000	702,594	446,318	258,074	341,078	104,511
Hardwood	2,393,915	--	363,848	389,719	377,711	280,355	290,573	532,488	159,221
Total	6,933,913	700,147	1,363,124	1,377,719	1,080,305	726,673	548,647	873,566	263,732
Forest industry									
Softwood	6,365,766	1,622,634	1,443,785	1,179,447	797,447	491,229	353,750	375,232	102,242
Hardwood	4,067,427	--	739,231	746,598	672,979	555,330	429,280	691,050	232,959
Total	10,433,193	1,622,634	2,183,016	1,926,045	1,470,426	1,046,559	783,030	1,066,282	335,201
Forest industry-leased									
Softwood	667,148	213,226	122,943	97,607	53,454	55,519	36,209	88,190	--
Hardwood	267,755	--	43,579	56,348	39,939	18,632	21,931	58,513	28,813
Total	934,903	213,226	166,522	153,955	93,393	74,151	58,140	146,703	28,813
Other private									
Softwood	13,760,203	2,811,337	3,120,018	2,758,539	1,852,298	1,272,960	765,309	1,002,399	177,343
Hardwood	9,195,792	--	1,585,006	1,556,140	1,448,117	1,163,585	846,786	1,772,802	823,356
Total	22,955,995	2,811,337	4,705,024	4,314,679	3,300,415	2,436,545	1,612,095	2,775,201	1,000,699
All ownerships									
Softwood	28,369,207	5,991,841	6,568,543	5,724,536	3,842,060	2,452,477	1,495,972	1,897,361	396,417
Hardwood	16,497,975	--	2,830,718	2,824,508	2,642,798	2,112,651	1,670,552	3,162,230	1,254,518
Total	44,867,182	5,991,841	9,399,261	8,549,044	6,484,858	4,565,128	3,166,524	5,059,591	1,650,935

Table 28.--Volume of growing stock on timberland, by broad management class, species group, and stand-age class, Florida, 1987

Broad management class and species group	All classes	No manageable stand	Stand-age class (years)								
			0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81+
			Thousand cubic feet								
Pine plantation											
Softwood	2,013,045	15,977	35,353	651,287	1,092,138	190,554	17,365	5,491	4,880	--	--
Hardwood	36,153	408	6,114	6,853	19,728	2,322	728	--	--	--	--
Total	2,049,198	16,385	41,467	658,140	1,111,866	192,876	18,093	5,491	4,880	--	--
Natural pine											
Softwood	3,485,205	481,068	53,561	97,806	377,921	845,636	759,210	513,260	184,885	134,153	37,705
Hardwood	191,095	15,789	3,780	6,337	17,659	37,928	61,884	15,139	12,434	16,427	3,718
Total	3,676,300	496,857	57,341	104,143	395,580	883,564	821,094	528,399	197,319	150,580	41,423
Oak-pine											
Softwood	775,130	195,878	16,235	20,006	32,579	85,087	189,250	101,097	53,327	47,009	34,662
Hardwood	368,983	42,641	4,266	4,685	17,700	51,932	108,614	63,318	36,857	21,999	16,971
Total	1,144,113	238,519	20,501	24,691	50,279	137,019	297,864	164,415	90,184	69,008	51,633
Upland hardwood											
Softwood	128,309	67,773	6,772	9,356	4,789	8,269	13,091	7,742	5,300	2,260	2,957
Hardwood	791,544	231,188	15,248	31,165	27,627	71,976	122,288	101,536	66,468	45,985	78,063
Total	919,853	298,961	22,020	40,521	32,416	80,245	135,379	109,278	71,768	48,245	81,020
Lowland hardwood											
Softwood	2,903,166	177,928	13,344	20,005	69,321	159,693	284,188	518,793	473,109	390,566	796,219
Hardwood	4,276,931	504,946	37,244	46,991	97,098	328,964	579,022	790,374	718,940	539,087	634,265
Total	7,180,097	682,874	50,588	66,996	166,419	488,657	863,210	1,309,167	1,192,049	929,653	1,430,484
All types											
Softwood	9,304,855	938,624	125,265	798,460	1,576,748	1,289,239	1,263,104	1,146,383	721,501	573,988	871,543
Hardwood	5,664,706	794,972	66,652	96,031	179,812	493,122	872,536	970,367	834,699	623,498	733,017
Total	14,969,561	1,733,596	191,917	894,491	1,756,560	1,782,361	2,135,640	2,116,750	1,556,200	1,197,486	1,604,560

Table 29.--Average net annual growth and removals of live timber and growing stock on timberland, by species, Florida, 1980-1986

Species	Live timber[a]		Growing stock	
	Net annual growth	Annual timber removals	Net annual growth	Annual timber removals
	Thousand cubic feet			
Softwood				
Yellow pines	428,125	443,305	427,177	441,241
Eastern white pine	--	--	--	--
Spruce and fir	--	--	--	--
Cypress	57,888	32,306	57,340	31,872
Other eastern softwoods	3,107	1,130	3,031	1,130
Total softwoods	489,120	476,741	487,548	474,243
Hardwood				
Select white and red oaks	968	821	964	703
Other white and red oaks	56,688	36,223	47,938	28,669
Hickory	2,750	3,145	2,622	2,981
Yellow birch	--	--	--	--
Hard maple	435	--	406	--
Sweetgum	14,533	9,460	14,057	8,946
Ash, walnut, and black cherry	9,919	2,850	8,250	2,374
Yellow-poplar	2,783	1,193	2,736	1,193
Tupelo and blackgum	26,771	12,405	24,844	11,191
Bay and magnolia	25,600	6,565	23,175	5,085
Other eastern hardwoods	24,784	12,866	15,766	5,302
Total hardwoods	165,231	85,528	140,758	66,444
All species	654,351	562,269	628,306	540,687

[a]Merchantable portion only.

Table 30.--Average net annual growth and removals of growing stock on timberland, by ownership class, softwood, and hardwood, Florida, 1980-1986

Ownership class	Net annual growth			Annual timber removals		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
			Thousand cubic feet			
National forest	35,659	31,374	4,285	32,031	31,980	51
Other public	58,727	42,396	16,331	17,513	16,528	985
Forest industry	229,825	194,624	35,201	219,001	191,183	27,818
Forest industry-leased	36,512	33,162	3,350	37,206	32,893	4,315
Other private	267,583	185,992	81,591	234,936	201,659	33,277
All ownerships	628,806	487,548	140,758	540,687	474,243	66,444

Table 31.--Average net annual growth and removals of sawtimber on timberland, by species, Florida, 1980-1986

Species	Net annual growth	Annual timber removals
	Thousand board feet	
Softwood		
Yellow pines	1,249,121	1,158,767
Eastern white pine	--	--
Spruce and fir	--	--
Cypress	235,638	107,499
Other eastern softwoods	13,310	4,205
Total softwoods	1,498,069	1,270,471
Hardwood		
Select white and red oaks	3,808	2,412
Other white and red oaks	186,630	80,125
Hickory	11,068	8,632
Yellow birch	--	--
Hard maple	2,073	--
Sweetgum	56,099	26,591
Ash, walnut, and black cherry	28,174	4,789
Yellow-poplar	7,684	3,878
Tupelo and blackgum	75,800	32,378
Bay and magnolia	62,078	10,182
Other eastern hardwoods	48,627	10,494
Total hardwoods	482,041	179,481
All species	1,980,110	1,449,952

Table 32.--Average net annual growth and removals of sawtimber on timberland, by ownership class, softwood, and hardwood, Florida, 1980-1986

Ownership class	Net annual growth			Annual timber removals		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Thousand board feet					
National forest	111,896	99,153	12,743	99,360	99,360	--
Other public	240,932	180,054	60,878	52,199	49,284	2,915
Forest industry	543,973	434,767	109,206	550,265	473,148	77,117
Forest industry-leased	76,969	70,308	6,661	74,062	63,400	10,662
Other private	1,006,340	713,787	292,553	674,066	585,279	88,787
All ownerships	1,980,110	1,498,069	482,041	1,449,952	1,270,471	179,481

Table 33.--Average annual mortality of live timber, growing stock, and sawtimber on timberland, by species, Florida, 1980-1986

Species	Live timber[a]	Growing stock	Sawtimber
	Thousand cubic feet		Thousand board feet
Softwood			
Yellow pines	52,853	51,419	161,946
Eastern white pine	--	--	--
Spruce and fir	--	--	--
Cypress	11,457	10,163	24,037
Other eastern softwoods	833	693	3,085
Total softwoods	65,143	62,275	189,068
Hardwood			
Select white and red oaks	617	371	1,433
Other white and red oaks	33,808	23,592	87,889
Hickory	897	596	2,074
Yellow birch	--	--	--
Hard maple	--	--	--
Sweetgum	5,150	4,411	12,792
Ash, walnut, and black cherry	5,357	2,971	6,835
Yellow-poplar	527	423	1,139
Tupelo and blackgum	10,846	8,519	27,008
Bay and magnolia	15,462	11,292	29,535
Other eastern hardwoods	22,734	7,607	18,346
Total hardwoods	95,398	59,782	187,051
All species	160,541	122,057	376,119

[a]Merchantable portion only.

Table 34.--Average annual mortality of growing stock and sawtimber on timberland, by ownership class, softwood, and hardwood, Florida, 1980-1986

Ownership class	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Thousand cubic feet			Thousand board feet		
National forest	8,845	6,448	2,397	27,644	21,520	6,124
Other public	9,687	4,671	5,016	34,188	17,551	16,637
Forest industry	27,981	11,532	16,449	91,214	28,260	62,954
Forest industry-leased	1,882	1,121	761	4,582	2,377	2,205
Other private	73,662	38,503	35,159	218,491	119,360	99,131
All ownerships	122,057	62,275	59,782	376,119	189,068	187,051

Table 35.--Average annual mortality of growing stock and sawtimber on timberland, by cause of death, softwood, and hardwood, Florida, 1980-1986

Cause of death	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Thousand cubic feet			Thousand board feet		
Fire	18,580	15,685	2,895	42,741	35,541	7,200
Insects	10,375	10,375	--	38,618	38,618	--
Disease	10,421	4,750	5,671	32,464	14,496	17,968
Weather	16,397	7,066	9,331	66,044	30,943	35,101
Suppression	10,619	5,795	4,824	4,078	1,787	2,291
Animals	735	--	735	3,004	--	3,004
Undetermined	54,930	18,604	36,326	189,170	67,683	121,487
All causes	122,057	62,275	59,782	376,119	189,068	187,051

Table 36.--Average annual output of timber products, by product, species group, and type of material, Florida, 1980-1986

Product and species group	Standard units	Total output		Roundwood products		Mill byproducts	
		Number of units	Thousand cubic feet	Number of units	Thousand cubic feet	Number of units	Thousand cubic feet
Saw logs							
Softwood	M fbm[a]	712,379	137,525	704,951	136,091	7,428	1,434
Hardwood	M fbm[a]	38,616	6,601	38,575	6,594	41	7
Total	M fbm[a]	750,995	144,126	743,526	142,685	7,469	1,441
Veneer logs and bolts							
Softwood	M fbm[a]	118,274	23,191	118,274	23,191	--	--
Hardwood	M fbm[a]	15,863	2,666	15,863	2,666	--	--
Total	M fbm[a]	134,137	25,857	134,137	25,857	--	--
Pulpwood[b]							
Softwood	Cords[c]	3,895,688	288,281	3,294,202	243,771	601,486	44,510
Hardwood	Cords[c]	331,126	26,159	312,620	24,697	18,506	1,462
Total	Cords[c]	4,226,814	314,440	3,606,822	268,468	619,992	45,972
Poles and piling							
Softwood	C pieces	3,657	6,583	3,657	6,583	--	--
Hardwood	C pieces	--	--	--	--	--	--
Total	C pieces	3,657	6,583	3,657	6,583	--	--
Posts (round and split)							
Softwood	M pieces	3,679	3,679	3,679	3,679	--	--
Hardwood	M pieces	167	150	167	150	--	--
Total	M pieces	3,846	3,829	3,846	3,829	--	--
Other[d]							
Softwood	M ft^3	27,279	27,279	6,438	6,438	20,841	20,841
Hardwood	M ft^3	2,591	2,591	1,078	1,078	1,513	1,513
Total	M ft^3	29,870	29,870	7,516	7,516	22,354	22,354
Total industrial products							
Softwood		--	486,538	--	419,753	--	66,785
Hardwood		--	38,167	--	35,185	--	2,982
Total		--	524,705	--	454,938	--	69,767
Fuelwood[e]							
Softwood	Cords	52,895	3,856	45,858	3,343	7,037	513
Hardwood	Cords	358,080	23,354	353,250	23,039	4,830	315
Total	Cords	410,975	27,210	399,108	26,382	11,867	828
All products							
Softwood		--	490,394	--	423,096	--	67,298
Hardwood		--	61,521	--	58,224	--	3,297
Total		--	551,915	--	481,320	--	70,595

[a]International 1/4-inch rule.

[b]Roundwood figures include an estimated 23,490 thousand cubic feet of roundwood chipped at other primary wood-using plants.

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

[d]Includes liter, mulch, particleboard, charcoal, and other specialty products.

[e]Excludes approximately 32,514 thousand cubic feet of wood residues, and 49,450 thousand cubic feet of bark used for industrial fuel.

Table 37.--Average annual output of roundwood products, by product, species group, and source of material, Florida, 1980-1986

Product and species group	All sources	Growing-stock trees[a]			Cull trees[a]	Salvable dead trees[a]	Other sources[b]
		Total	Sawtimber	Poletimber			
	Thousand cubic feet						
Saw logs							
Softwood	136,091	132,553	124,580	7,973	--	--	3,538
Hardwood	6,594	6,054	5,564	490	523	--	17
Total	142,685	138,607	130,144	8,463	523	--	3,555
Veneer logs and bolts							
Softwood	23,191	23,191	23,191	--	--	--	--
Hardwood	2,666	2,666	2,666	--	--	--	--
Total	25,857	25,857	25,857	--	--	--	--
Pulpwood							
Softwood	243,771	226,571	30,512	196,059	1,311	1,059	14,830
Hardwood	24,697	16,157	4,757	11,400	4,411	--	4,129
Total	268,468	242,728	35,269	207,459	5,722	1,059	18,959
Poles and piling							
Softwood	6,583	6,583	6,583	--	--	--	--
Hardwood	--	--	--	--	--	--	--
Total	6,583	6,583	6,583	--	--	--	--
Posts (round and split)							
Softwood	3,679	3,007	408	2,599	--	--	672
Hardwood	150	42	--	42	8	--	100
Total	3,829	3,049	408	2,641	8	--	772
Other							
Softwood	6,438	6,282	3,417	2,865	--	--	156
Hardwood	1,078	1,017	120	897	--	--	61
Total	7,516	7,299	3,537	3,762	--	--	217
Total industrial products							
Softwood	419,753	398,187	188,691	209,496	1,311	1,059	19,196
Hardwood	35,185	25,936	13,107	12,829	4,942	--	4,307
Total	454,938	424,123	201,798	222,325	6,253	1,059	23,503
Fuelwood							
Softwood	3,343	2,690	2,384	306	--	234	419
Hardwood	23,039	9,669	4,892	4,777	8,100	2,704	2,566
Total	26,382	12,359	7,276	5,083	8,100	2,938	2,985
All products							
Softwood	423,096	400,877	191,075	209,802	1,311	1,293	19,615
Hardwood	58,224	35,605	17,999	17,606	13,042	2,704	6,873
Total	481,320	436,482	209,074	227,408	14,353	3,997	26,488

[a]On timberland.

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

Table 38.--Average annual timber removals from growing stock on timberland, by item, softwood, and hardwood, Florida, 1980-1986

Item	All species	Softwood	Hardwood
	Thousand cubic feet		
Roundwood products			
Saw logs	138,607	132,553	6,054
Veneer logs and bolts	25,857	23,191	2,666
Pulpwood	242,728	226,571	16,157
Poles and piling	6,583	6,583	--
Posts	3,049	3,007	42
Other	7,299	6,282	1,017
Fuelwood	12,359	2,690	9,669
All products	436,482	400,877	35,605
Logging residues	31,440	21,199	10,241
Other removals	72,765	52,167	20,598
Total removals	540,687	474,243	66,444

Table 39.--Average annual timber removals from live sawtimber on timberland, by item, softwood, and hardwood, Florida, 1980-1986

Item	All species	Softwood	Hardwood
	Thousand board feet		
Roundwood products			
Saw logs	747,803	710,879	36,924
Veneer logs and bolts	189,011	170,260	18,751
Pulpwood	159,923	132,916	27,007
Poles and piling	28,675	28,675	--
Posts	1,778	1,778	--
Other	17,539	16,961	578
Fuelwood	46,298	13,566	32,732
All products	1,191,027	1,075,035	115,992
Logging residues	21,443	16,578	4,865
Other removals	237,482	178,858	58,624
Total removals	1,449,952	1,270,471	179,481

Table 40.--Average annual volume of unused residues at primary manufacturing plants, by species group, type of residue, and industry, Florida, 1980-1986

Species group and type of residue[a]	All industries	Lumber	Veneer and plywood	Other
	Thousand cubic feet			
Softwood				
Coarse[b]	796	541	3	252
Fine[c]	366	364	2	--
Total	1,162	905	5	252
Hardwood				
Coarse[b]	315	305	10	--
Fine[c]	381	364	17	--
Total	696	669	27	--
All species				
Coarse[b]	1,111	846	13	252
Fine[c]	747	728	19	--
Total	1,858	1,574	32	252

[a]Excludes 752 thousand cubic feet of unused bark.

[b]Material such as slabs and edgings.

[c]Material such as sawdust and shavings.

Table 41.--Current area of timberland and associated inventory, net annual growth, and annual removals of growing stock, by species group and ownership, with 30-year projections, Florida

Component, species group, and ownership	Unit of measure	Inventory year	Projected to--		
		1987	1997	2007	2017
Area	M acres				
Public		2,443	2,633	2,714	2,741
Forest industry		5,447	5,555	5,640	5,610
Other private		7,093	6,708	6,466	6,236
Total		14,983	14,896	14,820	14,587
Pine volume					
Inventory	MM ft^3				
Public		1,600.0	1,790.1	2,040.3	2,311.9
Forest industry		2,293.6	2,028.3	2,153.3	2,419.0
Other private		2,652.9	2,256.2	2,091.4	2,389.2
Total		6,546.5	6,074.6	6,285.0	7,120.1
Net annual growth	MM ft^3				
Public		65.6	66.6	73.6	74.4
Forest industry		212.4	195.4	220.8	238.9
Other private		149.2	146.6	155.3	171.0
Total		427.2	408.6	449.7	484.3
Annual removals	MM ft^3				
Public		48.1	48.1	48.1	48.1
Forest industry		211.6	211.6	211.6	211.6
Other private		181.5	181.5	162.1	155.6
Total		441.2	441.2	421.8	415.3
Other volume[a]					
Inventory	MM ft^3				
Public		1,393.5	1,910.8	2,399.4	2,838.6
Forest industry		2,370.1	2,607.3	2,874.7	3,115.5
Other private		4,659.5	5,538.7	6,362.9	7,026.2
Total		8,423.1	10,056.8	11,637.0	12,980.3
Net annual growth	MM ft^3				
Public		28.8	40.6	41.0	37.7
Forest industry		53.9	76.0	78.4	70.9
Other private		118.4	151.3	141.7	119.8
Total		201.1	267.9	261.1	228.4
Annual removals	MM ft^3				
Public		1.4	1.4	1.4	1.4
Forest industry		44.6	44.6	44.6	44.6
Other private		53.4	53.4	53.4	53.4
Total		99.4	99.4	99.4	99.4

[a]Includes cypress.

Table 42.--Land area, by land use class, major forest type, and survey completion date, Florida

Land use class	Survey completion date			Change 1980-1987
	1970	1980	1987	
		Acres		
Forest land				
Timberland:				
Pine and oak-pine types	9,567,984	9,193,657	8,737,336	-456,321
Hardwood types	6,693,255	6,470,520	6,245,271	-225,249
Total	16,261,239	15,664,177	14,982,607	-681,570
Reserved timberland	94,200	411,844	403,569	-8,275
Woodland	1,590,744	1,057,868	1,162,836	+104,968
Total forest land	17,946,183	17,133,889	16,549,012	-584,877
Nonforest land				
Cropland	3,671,347	3,784,515	3,937,202	+152,687
Pasture and range	6,456,018	6,991,503	6,324,067	-667,436
Other	6,464,601	6,622,456	7,721,452	+1,098,996
Total	16,591,966	17,398,474	17,982,721	+584,247
All land[a]	34,538,149	34,532,363	34,531,733	-630

[a]Excludes all water areas.

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

Species group and year	All classes	Diameter class (inches at breast height)								
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0 and larger
					SAWTIMBER (in thousand board feet)					
Softwood										
1970	22,132,405	--	--	5,533,035	6,126,719	4,604,060	2,720,746	1,551,291	724,981	871,573
1980	26,627,172	--	--	6,241,833	6,944,109	5,392,841	3,388,148	1,969,022	1,147,485	1,543,734
1987	28,369,207	--	--	5,991,841	6,568,543	5,724,536	3,842,060	2,452,477	1,495,972	2,293,778
Hardwood										
1970	12,166,188	--	--	--	2,173,606	2,322,768	1,971,551	1,634,964	1,224,531	2,838,768
1980	14,162,321	--	--	--	2,505,491	2,689,525	2,162,847	1,839,588	1,444,291	3,520,579
1987	16,497,975	--	--	--	2,830,718	2,824,508	2,642,798	2,112,651	1,670,552	4,416,748
					GROWING STOCK (in thousand cubic feet)					
Softwood										
1970	7,688,799	1,238,154	1,492,768	1,561,723	1,401,633	939,529	511,674	277,151	124,991	141,176
1980	9,205,430	1,488,264	1,830,808	1,764,369	1,587,499	1,097,326	637,052	352,487	197,384	250,241
1987	9,304,855	1,425,083	1,838,651	1,675,567	1,478,815	1,140,560	705,641	426,429	249,979	364,130
Hardwood										
1970	4,434,978	420,986	556,699	624,244	674,242	603,887	458,910	349,148	245,354	501,508
1980	5,090,273	484,353	611,944	707,245	777,512	699,063	503,993	393,097	289,838	623,228
1987	5,664,706	540,672	677,818	784,949	816,420	697,151	589,992	439,339	328,373	789,992
					LIVE TIMBER[b] (in thousand cubic feet)					
Softwood										
1970	7,820,852	1,274,740	1,523,437	1,585,528	1,414,844	947,648	517,563	278,825	125,872	152,395
1980	9,362,569	1,527,696	1,866,349	1,790,889	1,603,213	1,107,150	644,330	354,501	198,771	269,670
1987	9,438,665	1,449,132	1,867,478	1,699,151	1,491,882	1,148,725	713,043	432,525	252,052	384,677
Hardwood										
1970	5,896,135	677,456	800,566	836,197	842,036	735,340	571,585	424,690	312,404	695,861
1980	6,772,216	775,032	881,086	946,714	971,416	850,117	629,355	479,764	370,162	868,570
1987	7,343,195	816,217	920,112	1,008,662	1,009,224	842,419	708,999	536,622	403,257	1,097,683

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

[b]Merchantable volume.

Table 44.--Merchantable volume of live timber, by species group, Survey Unit, and survey completion date, Florida

Species group and Survey Unit	1970	1980	Change 1970-1980	1987	Change 1980-1987
	Thousand cubic feet	Thousand cubic feet	Percent	Thousand cubic feet	Percent
Softwood					
Northwest	2,512,611	3,036,851	+20.9	3,036,158	-0.2
Northeast	3,620,226	4,356,740	+20.3	4,163,622	-4.4
Central	1,232,293	1,465,367	+18.9	1,654,274	+12.9
South	455,722	503,611	+10.5	584,611	+16.1
All units	7,820,852	9,362,569	+19.7	9,438,665	+.8
Hardwood					
Northwest	2,155,355	2,429,912	+12.7	2,594,051	+6.8
Northeast	2,537,428	2,875,315	+13.3	3,021,759	+5.1
Central	1,106,127	1,373,397	+24.2	1,616,391	+17.7
South	97,225	93,592	-3.7	110,994	+18.6
All units	5,896,135	6,772,216	+14.9	7,343,195	+8.4

Table 45.--Land area and total forest, by county, Florida, 1987

County	All land[a]	Total forest[b]	
	Acres	Acres	Percent
Alachua	576,941	307,773	53.3
Baker	374,509	338,624	90.4
Bay	484,858	402,062	82.9
Bradford	187,373	130,077	69.4
Brevard	637,062	118,545	18.6
Broward	775,213	35,666	4.6
Calhoun	363,392	298,800	82.2
Charlotte	441,613	54,217	12.3
Citrus	402,330	232,125	57.7
Clay	379,008	289,812	76.5
Collier	1,276,224	745,852	58.4
Columbia	509,728	364,523	71.5
Dade	1,251,366	240,537	19.2
De Soto	406,867	48,176	11.8
Dixie	448,826	396,866	88.4
Duval	496,954	262,713	52.9
Escambia	422,682	250,847	59.3
Flagler	314,099	255,897	81.5
Franklin	348,698	312,324	89.6
Gadsden	331,264	242,495	73.2
Gilchrist	226,413	138,145	61.0
Glades	488,301	91,189	18.7
Gulf	357,523	294,176	82.3
Hamilton	331,193	228,055	68.9
Hardee	407,968	90,844	22.3
Hendry	744,013	94,282	12.7
Hernando	305,421	170,299	55.8
Highlands	658,310	84,688	12.9
Hillsborough	673,830	131,354	19.5
Holmes	312,000	184,977	59.3
Indian River	318,118	36,513	11.5
Jackson	602,611	284,617	47.2
Jefferson	389,933	281,815	72.3
Lafayette	348,928	286,790	82.2
Lake	610,790	258,234	42.3
Lee	513,952	181,037	35.2
Leon	432,582	295,031	68.2
Levy	703,718	496,965	70.6
Liberty	535,814	508,591	94.9
Madison	454,618	310,381	68.3
Manatee	478,163	49,249	10.3
Marion	1,030,195	576,799	56.0
Martin	355,002	37,892	10.7
Monroe	661,824	420,634	63.6
Nassau	415,386	335,452	80.8
Okaloosa	598,918	429,121	71.6
Okeechobee	493,114	33,366	6.8
Orange	582,714	175,071	30.0
Osceola	863,795	186,501	21.6
Palm Beach	1,275,590	82,691	6.5
Pasco	472,224	150,790	31.9
Pinellas	179,315	19,594	10.9
Polk	1,166,803	288,235	24.7
Putnam	469,043	351,426	74.9
St. Johns	395,059	270,465	68.5
St. Lucie	371,840	34,853	9.4
Santa Rosa	655,053	476,441	72.7
Sarasota	366,810	57,182	15.6
Seminole	190,739	76,704	40.2
Sumter	359,174	178,938	49.8
Suwannee	441,388	211,231	47.9
Taylor	676,813	592,791	87.6
Union	157,286	118,903	75.6
Volusia	707,198	482,229	68.2
Wakulla	384,845	337,567	87.7
Walton	682,080	510,924	74.9
Washington	377,427	288,049	76.3
Total	34,652,841	16,549,012	47.8

[a]Excludes inland water.

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

Table 46.--Area of timberland, by county and ownership class, Florida, 1987

County	All ownerships	National forest	Other public	Forest industry[a]	Other private
			Acres		
Alachua	297,262	--	6,623	125,026	165,613
Baker	327,657	67,249	4,070	207,641	48,697
Bay	400,032	--	28,217	247,747	124,068
Bradford	130,077	--	13,865	83,356	32,856
Brevard	109,806	--	13,627	1,920	94,259
Broward	--	--	--	--	--
Calhoun	298,800	--	118	198,688	99,994
Charlotte	33,838	--	7,115	--	26,723
Citrus	226,973	--	49,979	8,763	168,231
Clay	289,812	--	48,119	86,192	155,501
Collier	309,023	--	4,670	--	304,353
Columbia	--	--	--	--	--
Dade	357,298	74,145	4,551	151,818	126,784
De Soto	48,176	--	1,274	--	46,902
Dixie	396,866	--	6,249	322,742	67,875
Duval	261,242	--	18,369	48,530	194,343
Escambia	246,116	--	8,054	100,721	137,341
Flagler	253,247	--	1,182	150,359	101,706
Franklin	309,773	21,170	25,365	253,184	10,054
Gadsden	242,495	--	12,529	88,654	141,312
Gilchrist	138,145	--	285	32,334	105,526
Glades	79,469	--	230	73,337	5,902
Gulf	293,027	--	40,214	210,555	42,258
Hamilton	228,055	--	2,674	148,038	77,343
Hardee	90,844	--	1,098	--	89,746
Hendry	85,487	--	9,309	50	76,128
Hernando	170,299	--	51,499	410	118,390
Highlands	84,202	--	26,853	--	57,349
Hillsborough	121,406	--	22,177	--	99,229
Holmes	184,664	--	3,269	69,725	111,670
Indian River	29,367	--	1,349	--	28,018
Jackson	284,617	--	8,101	64,942	211,574
Jefferson	279,715	--	6,950	119,270	153,495
Lafayette	286,790	--	413	214,077	72,300
Lake	239,716	69,712	16,418	305	153,281
Lee	120,398	--	2,323	--	118,075
Leon	294,872	101,538	10,476	56,677	126,181
Levy	486,570	--	18,166	281,017	187,387
Liberty	500,791	252,133	23,492	167,578	57,588
Madison	310,381	--	2,063	161,966	146,352
Manatee	43,563	--	7,364	--	36,199
Marion	563,237	244,691	30,214	96,078	192,254
Martin	30,485	--	9,263	--	21,222
Monroe	--	--	--	--	--
Nassau	334,940	--	3,902	197,370	133,668
Okaloosa	428,524	--	272,085	54,823	101,616
Okeechobee	31,780	--	292	--	31,488
Orange	172,515	--	45,825	--	126,690
Osceola	183,545	--	13,612	215	169,718
Palm Beach	--	--	--	--	--
Pasco	150,455	--	34,225	28,757	87,473
Pinellas	11,541	--	1,626	--	9,915
Polk	263,571	--	37,674	--	225,897
Putnam	348,923	19,637	8,728	110,909	209,649
St. Johns	267,741	--	4,321	139,252	124,168
St. Lucie	33,267	--	893	--	32,374
Santa Rosa	475,212	--	189,367	171,004	114,841
Sarasota	56,050	--	12,241	--	43,809
Seminole	74,953	--	1,609	--	73,344
Sumter	173,311	--	54,550	18,990	99,771
Suwannee	211,231	--	4,347	24,486	182,398
Taylor	586,127	--	504	546,082	39,541
Union	118,903	--	5,470	76,141	37,292
Volusia	467,605	--	4,675	78,988	383,942
Wakulla	311,635	139,880	38,636	56,745	76,374
Walton	508,291	--	156,129	128,721	223,441
Washington	287,894	--	14,057	42,236	231,601
Total	14,982,607	990,155	1,452,944	5,446,419	7,093,089

[a]Includes 676,795 acres of other private land under long-term lease.

Table 47.--Area of timberland, by county and broad management class, Florida, 1987

County	All classes	Pine plantation	Natural pine	Oak-pine	Upland hardwood	Lowland hardwood
	Acres					
Alachua	297,262	130,484	39,535	17,026	55,669	54,548
Baker	327,657	140,211	89,951	16,349	--	81,146
Bay	400,032	191,922	112,705	15,559	46,318	33,528
Bradford	130,077	51,763	23,361	21,617	3,865	29,471
Brevard	109,806	11,088	40,240	--	4,923	53,555
Broward	--	--	--	--	--	--
Calhoun	298,800	131,861	39,141	41,842	23,733	62,223
Charlotte	33,838	8,497	13,361	--	--	11,980
Citrus	226,973	14,518	45,649	44,238	66,324	56,244
Clay	289,812	91,559	65,655	10,723	52,731	69,144
Collier	309,023	--	44,638	24,348	4,058	235,979
Columbia	357,298	124,602	76,553	20,584	47,257	88,302
Dade	--	--	--	--	--	--
De Soto	48,176	--	11,923	2,345	9,381	24,527
Dixie	396,866	170,603	18,211	21,314	41,963	144,775
Duval	261,242	75,848	64,467	34,901	33,475	52,551
Escambia	246,116	72,573	84,753	31,857	24,468	32,465
Flagler	253,247	104,528	59,318	16,275	7,395	65,731
Franklin	309,773	154,065	62,969	21,805	4,138	66,796
Gadsden	242,495	51,726	45,622	34,081	19,951	91,115
Gilchrist	138,145	64,357	10,051	10,049	43,372	10,316
Glades	79,469	22,562	19,744	1,475	--	35,688
Gulf	293,027	55,519	92,321	19,441	2,817	122,929
Hamilton	228,055	106,017	24,871	12,697	30,752	53,718
Hardee	90,844	--	21,495	4,079	12,237	53,033
Hendry	85,487	460	33,306	4,758	4,758	42,205
Hernando	170,299	20,210	34,840	15,122	74,639	25,488
Highlands	84,202	7,500	18,034	5,214	15,674	37,780
Hillsborough	121,406	5,088	10,177	12,720	21,001	72,420
Holmes	184,664	62,292	32,757	16,655	27,289	45,671
Indian River	29,367	--	16,048	5,095	2,547	5,677
Jackson	284,617	60,167	44,147	33,366	26,780	120,157
Jefferson	279,715	47,768	47,403	27,334	30,026	127,184
Lafayette	286,790	105,310	49,959	17,423	32,661	81,437
Lake	239,716	33,817	66,136	19,102	28,360	92,301
Lee	120,398	200	56,676	14,169	4,723	44,630
Leon	294,872	81,761	79,176	27,868	61,920	44,147
Levy	486,570	173,289	47,127	37,586	109,561	119,007
Liberty	500,791	113,077	152,649	38,089	31,592	165,384
Madison	310,381	87,522	51,750	16,732	59,819	94,558
Manatee	43,563	--	14,153	--	9,049	20,361
Marion	563,237	137,397	177,553	46,722	134,134	67,431
Martin	30,485	4,494	16,874	1,769	--	7,348
Monroe	--	--	--	--	--	--
Nassau	334,940	141,293	55,227	17,893	14,786	105,741
Okaloosa	428,524	61,896	193,488	64,529	50,256	58,355
Okeechobee	31,780	4,198	6,397	--	--	21,185
Orange	172,515	2,534	59,381	3,119	18,014	89,467
Osceola	183,545	2,391	40,022	11,951	17,582	111,599
Palm Beach	--	--	--	--	--	--
Pasco	150,455	13,751	25,636	6,906	41,809	62,353
Pinellas	11,541	--	6,975	1,983	--	2,583
Polk	263,571	16,128	36,866	14,119	59,095	137,363
Putnam	348,923	93,165	99,018	29,099	70,782	56,859
St. Johns	267,741	78,025	70,253	33,571	10,136	75,756
St. Lucie	33,267	--	25,262	2,490	--	5,515
Santa Rosa	475,212	117,931	152,934	57,889	60,907	85,551
Sarasota	56,050	582	20,054	8,749	7,301	19,364
Seminole	74,953	--	14,025	3,189	25,511	32,228
Sumter	173,311	14,744	40,270	8,032	44,668	65,597
Suwannee	211,231	78,425	23,155	20,505	64,158	24,988
Taylor	586,127	280,367	69,256	17,647	18,141	200,716
Union	118,903	50,747	31,956	2,429	7,726	26,045
Volusia	467,605	73,946	148,384	57,069	25,214	162,992
Wakulla	311,635	78,935	114,467	34,689	10,527	73,017
Walton	508,291	107,508	178,973	30,640	81,451	109,719
Washington	287,894	94,591	33,457	21,942	52,951	84,953
Total	14,982,607	4,025,812	3,500,755	1,210,769	1,890,375	4,354,896

Table 48.--Merchantable volume of live timber 5.0 inches d.b.h. and larger on timberland, by county and species group, Florida, 1987

County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
	Thousand cubic feet				
Alachua	347,434	152,257	52,224	59,885	83,068
Baker	400,590	253,503	68,051	77,073	1,963
Bay	177,918	133,873	8,741	23,106	12,198
Bradford	91,006	55,002	6,688	14,958	14,358
Brevard	120,546	53,265	14,412	23,403	29,466
Broward	--	--	--	--	--
Calhoun	278,829	143,083	20,287	70,803	44,656
Charlotte	30,678	11,047	16,333	615	2,683
Citrus	203,727	63,464	40,836	32,514	66,913
Clay	298,145	149,136	11,437	54,793	82,779
Collier	338,530	47,000	229,923	33,154	28,453
Columbia	394,149	209,090	51,377	89,837	43,845
Dade	--	--	--	--	--
De Soto	57,867	6,329	5,776	18,459	27,303
Dixie	507,921	148,291	104,940	109,125	145,565
Duval	308,291	128,927	14,673	87,674	77,017
Escambia	345,893	177,919	5,671	115,071	47,232
Flagler	311,443	141,804	92,080	48,112	29,447
Franklin	250,135	108,866	51,060	74,225	15,984
Gadsden	272,653	94,588	--	86,681	91,384
Gilchrist	94,686	54,757	17,416	3,479	19,034
Glades	76,566	34,841	27,935	5,072	8,718
Gulf	292,565	57,806	64,799	110,203	59,757
Hamilton	260,998	106,036	30,977	65,222	58,763
Hardee	130,113	28,022	28,117	17,094	56,880
Hendry	138,347	25,672	90,102	10,002	12,571
Hernando	202,604	50,518	5,448	61,385	85,253
Highlands	106,981	16,153	34,927	33,918	21,983
Hillsborough	232,165	24,585	103,522	37,132	66,926
Holmes	181,078	68,039	9,551	76,759	26,729
Indian River	34,252	17,600	8,470	267	7,915
Jackson	363,665	116,200	22,283	117,936	107,246
Jefferson	386,933	89,289	40,654	144,258	112,732
Lafayette	260,443	121,323	49,564	41,067	48,489
Lake	324,315	99,113	75,747	95,431	54,024
Lee	97,281	33,004	57,746	--	6,531
Leon	338,753	160,546	6,202	90,147	81,858
Levy	582,575	218,455	98,967	113,144	152,009
Liberty	612,332	231,080	106,073	187,349	87,830
Madison	362,911	99,078	62,685	138,824	62,324
Manatee	46,883	7,564	--	17,036	22,283
Marion	545,500	338,133	20,422	68,031	118,914
Martin	14,203	10,782	226	--	3,195
Monroe	--	--	--	--	--
Nassau	437,783	190,638	41,672	129,335	76,138
Okaloosa	453,543	295,405	18,285	80,443	59,410
Okeechobee	75,583	12,921	16,423	34,513	11,726
Orange	248,233	52,226	94,502	72,916	28,589
Osceola	342,653	60,584	171,220	69,038	41,811
Palm Beach	--	--	--	--	--
Pasco	252,023	31,327	90,214	47,133	83,349
Pinellas	15,000	8,889	3,329	2,266	516
Polk	437,974	70,610	171,381	124,437	71,546
Putnam	362,570	174,495	12,784	96,154	79,137
St. Johns	307,806	139,416	32,354	77,532	58,504
St. Lucie	25,349	18,291	2,494	420	4,144
Santa Rosa	610,607	357,058	51,847	148,575	53,127
Sarasota	40,623	16,612	--	4,651	19,360
Seminole	80,908	20,087	477	18,367	41,977
Sumter	292,866	39,280	89,539	66,880	97,167
Suwannee	168,204	48,243	219	26,662	93,080
Taylor	475,828	175,475	71,221	107,865	121,267
Union	127,228	57,748	16,378	46,193	6,909
Volusia	539,870	201,738	143,948	114,352	79,832
Wakulla	328,800	173,847	7,820	78,803	68,330
Walton	461,908	282,682	13,061	112,229	53,936
Washington	274,597	63,566	55,977	95,780	59,274
Total	16,781,860	6,577,178	2,861,487	4,007,788	3,335,407

Table 49.--Volume of growing stock on timberland, by county and species group, Florida, 1987

County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
	Thousand cubic feet				
Alachua	321,961	151,985	51,525	52,054	66,397
Baker	393,443	253,061	67,886	70,760	1,736
Bay	168,861	133,873	8,741	17,235	9,012
Bradford	87,065	54,778	6,688	14,283	11,316
Brevard	102,020	52,946	14,313	15,937	18,824
Broward	--	--	--	--	--
Calhoun	247,070	141,938	19,176	52,030	33,926
Charlotte	28,257	11,047	15,848	277	1,085
Citrus	154,888	62,509	39,615	23,979	28,785
Clay	257,201	148,711	11,437	48,772	48,281
Collier	306,580	47,000	213,950	28,970	16,660
Columbia	366,963	208,923	50,077	76,253	31,710
Dade	--	--	--	--	--
De Soto	35,809	6,092	5,776	15,877	8,064
Dixie	438,281	148,291	103,414	95,130	91,446
Duval	281,941	128,484	14,346	83,432	55,679
Escambia	322,810	177,563	5,671	106,152	33,424
Flagler	294,892	141,004	91,378	43,984	18,526
Franklin	223,161	108,866	46,106	60,526	7,663
Gadsden	235,374	93,291	--	72,935	69,148
Gilchrist	82,278	54,581	16,643	2,794	8,260
Glades	67,212	34,841	27,755	3,369	1,247
Gulf	220,673	57,806	58,632	85,083	19,152
Hamilton	246,355	105,708	30,977	60,699	48,971
Hardee	97,301	27,496	28,117	13,897	27,791
Hendry	121,746	25,672	85,713	4,607	5,754
Hernando	176,404	50,057	5,448	58,974	61,925
Highlands	89,409	16,153	34,507	28,983	9,766
Hillsborough	204,390	24,585	102,628	31,591	45,586
Holmes	167,021	68,039	8,662	68,736	21,584
Indian River	27,548	16,490	8,470	267	2,321
Jackson	328,367	116,200	21,101	103,980	87,086
Jefferson	345,506	88,676	40,431	130,731	85,668
Lafayette	241,050	120,181	48,759	36,377	35,733
Lake	277,521	97,532	74,279	72,500	33,210
Lee	85,523	33,004	52,519	--	--
Leon	314,153	160,318	6,202	78,104	69,529
Levy	515,926	218,455	97,012	98,755	101,704
Liberty	542,876	230,902	94,064	152,652	65,258
Madison	316,917	98,333	61,374	122,317	34,893
Manatee	27,861	7,299	--	13,404	7,158
Marion	492,341	335,883	20,422	54,932	81,104
Martin	10,539	10,313	226	--	--
Monroe	--	--	--	--	--
Nassau	394,980	189,941	40,833	110,209	53,997
Okaloosa	387,051	292,081	15,448	51,167	28,355
Okeechobee	58,351	12,921	16,423	24,352	4,655
Orange	232,202	51,547	92,295	65,841	22,519
Osceola	316,504	60,584	168,126	60,832	26,962
Palm Beach	--	--	--	--	--
Pasco	215,159	31,327	88,848	43,456	51,528
Pinellas	15,000	8,889	3,329	2,266	516
Polk	387,694	70,170	167,830	104,271	45,423
Putnam	333,237	174,093	11,725	91,694	55,725
St. Johns	278,033	138,937	29,618	67,272	42,206
St. Lucie	20,785	18,291	2,494	--	--
Santa Rosa	568,392	356,429	50,534	124,259	37,170
Sarasota	24,532	16,612	--	3,404	4,516
Seminole	65,279	19,666	477	15,163	29,973
Sumter	257,161	38,857	87,007	57,984	73,313
Suwannee	139,596	47,436	219	23,887	68,054
Taylor	430,431	173,754	69,131	97,125	90,421
Union	124,804	57,467	16,378	45,033	5,926
Volusia	487,845	201,479	138,266	101,040	47,060
Wakulla	306,381	172,923	7,412	69,522	56,524
Walton	424,410	280,951	11,695	103,363	28,401
Washington	236,240	63,217	50,421	77,647	44,955
Total	14,969,561	6,546,458	2,758,397	3,441,125	2,223,581

Table 50.--Volume of sawtimber on timberland, by county and species group, Florida, 1987

County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
	Thousand board feet				
Alachua	867,699	269,927	197,442	139,553	260,777
Baker	1,082,496	711,739	203,613	164,291	2,853
Bay	289,017	204,467	23,163	54,131	7,256
Bradford	189,348	99,946	12,673	21,878	54,851
Brevard	276,963	93,162	40,887	59,204	83,710
Broward	--	--	--	--	--
Calhoun	757,979	383,980	84,074	166,237	123,688
Charlotte	62,415	24,512	32,804	--	5,099
Citrus	509,420	193,390	173,024	67,269	75,737
Clay	686,941	393,937	41,628	108,206	143,170
Collier	877,155	143,422	601,680	78,857	53,196
Columbia	1,065,519	694,807	169,345	124,139	77,228
Dade	--	--	--	--	--
De Soto	126,212	29,158	23,663	43,323	30,068
Dixie	1,132,383	315,760	318,244	250,144	248,235
Duval	865,189	428,259	38,918	215,663	182,349
Escambia	1,138,189	615,946	22,974	390,774	108,495
Flagler	757,384	302,216	257,331	116,921	80,916
Franklin	668,255	293,853	139,351	211,770	23,281
Gadsden	802,131	360,491	--	211,514	230,126
Gilchrist	185,615	104,310	48,712	4,073	28,520
Glades	207,038	92,972	103,430	4,637	5,999
Gulf	655,935	131,429	182,153	269,331	73,022
Hamilton	604,846	241,046	69,858	117,036	176,906
Hardee	375,538	137,141	105,517	29,542	103,338
Hendry	395,640	78,318	277,564	19,682	20,076
Hernando	571,602	180,736	24,287	166,150	200,429
Highlands	321,114	58,584	146,011	75,901	40,618
Hillsborough	641,067	116,102	278,864	80,314	165,787
Holmes	512,960	263,285	36,071	143,459	70,145
Indian River	110,307	76,008	24,232	--	10,067
Jackson	1,074,208	451,855	79,731	254,487	288,135
Jefferson	1,213,020	402,779	162,196	365,248	282,797
Lafayette	583,575	268,830	120,069	57,735	136,941
Lake	871,810	373,741	199,179	178,974	119,916
Lee	183,339	46,105	137,234	--	--
Leon	1,109,015	632,840	16,045	223,254	236,876
Levy	1,428,263	547,116	277,991	280,713	322,443
Liberty	1,913,295	786,016	387,126	476,004	264,149
Madison	903,319	312,305	198,347	299,364	93,303
Manatee	106,374	32,403	--	49,901	24,070
Marion	1,390,207	888,150	64,362	136,578	301,117
Martin	40,631	40,631	--	--	--
Monroe	--	--	--	--	--
Nassau	1,021,708	505,141	134,937	216,758	164,872
Okaloosa	1,349,401	1,082,601	71,811	98,163	96,826
Okeechobee	203,725	45,467	66,346	77,282	14,630
Orange	700,659	149,603	281,753	185,388	83,915
Osceola	970,242	287,965	459,028	160,957	62,292
Palm Beach	--	--	--	--	--
Pasco	661,477	115,272	236,141	122,562	187,502
Pinellas	53,222	37,553	7,467	6,729	1,473
Polk	1,147,375	278,496	430,017	272,713	166,149
Putnam	943,442	428,231	42,717	276,696	195,798
St. Johns	705,229	364,571	90,895	125,754	124,009
St. Lucie	79,465	69,589	9,876	--	--
Santa Rosa	1,769,373	1,179,542	190,253	300,831	98,747
Sarasota	73,329	48,126	--	8,345	16,858
Seminole	266,765	84,865	2,117	57,619	122,164
Sumter	831,490	121,583	284,775	167,295	257,837
Suwannee	497,905	147,778	--	88,183	261,944
Taylor	1,072,135	350,249	203,919	232,940	285,027
Union	282,650	109,296	50,346	108,202	14,806
Volusia	1,453,766	715,077	328,202	242,573	167,914
Wakulla	1,153,274	733,552	30,474	206,309	182,939
Walton	1,349,353	943,836	50,457	290,896	64,164
Washington	727,784	204,343	253,473	147,188	122,780
Total	44,867,182	19,824,410	8,544,797	9,049,640	7,448,335

Table 51.--Average net annual change[a] of growing stock on timberland, by county and species group, Florida, 1980-1986

County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
	Thousand cubic feet				
Alachua	-3,137	-5,147	+857	+813	+340
Baker	+6,016	+3,362	+1,171	+1,418	+65
Bay	+2,583	+1,893	+194	+296	+200
Bradford	-6,227	-6,108	+123	+23	-265
Brevard	+1,242	+228	+272	+383	+359
Broward	--	--	--	--	--
Calhoun	+2,670	+763	+325	+878	+704
Charlotte	-316	-687	+351	+18	+2
Citrus	+4,970	+2,945	+415	+584	+1,026
Clay	+4,438	+2,995	-795	+1,101	+1,137
Collier	+7,038	+1,252	+4,264	+1,008	+514
Columbia	+106	-2,556	-318	+2,318	+662
Dade	--	--	--	--	--
De Soto	+1,060	+204	+122	+496	+238
Dixie	+14,095	+9,664	+1,886	+1,280	+1,265
Duval	-887	-2,945	+37	+1,214	+807
Escambia	+2,799	+74	+140	+1,516	+1,069
Flagler	+1,507	-541	+1,001	+798	+249
Franklin	+4,613	+3,384	+537	+593	+99
Gadsden	-3,263	-3,165	--	-423	+325
Gilchrist	-7,866	-6,166	-469	-77	-1,154
Glades	+2,409	+1,862	+438	+75	+34
Gulf	-1,775	-2,809	+1,080	-61	+15
Hamilton	+2,181	+349	-14	+938	+908
Hardee	-724	-1,768	-7	+308	+743
Hendry	+1,398	-531	+1,708	+83	+138
Hernando	+5,367	+2,573	+144	+1,420	+1,230
Highlands	+1,078	-621	+686	+741	+272
Hillsborough	+3,739	+217	+1,870	+492	+1,160
Holmes	-2,864	-3,620	+164	+993	-401
Indian River	+883	+539	+279	+15	+50
Jackson	-428	-2,630	+487	+1,837	-122
Jefferson	-6,608	-10,133	+615	+2,512	+398
Lafayette	+2,809	+2,535	-173	+303	+144
Lake	+7,017	+4,121	+726	+1,430	+740
Lee	+2,645	+1,790	+855	--	--
Leon	-25	-2,091	+134	+1,131	+801
Levy	+4,720	+1,652	+1,133	+781	+1,154
Liberty	+2,510	-222	+945	+1,453	+334
Madison	-413	+382	+509	-350	-954
Manatee	+662	+90	--	+265	+307
Marion	+1,247	+961	+64	+550	-328
Martin	+431	+423	+38	--	-30
Monroe	--	--	--	--	--
Nassau	+3,556	+2,913	+686	-220	+177
Okaloosa	+8,740	+7,200	+245	+916	+379
Okeechobee	+1,803	+631	+370	+637	+165
Orange	+3,116	+842	+153	+1,678	+443
Osceola	+6,573	+1,756	+2,233	+1,824	+760
Palm Beach	--	--	--	--	--
Pasco	+3,019	-1,176	+1,465	+1,223	+1,507
Pinellas	-183	+161	-457	+94	+19
Polk	+7,409	+2,164	+1,562	+2,778	+905
Putnam	-5,366	-8,016	+205	+1,947	+498
St. Johns	-2,108	-1,683	+82	-354	-153
St. Lucie	+779	+880	+61	--	-162
Santa Rosa	+6,760	+2,160	+791	+2,434	+1,375
Sarasota	+884	+430	--	+107	+347
Seminole	-806	-1,302	+33	-51	+514
Sumter	+4,344	+1,473	+68	+1,145	+1,658
Suwannee	-8,005	-10,183	-61	+368	+1,871
Taylor	-9,935	-6,234	-1,910	-957	-834
Union	-3,655	-5,086	+359	+945	+127
Volusia	+3,695	+2,289	-1,169	+1,702	+873
Wakulla	+209	-1,083	+221	+1,091	-20
Walton	+6,243	+5,335	-26	+923	+11
Washington	+2,847	-53	+664	+1,605	+631
Total	+87,619	-14,064	+27,369	+48,988	+25,326

[a]Average net annual growth minus average annual timber removals.

Table 52.--Average net annual change[a] of sawtimber on timberland, by county and species group, Florida, 1980-1986

County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
	Thousand board feet				
Alachua	+16,718	+5,467	+3,848	+3,639	+3,764
Baker	-973	-7,174	+4,351	+1,778	+72
Bay	-9,456	-11,075	+245	+731	+643
Bradford	-22,163	-20,583	-37	-474	-1,069
Brevard	+5,033	+826	+1,248	+1,661	+1,298
Broward	--	--	--	--	--
Calhoun	+3,532	-4,165	+2,402	+2,634	+2,661
Charlotte	+931	-139	+851	--	+219
Citrus	+20,116	+10,635	+3,187	+1,412	+4,882
Clay	+15,224	+11,112	-2,226	+2,576	+3,762
Collier	+23,699	+3,793	+15,275	+2,932	+1,699
Columbia	-5,318	-6,009	-536	+179	+1,048
Dade	--	--	--	--	--
De Soto	+5,087	+1,918	+689	+1,766	+714
Dixie	+42,043	+21,684	+6,457	+4,884	+9,018
Duval	+11,625	+223	+429	+5,599	+5,374
Escambia	+22,252	+12,035	+613	+5,351	+4,253
Flagler	+13,469	+5,761	+3,550	+2,825	+1,333
Franklin	+791	-4,402	+2,017	+2,682	+494
Gadsden	-11,436	-12,857	--	-1,567	+2,988
Gilchrist	-4,496	+1,230	-2,148	-476	-3,102
Glades	+9,871	+6,468	+2,322	+873	+208
Gulf	-15,572	-21,496	+4,431	+1,400	+93
Hamilton	-4,357	-12,031	+1,742	+2,958	+2,974
Hardee	-3,025	-6,058	+478	+628	+1,927
Hendry	+9,532	+286	+6,685	+435	+2,126
Hernando	+18,958	+8,306	+771	+6,142	+3,739
Highlands	+5,511	-2,880	+3,804	+3,216	+1,371
Hillsborough	+18,014	+3,003	+9,182	+2,839	+2,990
Holmes	-5,077	-6,952	+930	+2,435	-1,490
Indian River	+4,632	+3,221	+1,261	--	+150
Jackson	+15,329	+2,419	+1,715	+5,340	+5,855
Jefferson	-22,609	-41,195	+4,366	+9,111	+5,109
Lafayette	+6,704	+6,328	-1,141	-138	+1,655
Lake	+31,772	+16,571	+3,637	+7,210	+4,354
Lee	+9,256	+5,167	+4,089	--	--
Leon	+8,577	-1,223	+293	+3,878	+5,629
Levy	+38,821	+25,356	+5,060	+3,820	+4,585
Liberty	+10,981	-2,474	+5,631	+5,192	+2,632
Madison	-536	+2,210	+1,950	-2,380	-2,316
Manatee	+2,679	+591	--	+1,178	+910
Marion	-10,034	-14,609	-62	+4,406	+231
Martin	+1,065	+1,170	--	--	-105
Monroe	--	--	--	--	--
Nassau	+9,558	+4,688	+1,924	+1,808	+1,138
Okaloosa	+34,872	+28,992	+1,475	+1,596	+2,809
Okeechobee	+7,612	+2,091	+1,975	+2,791	+755
Orange	+21,706	+9,419	+4,317	+5,153	+2,817
Osceola	+29,485	+11,005	+10,658	+6,201	+1,621
Palm Beach	--	--	--	--	--
Pasco	+14,281	-5,953	+7,820	+4,118	+8,296
Pinellas	+219	+1,396	-1,500	+276	+47
Polk	+39,195	+7,686	+14,930	+11,481	+5,098
Putnam	-4,696	-12,986	+960	+5,270	+2,060
St. Johns	-5,852	-3,436	+977	-2,271	-1,122
St. Lucie	+2,987	+2,850	+340	--	-203
Santa Rosa	+42,031	+26,688	+4,966	+6,653	+3,724
Sarasota	+3,539	+2,606	--	+560	+373
Seminole	+353	-5,016	+192	+1,959	+3,218
Sumter	+18,187	+5,088	+4,263	+3,213	+5,623
Suwannee	-1,188	-10,058	-403	+2,004	+7,269
Taylor	-11,056	+1,291	-9,715	-1,393	-1,239
Union	-6,216	-10,066	+747	+2,787	+316
Volusia	+11,687	+12,441	-8,856	+4,243	+3,859
Wakulla	+5,991	+679	+543	+2,955	+1,814
Walton	+44,963	+37,684	-50	+4,983	+2,346
Washington	+15,330	+2,807	+4,322	+4,943	+3,258
Total	+530,158	+90,354	+137,244	+166,005	+136,555

[a]Average net annual growth minus average annual timber removals.

Table 53.--Green weight of forest biomass on timberland, by county and species group, Florida, 1987

County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
	Hundred thousand pounds				
Alachua	371,695	161,157	47,944	55,755	106,839
Baker	419,318	260,026	68,668	84,867	5,757
Bay	232,187	174,591	9,688	24,140	23,768
Bradford	103,449	58,409	8,029	20,069	16,942
Brevard	124,291	51,515	13,284	23,486	36,006
Broward	--	--	--	--	--
Calhoun	301,924	152,163	20,525	75,886	53,350
Charlotte	32,544	11,875	16,672	496	3,501
Citrus	227,569	62,791	38,150	33,727	92,901
Clay	323,840	154,543	10,930	56,944	101,423
Collier	343,139	47,510	215,502	35,998	44,129
Columbia	411,697	202,664	48,922	102,901	57,210
Dade	--	--	--	--	--
De Soto	63,933	5,945	5,380	17,811	34,797
Dixie	554,957	162,572	98,882	118,469	175,034
Duval	322,586	129,642	13,805	89,272	89,867
Escambia	362,624	180,766	6,160	111,025	64,673
Flagler	318,400	152,563	85,684	46,174	33,979
Franklin	292,131	140,695	50,571	77,027	23,838
Gadsden	282,371	91,639	--	82,208	108,524
Gilchrist	111,347	58,858	16,699	4,969	30,821
Glades	76,873	33,793	26,183	5,222	11,675
Gulf	290,626	68,872	63,248	108,144	50,362
Hamilton	277,363	113,760	27,878	67,350	68,375
Hardee	140,804	25,037	27,712	16,782	71,273
Hendry	133,085	24,447	83,314	9,890	15,434
Hernando	221,824	52,089	5,041	55,402	109,292
Highlands	105,500	16,575	32,989	30,408	25,528
Hillsborough	228,246	23,072	90,912	35,636	78,626
Holmes	193,740	66,970	9,317	80,034	37,419
Indian River	33,134	15,979	7,645	351	9,159
Jackson	376,237	108,694	24,429	116,991	126,123
Jefferson	383,693	82,135	37,148	136,824	127,586
Lafayette	273,455	122,224	46,690	44,245	60,296
Lake	317,578	98,415	69,222	87,957	61,984
Lee	101,284	34,329	54,202	--	12,753
Leon	350,672	154,829	6,325	89,465	100,053
Levy	606,817	217,443	91,581	110,228	187,565
Liberty	634,575	238,815	100,743	194,018	100,999
Madison	369,887	96,700	55,390	133,395	84,402
Manatee	51,587	6,752	--	15,168	29,667
Marion	569,221	330,334	18,233	68,235	152,419
Martin	16,075	11,622	826	--	3,627
Monroe	--	--	--	--	--
Nassau	461,833	196,385	40,041	130,876	94,531
Okaloosa	474,694	282,792	17,878	77,189	96,835
Okeechobee	72,766	12,923	14,994	30,464	14,385
Orange	238,641	48,714	86,748	69,002	34,177
Osceola	322,787	54,410	155,187	63,400	49,790
Palm Beach	--	--	--	--	--
Pasco	247,730	29,460	79,866	43,746	94,658
Pinellas	14,203	8,218	2,972	1,865	1,148
Polk	423,974	68,158	156,503	119,284	80,029
Putnam	376,285	179,857	12,063	88,890	95,475
St. Johns	331,119	146,273	30,501	82,914	71,431
St. Lucie	25,951	17,905	2,324	384	5,338
Santa Rosa	637,006	351,395	49,720	145,692	90,199
Sarasota	48,632	18,427	--	4,665	25,540
Seminole	86,820	18,588	419	17,104	50,709
Sumter	290,922	40,436	83,402	64,585	102,499
Suwannee	196,887	53,092	244	26,233	117,318
Taylor	520,461	196,944	66,164	107,270	150,083
Union	132,142	60,860	16,584	46,049	8,649
Volusia	547,035	201,847	138,736	113,937	92,515
Wakulla	341,807	166,120	8,469	81,288	85,930
Walton	490,875	274,303	12,324	106,206	98,042
Washington	313,105	72,797	54,870	100,325	85,113
Total	17,547,953	6,702,714	2,684,532	3,988,337	4,172,370

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Bechtold, William A.; Brown, Mark J.; Sheffield, Raymond M.

Florida's forests, 1987. Resour. Bull. SE-110. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station; 1990. 83 pp.

Between 1980 and 1987, area of timberland in Florida declined from 15.7 to 15.0 million acres. Inventory volume of softwood growing stock increased by 1 percent; volume of hardwoods increased by 11 percent. Softwood net annual growth decreased by 3 percent, and hardwood growing-stock growth declined by 15 percent. Softwood removals increased by 48 percent, whereas removals of hardwood growing stock declined by 18 percent. Softwood growth exceeded softwood removals by 3 percent, and hardwood growth surpassed removals by more than two to one.

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

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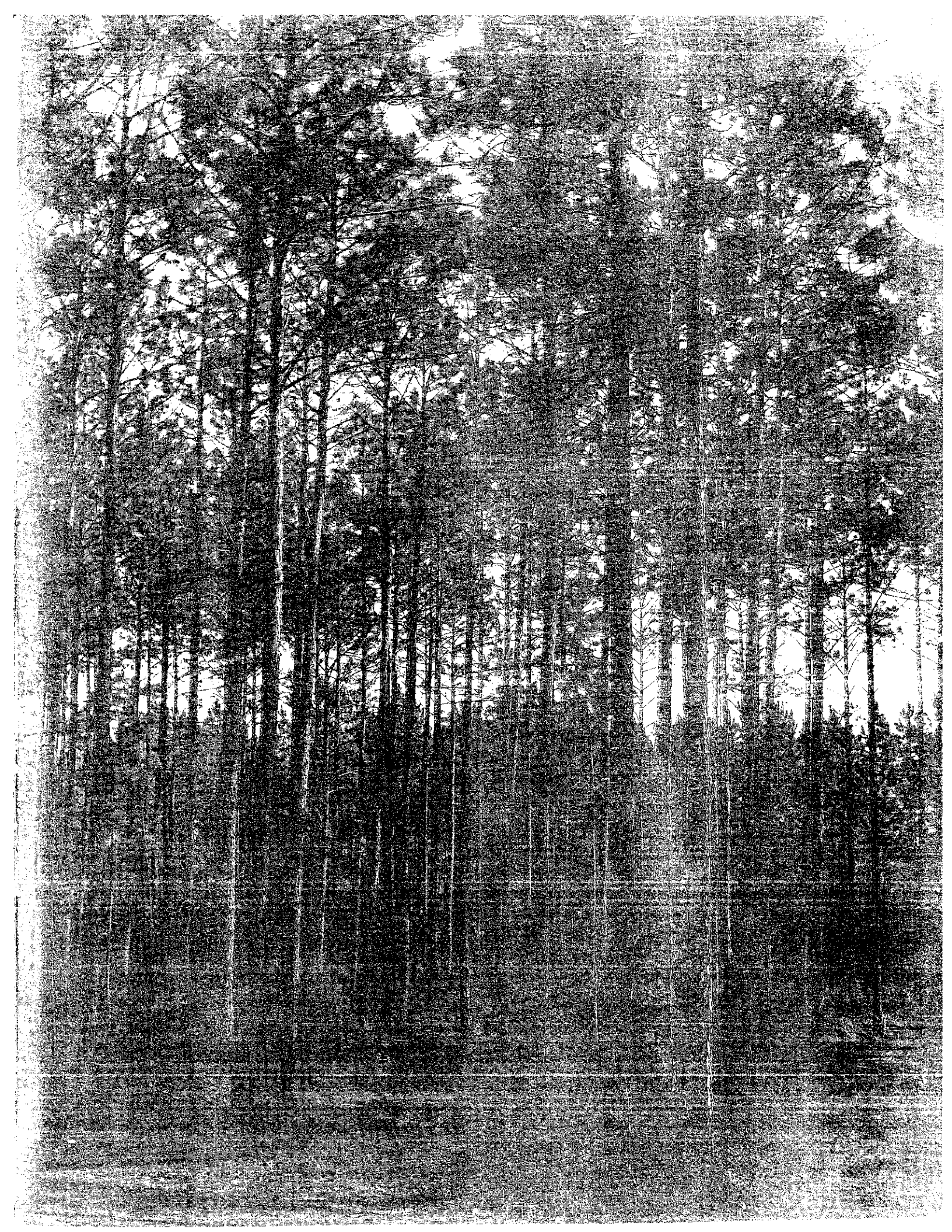

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