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Agriculture and Consumer Services

Foreword

In accordance with the Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974, the fifth inventory of Florida's forests was expanded to accommodate both timber and nontimber evaluations. This report presents the principal findings of the timber evaluation. The nontimber evaluations will be published separately.

In this fifth inventory, fieldwork began in September 1978 and was completed in May 1980. Four previous Statewide inventories, completed in 1936, 1949, 1959, and 1970, provide reference points for measuring changes and trends over the past 44 years. This analysis focuses mainly on changes since 1970.

RPA and the Forest and Rangeland Renewable Resources Research Act of 1978 authorize these forest inventories and evaluations. The Southeastern Forest Experiment Station, headquartered in Asheville, North Carolina, administers these forest evaluations in Florida, Georgia, North Carolina, South Carolina, and Virginia. The primary objective of these periodic evaluations is to develop and maintain the resource information needed for formulating sound forest policies and programs.

The combined efforts of many people have gone into this inventory of Florida's forest resources. Appreciation is expressed to all Station personnel who participated in the field and office work. The Southeastern Station gratefully acknowledges the cooperation and assistance provided by the Division of Forestry, Florida Department of Agriculture and Consumer Services, and special support provided by the Department of Defense for the inventory of land on Eglin Air Force Base. Appreciation is also expressed for the cooperation of other public agencies, forest industries, and private landowners in providing information and allowing access to the sample locations.

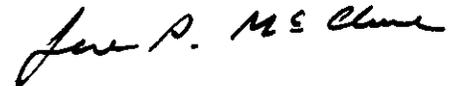
For inventory purposes and analyses, Florida is divided into four areas called Survey Units. A report highlighting the inventory findings and containing breakdowns of the data has already been published for each of the Survey Units. A preliminary State statistical report, a compilation of statistics from all Unit Reports, has also been published. Copies of these reports may be obtained free of charge from the Southeastern Station.

Information contained in these reports includes the most commonly used resources evaluation statistics. A Forest Information Retrieval (FIR) service is available for the custom compilation of similar forest resource data for any area within the five Southeastern States. Those requesting custom compilations or additional information that can be provided from the raw inventory data are expected to pay the retrieval costs, which vary with the complexity of the request. Costs may range from less than \$100, for a relatively simple request, up to several thousand dollars for a complex retrieval involving the services of a programmer. Although we strive to serve each request promptly, other work will sometimes delay attention to requests of this kind.

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FLORIDA'S FORESTS

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Forest Resources in the Southeast

Asheville, North Carolina

HIGHLIGHTS

Since the fourth inventory of Florida's forest resources was completed in 1970

- area of commercial forest land has declined by 597,000 acres, or by 4 percent. This decrease masked land use changes on nearly 2 million acres. Statewide, 1.3 million acres were diverted from forest to some other land use, while nearly 0.7 million acres were added to the commercial forest-land base. Of the diversions, 42 percent went to urban, 35 percent to agriculture, 22 percent to noncommercial forest, and less than 1 percent to water. Of the additions, 0.3 million acres reverted from nonforest to timberland, and 0.4 million acres were reclassified from noncommercial to commercial forest. Almost 83 percent of the reclassification occurred in South Florida. Altogether, these changes reduced the commercial forest base to 15.7 million acres, or 45 percent of the total land. Decreases were measured in all Survey Units except South Florida.

- area of commercial forest land owned by farmers and miscellaneous private individuals has decreased. The majority of the decrease in these ownership categories was due to land clearing and a shift of acreage to miscellaneous private corporate owners. Farmer-owned forest land has declined

by 984,000 acres, or 33 percent. Commercial forest land owned by miscellaneous private individuals has declined by 670,000 acres, or 15 percent. Holdings by private corporations other than forest industry have increased by 906,000 acres, or 44 percent. Land acquisitions by forest industry have increased their holdings by 117,000 acres. Forest industry now owns 4.7 million acres, and controls another 740,000 acres under long-term lease agreements. The commercial forest acreage in public holdings has remained relatively constant. Referrals to forest industry land in this report will include land leased from other owners.

- total acreage in the slash pine forest type has changed by less than 1 percent. The slash pine forest type occupies 34 percent of Florida's timberland and is the dominant forest type in the two northern Units. The oak-gum-cypress forest type covers 27 percent of Florida's commercial forest and is the dominant forest type in Central and South Florida. The long-leaf pine type has continued its extended decline and now accounts for only 8 percent of Florida's commercial forest. Area occupied by all pine forest types has decreased by 241,000 acres, or 3 percent, while area occupied by hardwood and oak-pine types has decreased by 356,000 acres, or 4 percent.

- nonstocked forest acreage has declined by 0.6 million acres, or 22 percent. The reduction of nonstocked forest acreage is largely due to higher rates of land clearing and higher rates of planting on nonstocked areas than on commercial forest as a whole. Net changes in the amount of acreage assigned to sawtimber, poletimber, and sapling-seedling stands come to less than 1 percent.

- within forest types, distribution of stand-size classes has changed significantly. Pine poletimber stands have increased by 4 percent, while hardwood poletimber stands decreased by 7 percent. In the sapling-seedling stand-size class, area of pine stands decreased by 14 percent, while hardwood stands increased by 39 percent. Because of recent reductions in tree planting, the number of softwood saplings has decreased by 15 percent, and the number of hardwood saplings has increased by 15 percent.

- volume of growing stock on commercial forest has increased from 11.6 to 13.6 billion cubic feet, or by 18 percent. Softwood growing stock makes up 64 percent of the total, and has increased by 20 percent. Volume of hardwood growing stock has increased by 15 percent. The current inventory of growing stock includes 39.9 billion board feet of sawtimber. Growing-stock volume increases were measured in all Survey Units, but 78 percent of the total increase occurred in the two northern Units. Slash pine is the dominant species in the State, with 28 percent of the total growing-stock volume. Slash pine growing-stock volume has increased by 35 percent since the fourth survey; it has increased more than the volume of any other major species. Over 52 percent of the total growing-stock volume occurs on nonindustrial private forest (NIPF) land. The NIPF ownership class includes farmers and miscellaneous private individuals, not including lands leased to forest industry, and miscellaneous private corporations other than forest industry.

- the average rate of net annual growth has increased from 33 to 50

cubic feet per acre of commercial forest. Net annual growth across all commercial forest stands averaged 39 cubic feet per acre for softwoods and 11 cubic feet per acre for hardwoods. By Survey Unit, average growth per acre ranged from 63 cubic feet in the Northeast to 25 cubic feet in the South. By ownership class, average growth ranged from 60 cubic feet on National Forests to 44 cubic feet on other public land. Net annual growth was 57 cubic feet per acre on forest industry land and 45 cubic feet per acre on NIPF land.

- 542 million cubic feet of growing stock were removed from Florida's forests in 1979. This volume represents a 56 percent increase over 1969 levels. Softwoods provided a disproportionate share of growing-stock removals. Softwood growing stock made up 64 percent of the inventory and 77 percent of net growth, but provided 84 percent of the total removals. Of the total growing-stock removals, 72 percent were used for timber products, 7 percent remained in the woods as logging residues, and 21 percent resulted from cultural practices, land clearing, or other actions where trees were removed from commercial forests but not used. Annual removals from growing stock in 1979 included 1.8 billion board feet of sawtimber.

- pulpwood has remained the leading forest product. Pulpwood accounted for 64 percent of the total timber product output in 1979. Between 1969 and 1979 annual pulpwood production rose from 3.4 to 3.8 million cords, or by 11 percent. Saw-log production more than doubled between 1969 and 1979. Annual output of saw logs in 1979 was 733 million board feet. Production of hardwood veneer logs fell by 65 percent. Veneer production shifted from a market previously dominated by hardwoods to a market now dominated by softwoods.

- the number of acres planted annually to pine has declined by 24 percent. Vast planting efforts on NIPF land diminished following the termination of the Conservation Reserve Soil Bank Program in the early 1960's. Al-

ternate expansion of planting on forest industry land was insufficient to offset the NIPF decline. Average annual acreage planted between 1970 and 1980, compared to planting between 1959 and 1970, reflects this net decline.

- 1 acre was planted for every 2 acres harvested. About 2.6 million acres were harvested and retained in forest since the fourth survey. During the same period, 1.4 million acres were artificially regenerated. Due largely to efforts on the part of forest industry, the ratio of total planting to total harvesting in Florida was the highest in the Southeast. Forest industry and public owners planted about 2 acres for every 3 acres harvested. NIPF owners planted only 1 acre for every 4 harvested. In addition to acres planted, natural regeneration followed a harvest on 245,000 acres. Another 227,000 acres reverted naturally to forest from old fields and other nonforest. Thus, some 1.8 million acres were regenerated to a stocking level of at least 16.7 percent. However, only 1.4 million of these acres supported a manageable stand. For every 2 acres harvested, about 1 acre was replaced, either naturally or artificially, by a manageable stand.

- the overall outlook for prospective timber supplies has improved, but attention to management opportunities can further increase future supplies. If certain basic assumptions hold true, historic trends indicate that total growing-stock inventory will increase by 24 percent, growth by 18 percent, and growing-stock removals by 55 percent over the next 30 years. However, much of this increase will be supported by trees planted over 10 years ago. If attention is given to present management opportunities, the potential growth could exceed the prospective by 12 percent, and potential growing-stock removals could exceed the prospective by 24 percent on a sustained basis.

- management opportunities have been identified on 7.3 million acres. Conditions on 47 percent of Florida's commercial forests were inadequate for optimum timber production. NIPF owners have the most opportunities for improving their lands. The most important opportunity lies in the prompt regeneration of stands following a final harvest. Of the 2.6 million acres harvested and retained in forest, only 33 percent were subsequently artificially regenerated.



FOREST TRENDS

Florida's forests occupy about half of the total land area of the State and are recognized as one of the State's most valuable resources. Political, social, economic, and ecological interactions have produced a dynamic situation with far-reaching impacts on the State's forest resources. Findings from five Statewide inventories, dating from 1936, have documented the changes in Florida's forests.

Significant differences in climate, topography, land type, and vegetation which occur from the north to the south have necessitated the division of the State into four geographic areas for survey purposes (fig. 1). The U.S. Forest Service has used these geographic divisions since the first survey. Among these four areas, the portion of land forested and trends in land use differ significantly. The northern part of the State is the most heavily forested and supports most of the forest industry. In Northeast and Northwest Florida, forests occupy 71 and 76 percent of the land, respectively. Farther south, the portion of land classified as forest diminishes to 26 percent in both Central and South Florida as the forest gives way to pasture, rangeland, and marsh. Site conditions, climatic factors, and the suitability of the land for such crops as citrus and cane all limit establishment of forest in Central and South Florida.

This report describes the principal findings of a timber evaluation. However, the unique land characteristics and subtropical climate of South Florida focus attention on areas other than timber production. The on-going energy crisis, a year-round growing season, rapid-growing exotic species, and large expanses of land unsuitable for timber production have stirred interest in the vegetative biomass production potential of Florida. In conjunction with the regular forest survey, total aboveground weight of wood and bark, foliage and other vegetation on commercial forest, noncommer-

cial forest, and nonforest land were estimated.¹ Also, there is growing concern over the spread of Melaleuca quinquenervia, an exotic tree species introduced into South Florida from Australia early in this century. Many people regard the spread of this species as undesirable. A special aerial survey also conducted along with the fifth forest inventory provides a measure of melaleuca occurrence.² The results of these studies will be published separately.

Forest Acreage Continues to Decline

Over the past 50 years, Florida has experienced nearly a sixfold increase in population and the fastest rate of urban buildup in the Southeast. Land use changes associated with this population growth and urban buildup have gradually reduced the size of the State's extensive forest resources. Since 1936, successive forest inventories document a 27 percent decrease in acreage classified as forest land--from 23.5 to 17.1 million acres. However, when these figures are viewed by survey interval, the loss of forest acreage is found to be gradually slowing. Since 1970, acreage classified as forest land has declined from 17.9 million acres to 17.1 million acres, or by 5 percent.

About 91 percent of the forest qualifies as commercial forest, or tim-

¹ Cost, Noel D.; McClure, Joe P. Multiresource inventories: techniques for estimating biomass on a statewide basis. Res. Pap. SE-235. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station. (In preparation.)

² Cost, Noel D.; Craver, Gerald C. Distribution of melaleuca in south Florida measured from the air. In: Proceedings of melaleuca symposium; 1980 September 23-24; Fort Myers, FL. p. 1-8. Available from: Florida Department of Agriculture and Consumer Services, Division of Forestry, Tallahassee, FL.

berland. Between 1970 and 1980, acreage classified as commercial forest decreased from 16.3 to 15.7 million acres, or by almost 4 percent. This 0.6-million-acre decrease masked land-use changes and reclassifications affecting some 2 million acres (table I). Statewide, 1.3 million acres of commercial forest were diverted to other land uses, while 0.7 million acres were added to the commercial forest land base. Of the diversions, 42 percent went to urban, 35 percent to agriculture, 22 percent to noncommercial forest, and less than 1 percent to water.

though Northwest Florida experienced considerable land use changes affecting the forests between 1959 and 1970, there was actually a small net increase in acreage of timberland during this period. Reversions of nonforest land back to forest land compensated for the diversions of timberland to other uses. During the most recent remeasurement period, increased agricultural activity, urban development, and the reclassification of some 41,000 acres to noncommercial forest resulted in a 5 percent decrease of commercial forest land in Northwest Florida.

Table I.—Changes in area of commercial forest land, by Survey Unit, Florida, 1970-1980

Survey Unit	Area of commercial forest land in—		Net change	Changes							
	1970 ^a	1980		Total gain	Additions from:		Total loss	Diversions to—			
					Non-forest	Noncommercial forest		Noncommercial forest	Agriculture	Urban and other	Water
<i>Thousand acres</i>											
Northeast	7,082.4	6,844.5	-237.9	84.9	66.5	18.4	322.8	35.9	136.4	147.7	2.8
Northwest	5,778.3	5,512.1	-266.2	60.1	55.4	4.7	326.3	40.9	171.2	114.2	—
Central	2,675.9	2,473.7	-202.2	196.8	154.6	42.2	399.0	50.3	99.0	249.1	.6
South	724.6	833.9	+109.3	347.1	38.9	^b 308.2	237.8	157.8	44.7	35.3	—
State	16,261.2	15,664.2	-597.0	688.9	315.4	373.5	1,285.9	284.9	451.3	546.3	3.4

^aThese figures differ slightly from previously reported figures because of revisions in the estimates of land area.

^bMost of this acreage was classified as either rangeland or unproductive forest in the 1970 inventory.

Except for the reversion of 0.3 million acres of nonforest to timberland and the reclassification of 0.4 million acres from noncommercial to commercial forest, the decrease in timberland would have been much greater. Of the 0.7 million acres added to commercial forest for the State, 45 percent was due to the reclassification of unproductive forest and rangeland in South Florida.

Northeast Florida is heavily forested, with commercial forests occupying 70 percent of the land. This area experienced a 2 percent loss of timberland between 1959 and 1970. Between 1970 and 1980, this downward trend accelerated to 3 percent. In addition to urban development, extensive acreages of timberland in Northeast Florida have been cleared for pasture over the past 20 years. In this part of the State, pasture now exceeds cropland.

The most heavily forested Unit is the Northwest, where commercial forests occupy 75 percent of the land. Al-

Central Florida has experienced the largest percentage loss of commercial forest in the State. Timberland has decreased by about 8 percent in this area since 1970. Commercial forests now occupy about 25 percent of the total land area in Central Florida. Aside from the reclassification of forest to rangeland, diversion of forest land to agricultural uses was the leading cause of the commercial forest decline between 1959 and 1970. Since 1970, diversions of timberland to urban uses have outpaced those to agriculture in Central Florida. Agricultural and urban land diversions continue to erode the commercial forest-land base in this part of the State, but the latest survey shows the rate to be slowing.

In Central and South Florida, the classification of land use is difficult. In these areas, it is especially hard to separate nonstocked forest from rangeland, and commercial forest from unproductive forest. In the 1970 inventory, some 2.2 million acres in

these two Units were reclassified from nonstocked forest to rangeland. Where there had been no change in tree stocking, this reclassification was retained in the 1980 inventory.

In South Florida, over 0.8 million acres are now classified as commercial forest. This acreage represents a 15 percent increase over the 1970 figure. South Florida was the only Unit to show a net increase of commercial forest land. Although this trend is not unreasonable, it is only fair to state that a portion of this increase may be attributed to difficulties in land classification and to a different method of obtaining land use breakdowns than that used in the 1970 inventory. Notably, the increase of timberland in South Florida was realized despite the establishment of the Big Cypress National Preserve, within which all acres formerly classified as commercial forest were shifted to the productive-reserved category. In 1970, 0.4 million acres in South Florida were reclassified from commercial to unproductive forest. In the 1980 survey, a smaller portion of these acres in South Florida was classified as unproductive. Had all these acres remained in the unproductive category in the 1980 inventory, South Florida would have shown a net decrease of commercial forest acreage.

The increase of timberland realized in South Florida does not offset the decreases experienced in other areas of the State, because much of the timberland in this area is marginal. Although drainage has allowed forests to invade some formerly unproductive sites, timber producers in South Florida are few, and local timber markets are almost nonexistent.

Corporate Ownership Increases

Area of commercial forest land owned by farmers and miscellaneous private individuals has decreased substantially since the 1970 inventory. Farmer-owned timberland has declined by 984,000 acres, or 33 percent. Commercial forest owned by miscellaneous private individuals has declined by

670,000 acres, or 15 percent. Farmers and miscellaneous private individuals now own 12 percent and 25 percent, respectively, of Florida's timberlands. The majority of the decrease in these two categories is due to land clearing and to a shift of acreage to miscellaneous private corporate owners. Land acquisitions by companies with primary wood-using plants (forest industry) account for only a small portion of this decline. Holdings by other types of private corporations increased by 906,000 acres, or by 44 percent. The other private corporate class includes utility companies, realty and development firms, banks and trust companies, agribusiness, and all corporations other than those classified as forest industry. A portion of the transfer of farmer-owned timberlands to corporate ownerships is attributed to the incorporation of family farms for business and tax purposes. Miscellaneous private corporations now own about 19 percent of the State's commercial forests.

Commercial forest acreage owned by forest industry was overestimated in 1970 due to difficulties involving the separation of forest industry fee-simple holdings from lands leased to forest industry in Northeast Florida. Forest industry acreages have been adjusted accordingly, and this report reflects those adjustments. Since 1970, forest industry fee-simple acreage has increased by 117,000 acres, or by 3 percent over the State. Forest industry now owns 4.7 million acres and controls another 740,000 acres under long-term lease agreements. About 30 percent of Florida's timberland is owned by forest industry; 99 percent of this acreage is in the two northern Units.

Public ownership of commercial forest has remained relatively constant, with slight losses in National Forest and miscellaneous Federal ownerships and slight gains in State, county, and municipal ownerships. About 14 percent of Florida's timberland is held by various public agencies. About 1.0 million acres, or half of the public forest land in Florida, are in National Forests.

Slash Pine Acreage Remains Constant

The amount of acreage in the slash pine forest type has changed by less than 1 percent in the last 10 years. In an environment where the forest-land base has been consistently shrinking, slash pine has held its own. As the primary species featured in timber management in Florida, slash pine dominates all other forest types in the two northern Units. The slash pine type makes up 34 percent of Florida's timberlands.

The longleaf pine forest type has not fared as well. Since 1970, the longleaf type has declined by 257,000 acres, or by 17 percent. This decline is an extension of past trends, as forestry practices have favored slash pine over longleaf. The longleaf type now makes up about 8 percent of Florida's timberlands--down from 45 percent in 1936.

Most other pine forest types increased slightly in acreage. Pond pine was one exception, declining by 99,000 acres. Pond pine acreage, like longleaf, has been consistently waning over the years.

Oak-gum-cypress is the second leading forest type in the State, making up 27 percent of Florida's commercial forests. Oak-gum-cypress is the dominant forest type in Central and South Florida. Since 1970, this forest type has increased by about 2 percent. Most of the increase occurred in South Florida, where some formerly unproductive sites have reverted to oak-gum-cypress forests as a result of drainage.

The oak-hickory type, excluding scrub oaks, made the largest acreage gain of all forest types, increasing by 13 percent since 1970. The large gain in the oak-hickory type is likely related to inadequate regeneration efforts following the harvest of pine stands.

Acreage in the southern scrub oak type has declined by about 395,000 acres, or 28 percent. This decline is attributed to the relative ease of land clearing and site preparation of the

scrub oak type as compared to other forest types.

Acreage of oak-pine, another important timber type in Florida, has decreased by 134,000 acres. Generally, the oak-pine type results from harvesting pine stands and leaving a residual of nonmerchantable hardwoods and pines. In this type, pines make up at least 25 but not more than 50 percent of the stocking. Reductions of this type are not as large as suggested when the 1980 estimate is compared with that reported for 1970. In 1970, sample plots were allowed to straddle two or more conditions. If one portion of the plot was in an oak-hickory stand and the other in a pine stand, the area was often typed as oak-pine. That practice was eliminated in the 1980 survey.

The highest amount of type change occurred on lands where a final timber harvest had taken place. Between 1970 and 1980, 1.7 million acres of pine types were harvested and retained in commercial forest, excluding thinnings and other intermediate cuttings. At time of remeasurement, hardwood stocking exceeded pine on 26 percent of this acreage. The pine-to-hardwood type change was most prevalent on those harvested acres where no evidence of site preparation or artificial regeneration was found. This condition occurs most frequently on NIPF land.

On the whole, the ratio of pine types to hardwood (including oak-pine) types has remained about the same over the State since 1970. Excluding additions to and removals from the commercial forest-land base, treatments and disturbances occurring on all forest types increased the acreage occupied by pine forest types by 90,000 acres and reduced hardwood acreage by the same amount. When commercial forest additions and removals are considered, the net result is a 3 percent decrease in pine-type acreage and a 4 percent decrease in hardwood acreage since 1970.

Nonstocked Acreage Declines

Sawtimber stands now occupy 32 percent of Florida's timberland, pole-

timber 26 percent, and sapling-seedling stands 29 percent. Net changes in the acreage assigned to each of these three classes since 1970 amount to less than 1 percent.

At slightly over 2 million acres, Florida has proportionately more nonstocked acreage than any other Southeastern State. However, nonstocked acreage has declined by 22 percent since the fourth survey. This reduction of nonstocked forest is largely due to higher rates of land clearing and higher rates of planting on these acres, as compared to average rates for all commercial forest in the State.

By ownership, NIPF owners hold the highest proportions of sawtimber, poletimber, and nonstocked stands. About 64 percent of all nonstocked acres in the State fall in this ownership class. Forest industry holds the highest proportion of sapling-seedling stands. Of the total pine acreage under forest industry control, 12 percent is in sawtimber stands, 34 percent in poletimber stands, and 46 percent in sapling-seedling stands. The breakdown for NIPF land is 32 percent in sawtimber, 31 percent in poletimber, and 29 percent in sapling-seedling stands. If one compares the relatively low proportion of sawtimber stands and the high proportion of sapling-seedling stands on forest industry land to the same proportions on NIPF land, it is evident that forest industry has liquidated its older stands and replanted them to pine at a higher rate than NIPF owners.

Whereas little change has taken place in the total proportions of pine timber types to hardwood types or in the amount of acreage assigned to each stand-size class, significant rearrangement of forest types has taken place among the stand-size classes. Pine poletimber stands have increased by 4 percent, while hardwood poletimber stands have decreased by 7 percent. All of the gain in the pine poletimber category was in the slash pine type. Declines in hardwood poletimber occurred in all hardwood types except the oak-gum-cypress type. In the sapling-seedling stand-size class, pine stands decreased by 14 percent, while hardwood stands increased by 39

percent. Most of the decrease in the pine sapling-seedling category was due to a 21 percent decline for slash pine. The hardwood sapling-seedling increase occurred across all hardwood forest types. The reduction of pine sapling-seedling stands is directly related to reduced planting since the fourth survey.

More Acres Are Fully Stocked

In 1970, 14 percent of all commercial forest acreage was classed as fully stocked, 36 percent as medium stocked, and 50 percent as poorly stocked with growing-stock trees. The breakdown now is 27 percent fully stocked, 33 percent medium stocked, and 40 percent poorly stocked. Stocking is best on land controlled by forest industry. About 35 percent of these acres are fully stocked and 29 percent poorly stocked. Timberland held by NIPF owners is in somewhat poorer condition. Only 23 percent of these lands are fully stocked, and 47 percent are poorly stocked. Although stocking has improved significantly since 1970, there is still progress to be made, since 2 out of every 5 acres are poorly stocked. Opportunities to improve stocking are greatest on NIPF timberland. About 60 percent of all poorly stocked forest in the State is controlled by these owners.

In the past 10 years, the average basal area of all live trees 5.0 inches d.b.h. and larger has increased from 43 to 53 square feet per acre of commercial forest land. Rough and rotten trees now make up 16 percent of the total basal area--as opposed to 19 percent in 1970.

2-Inch Slash Pines Decline

The average number of saplings per acre has increased from 369 to 402. Hardwoods accounted for all of the increase; softwoods declined from 153 to 140 per acre. Since 1970, the number of all live softwoods has decreased by 4 percent in the 4-inch diameter class and by 22 percent in the 2-inch diameter class. A reduction of acreage

planted to pine since the fourth survey is a major contributing factor to the overall softwood sapling decline. The number of 2-inch slash pine saplings (the most widely planted species in the State) has fallen by 31 percent since 1970. On the other hand, the number of hardwood saplings has increased by 15 percent.

Growing-Stock Volume Is up 18 Percent

Since 1970, the volume of growing stock on commercial forest land has increased from 11.6 to 13.6 billion cubic feet, or by 18 percent. Softwood growing stock makes up 64 percent of the total growing-stock volume and has increased by 20 percent. The volume of hardwood growing stock has increased from 4.3 to 4.9 billion cubic feet, or by 15 percent. The current inventory of growing stock includes 39.9 billion board feet of sawtimber. Softwood

growing stock now includes over 25.6 billion board feet of sawtimber, and hardwood growing stock over 14.2 billion board feet--increases of 20 percent and 17 percent, respectively.

In addition, the 1980 inventory measured 1.8 billion cubic feet of timber in trees failing to qualify as growing stock because of species, poor form, or excessive internal rot. Although these trees are presently or prospectively unsuitable for saw logs, they contain 12 percent of the volume of all live trees 5.0 inches d.b.h. and larger. About 91 percent of this timber is hardwood, much of which can be used for pulpwood, other fiber products, and fuelwood.

Many acres planted in the late 1950's and early 1960's have developed into poletimber and sawtimber stands and have boosted softwood volume. The rapid growth of these plantations has outpaced a sharp upturn in softwood removals (fig. 2). The hard-

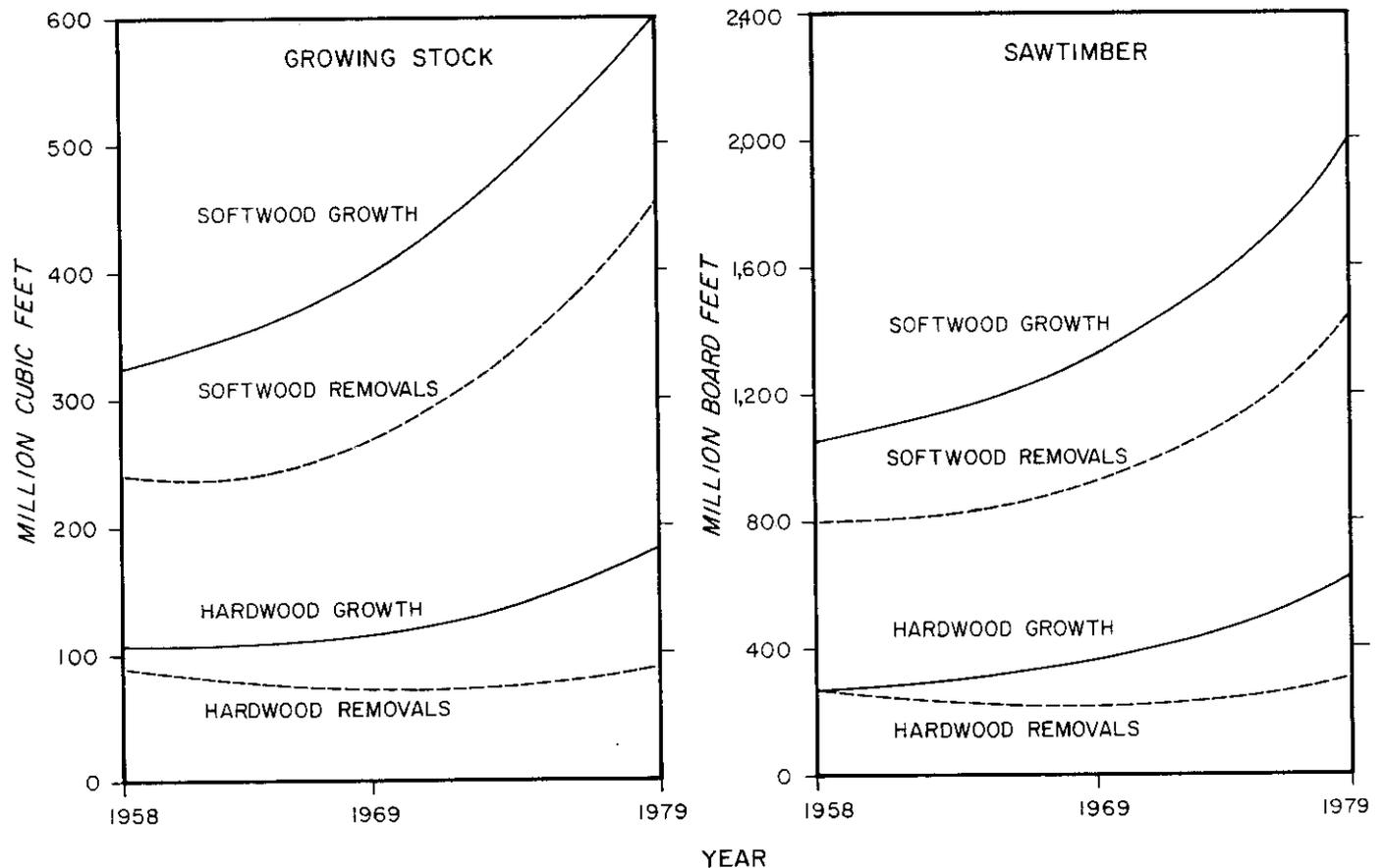


Figure 2.--Trends in net growth and timber removals in Florida since 1958.

wood volume increase reflects a widening gap between hardwood growth and removals. Softwood growth exceeds removals by 34 percent, and hardwood growth exceeds removals by 104 percent.

Growing-stock volume increases were measured in all Survey Units, but 78 percent of the total increase is confined to the two northern Units. Almost three-fourths of the volume increase in those Units is softwood.

By ownership, 52 percent of the total growing-stock volume occurs on NIPF land, 32 percent on forest industry land, and the remaining 16 percent on public land.

Volume increases range across all diameter classes for both softwoods and hardwoods. Plotting the volume over diameter class for the three most recent inventories brings several important trends to light. First, the rate of increase in the 6-inch softwood diameter class has declined from 36 percent between 1959 and 1970 to 20 percent between 1970 and 1980 (fig. 3). This rate will continue to decline, at least in the short run, because fewer softwood saplings are available to move into this class. Unless there is a substantial decline in historic mortality rates, the ingrowth into the 6-inch and 8-inch diameter classes is not likely to replace the outgrowth from these classes. Second, large acreages planted in the late 1950's and early 1960's are feeding trees into the 8-inch diameter class. Softwood volume now peaks in the 8-inch class, whereas in the past it peaked in the 10-inch class. Third, the rate of volume increase in most diameter classes above 8 inches has tapered off. This development suggests that Florida's older pine stands are being more heavily cut.

Approximately half of the softwood volume on forest industry land is now in sawtimber. In contrast, about two-thirds of the total softwood volume on NIPF land is in sawtimber. Indications are that wood-using companies are liquidating their older stands and converting them to plantations at a much higher rate than NIPF owners. In the future, forest industry will need to rely more heavily on farmers and other

nonindustrial private owners for sawtimber until more trees on industry land are allowed to grow into the larger diameter classes.

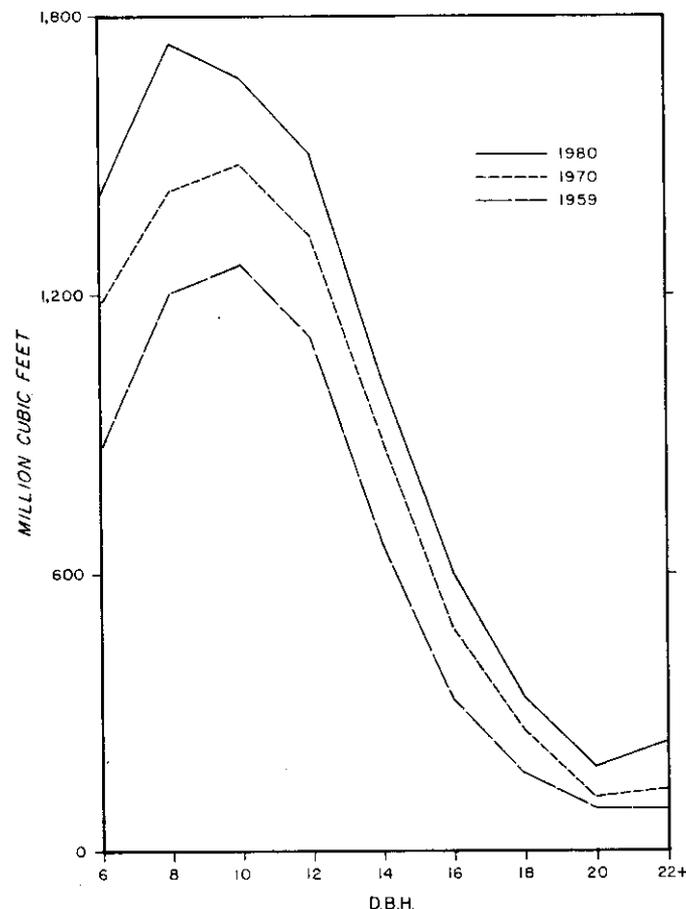


Figure 3.--Volume of softwood growing stock, by tree diameter, 1959, 1970, and 1980.

Changes in hardwood growing-stock volume are more consistent across the range of diameters (fig. 4). Volume in 6-inch hardwood growing stock has increased by 15 percent since 1970, as opposed to 7 percent for the previous decade. The volume increase in 6-inch hardwoods reflects the declining rate of increase in 6-inch softwoods. Advanced hardwood reproduction in the understory of pine stands often precludes the reestablishment of pines once a pine stand is harvested--unless site preparation measures are taken.

There is now more volume in hardwood growing-stock trees in all diameter classes than at any time since the original 1936 survey, yet the hardwood industry is having problems procuring quality hardwoods. These

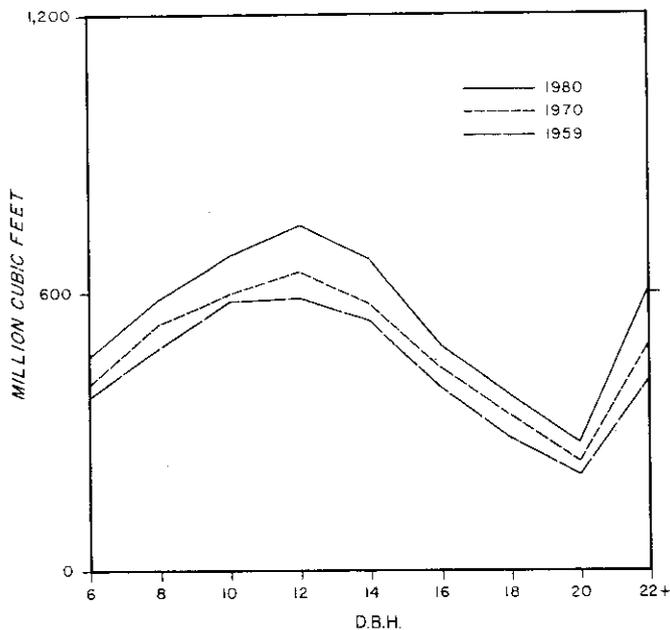


Figure 4.--Volume of hardwood growing stock, by tree diameter, 1959, 1970, and 1980.

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

Slash Pine Dominates the Growing Stock

Since 1970, slash pine growing-stock volume has increased from 2.8 to 3.8 billion cubic feet, or by 35 percent (fig. 5). Slash pine now makes up 28 percent of Florida's total growing-stock volume and 43 percent of the total softwood volume. It is responsible for over 63 percent of the total softwood volume increase in the State. In the two northern Units, slash pine is the dominant species. Over 58 percent of its volume increase occurred in Northeast Florida alone, which attests to the success of intensive forest management in this area.

Across the State, cypress is second in terms of total growing-stock

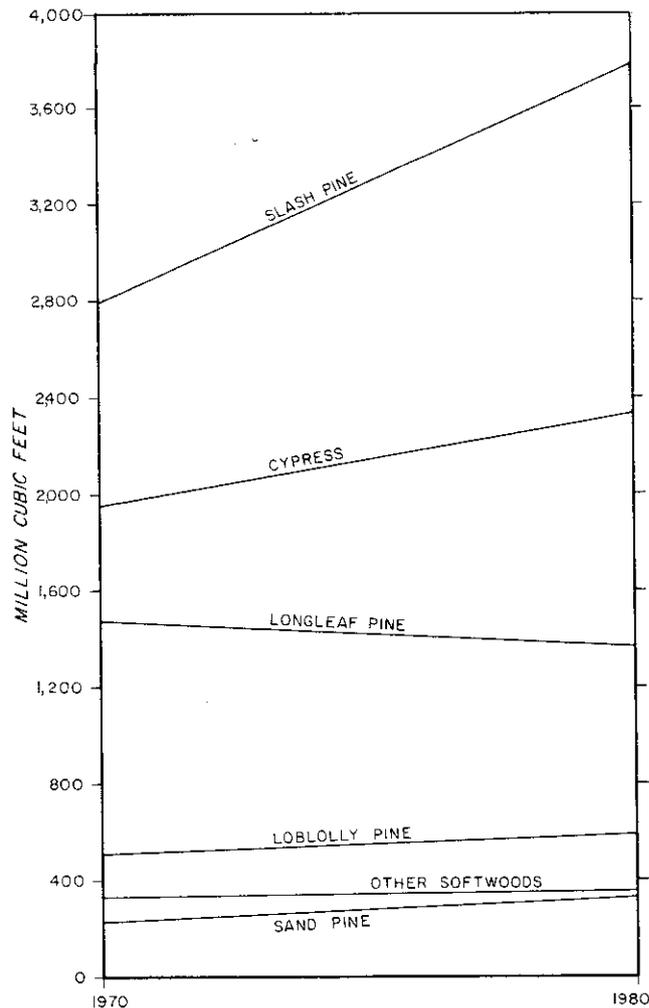


Figure 5.--Change in volume of softwood growing stock, by species, 1970-1980.

volume and is the dominant species in the two southern Units. Cypress accounts for 24 percent of the softwood volume increase and contributes 27 percent to total softwood volume.

In contrast to the overall softwood volume increase, longleaf pine growing-stock volume declined by 112 million cubic feet, or by about 8 percent. Over 96 percent of this decline took place in Northeast Florida. Longleaf pine now makes up only 16 percent of the total softwood volume but is still an important species to Florida's timber industry.

Tupelo and blackgum, a variety of red oaks, bay and magnolia, and sweetgum make up 70 percent of Florida's hardwood growing-stock volume (fig. 6). Tupelo and blackgum are the dominant hardwood species; they contribute 27 percent of the total hardwood volume.

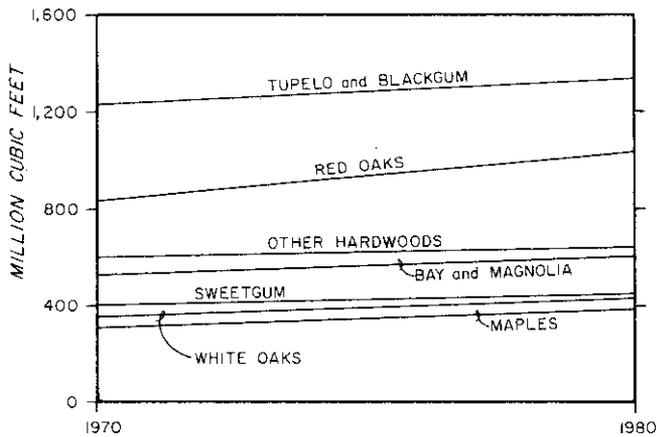


Figure 6.--Change in volume of hardwood growing stock, by species, 1970-1980.

Volume of these species has increased from 1.2 to 1.3 billion cubic feet. Red oaks contain 21 percent, bay and magnolia 12 percent, and sweetgum 9 percent of the total hardwood growing-stock volume.

Annual Growth Averages 50 Cubic Feet Per Acre

In 1979, net annual growth of growing stock totaled 785 million cubic feet and averaged 50 cubic feet per acre of commercial forest. The average net annual growth across all commercial forest stands was 39 cubic feet per acre for softwood species and 11 cubic feet per acre for hardwood species. In comparison, net annual growth in 1969 averaged 33 cubic feet per acre--26 cubic feet for softwoods and 7 cubic feet for hardwoods.

By Survey Unit, average annual growth was highest in Northeast Florida. Net annual growth on commercial forests averaged 63 cubic feet per acre in Northeast Florida, 43 in Northwest Florida, 39 in Central Florida, and 25 in South Florida.

By ownership, average annual growth ranged from a high of 60 cubic feet per acre on National Forest land to a low of 44 cubic feet per acre on other public land. Net annual growth was 57 cubic feet per acre on forest industry land and 45 cubic feet per acre on NIPF land.

Future softwood growth increases on forest industry land are likely because large numbers of sapling-seedling plantations on this land will boost softwood growth as they enter the 6-inch d.b.h. class and are included in volume estimates. In the short run, softwood growth on nonindustrial private land is also likely to increase. Large concentrations of pine stands on these ownerships range between 10 and 30 years of age. However, unless planting efforts on NIPF land are increased, softwood growth will decline as pine stands now 10 to 30 years old are harvested. These observations are based on analyses of the age distributions of stands in each ownership class. Over time, changes in rates of harvesting and regeneration can alter this outlook.

A more detailed breakdown of gross growth into its various components by Survey Unit and species group, along with the distribution of mortality and removals, provides a better understanding of annual change in timber volume (table II). Survivor growth, the volume increment on growing-stock trees 5.0 inches d.b.h. and larger in the inventory at the beginning of the year and surviving to its end, accounted for 79 percent of gross growth. Ingrowth, the net volume of growing-stock trees reaching 5.0 inches d.b.h. during the year, and the subsequent growth on these trees, accounted for another 18 percent. Growth on removals before removal and growth on mortality before death made up the remaining 3 percent.

In 1979, mortality of growing stock totaled 105 million cubic feet and reduced gross growth by about 12 percent. Softwoods made up about 58 percent of the total growing-stock mortality. When compared to the mortality estimates in 1969, softwood mortality more than doubled while hardwood mortality was up by less than 10 percent. The 1979 mortality losses included 304 million board feet of sawtimber, 54 percent of which were softwoods. Weather was the primary identifiable cause of death for both softwood and hardwood sawtimber. In the smaller

Table II.—Annual components of change in the volume of growing stock on commercial forest land, by Survey Unit and by softwood and hardwood, Florida, 1979

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				
<i>Million cubic feet</i>										
Northeast:										
Softwood	365.9	280.3	67.9	5.2	11.6	0.9	21.5	344.4	274.7	+69.7
Hardwood	102.5	84.1	15.6	1.3	1.1	.4	15.4	87.1	39.9	+47.2
Total	468.4	364.4	83.5	6.5	12.7	1.3	36.9	431.5	314.6	+116.9
Northwest:										
Softwood	196.6	159.8	28.4	2.3	5.4	.7	17.1	179.5	134.2	+45.3
Hardwood	73.9	62.1	9.8	.7	.9	.4	17.0	56.9	30.9	+26.0
Total	270.5	221.9	38.2	3.0	6.3	1.1	34.1	236.4	165.1	+71.3
Central:										
Softwood	77.1	61.0	13.2	1.1	1.3	.5	12.5	64.6	35.9	+28.7
Hardwood	42.8	36.1	5.7	.4	.3	.3	11.1	31.7	9.7	+22.0
Total	119.9	97.1	18.9	1.5	1.6	.8	23.6	96.3	45.6	+50.7
South:										
Softwood	27.0	21.3	4.7	.3	.4	.3	9.7	17.3	8.8	+8.5
Hardwood	4.7	4.0	.4	—	.3	—	.7	4.0	7.6	-3.6
Total	31.7	25.3	5.1	.3	.7	.3	10.4	21.3	16.4	+4.9
State:										
Softwood	666.6	522.4	114.2	8.9	18.7	2.4	60.8	605.8	453.6	+152.2
Hardwood	223.9	186.3	31.5	2.4	2.6	1.1	44.2	179.7	88.1	+91.6
Total	890.5	708.7	145.7	11.3	21.3	3.5	105.0	785.5	541.7	+243.8

diameter classes, the major identifiable cause of death was fire for softwoods and weather for hardwoods.

Fire was responsible for 21 percent of the total softwood growing-stock mortality in the State, as compared with 26 percent in 1969.

Since 1970, the area under fire protection burned annually has averaged 271,000 acres (table III). Wildfires have been contained and suppressed at an average size of about 30 acres. In 1972, all commercial forest land in the State came under fire protection.

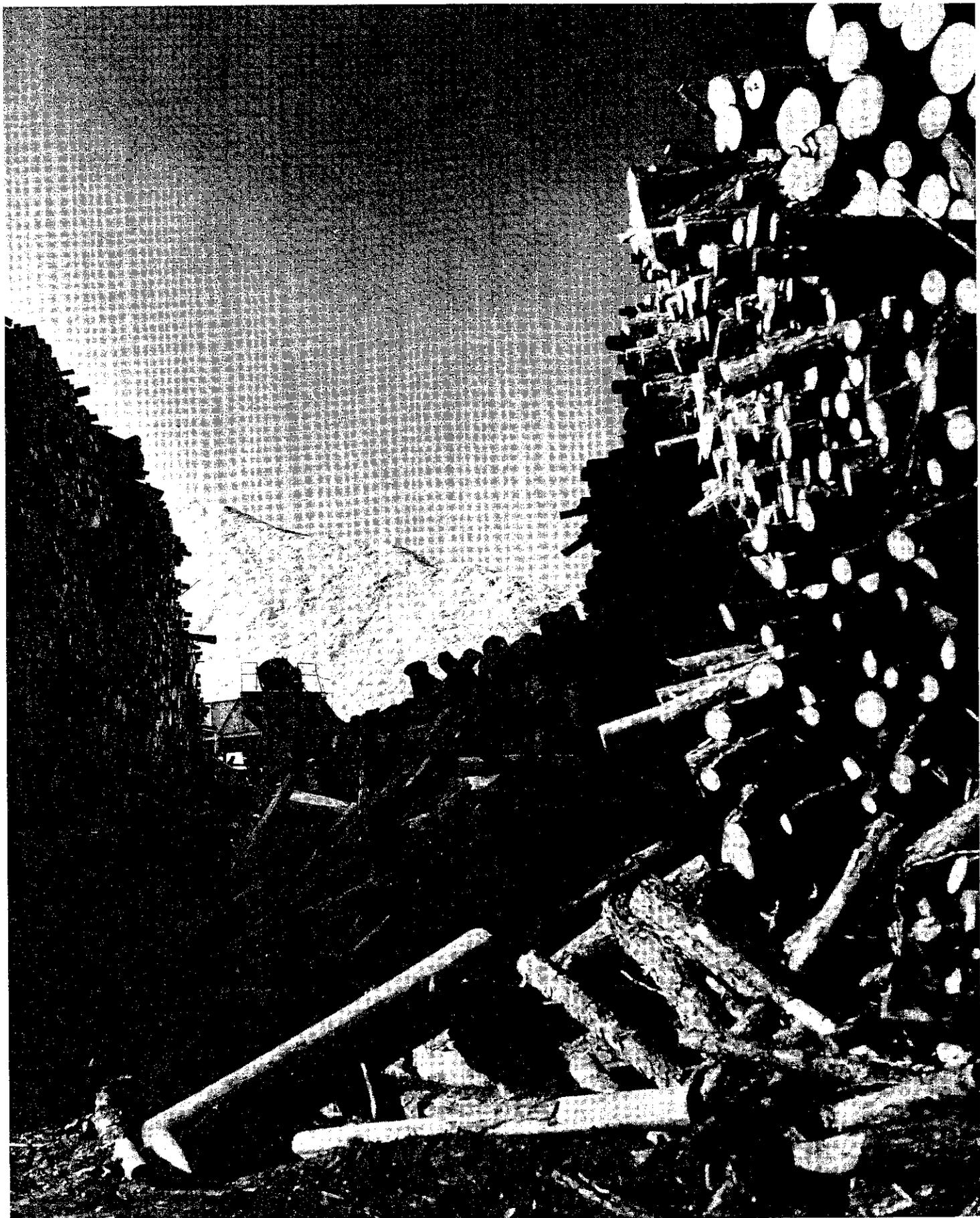
Table III.—Area under fire protection, protected area burned, number of fires, and average size of fires, Florida, 1969-1979^a

Year	Area protected ^b		Protected area burned		Fires	Average size of fires
	<i>M acres</i>	<i>Percent</i>	<i>M acres</i>	<i>Percent</i>		
1969	19,319	93	66	0.34	5,029	13
1970	19,314	93	84	.43	5,984	14
1971	26,701	95	686	2.57	9,822	70
1972	28,226	100	115	.41	7,341	16
1973	28,252	100	224	.79	7,453	30
1974	28,227	100	533	1.89	10,825	49
1975	28,313	100	296	1.05	7,479	40
1976	28,316	100	155	.55	8,845	17
1977	28,316	100	255	.90	11,326	22
1978	28,317	100	90	.32	7,068	13
1979	28,328	100	128	.45	7,185	18

^aSource: U.S. Department of Agriculture, Forest Service, Wildfire Statistics, 1969-1979.

^bIncludes forest and nonforested watershed lands.





TIMBER PRODUCTS OUTPUT

Timber products from Florida's forests contribute significantly to the State's economy. According to U.S. Department of Commerce statistics for fiscal year 1979, 1,482 firms in the State were directly linked to the forest products industry.³ These firms employed over 43,000 people and generated an annual payroll of \$562 million. In addition to providing timber for consumptive purposes, Florida's forests provide wildlife habitat, outdoor recreation, and esthetic values and enhance the quality of soil, water, and air.

All timber products output and residue disposal information contained in this report is for calendar year 1979. These estimates were obtained by merging information from three sources: (1) permanent sample locations were re-measured to provide estimates of total removals, (2) felled trees were measured at a sample of active harvesting operations to develop utilization information for each of the roundwood products, and (3) all primary wood-using plants were canvassed to obtain information on wood receipts, product output, and disposal of residues. Some 148 primary wood-using plants operated in the State in 1979 (fig. 7).

Altogether, 542 million cubic feet of growing-stock timber were removed from Florida's forests in 1979. Removals were 56 percent higher than in 1969. Since 1969, softwood growing-stock removals increased by 63 percent and hardwood removals by 27 percent. Annual timber removals averaged 75 percent of net annual growth for softwoods and 49 percent for hardwoods. Softwoods provided a disproportionate share of growing-stock removals. Softwood growing stock made up 64 percent of the inventory and 77 percent of the net growth but provided 84 percent of the removals. By ownership, 12 percent of

all removals were from public lands, 45 percent from lands controlled by forest industry, 12 percent from farmer-owned lands, and 31 percent from miscellaneous private individuals and corporations. Annual removals of growing stock included 1.8 billion board feet of sawtimber. Of the total growing-stock removals, 392 million cubic feet, or 72 percent, were used for timber products; 7 percent were left in the woods as logging residues; 21 percent were removed from commercial forests but not used. Included in this last category is timber removed due to cultural practices and land clearing. About two-fifths of the unused removals on cleared acreages are still standing, but in nonforest conditions such as agricultural and urban settings.

In addition to the 392 million cubic feet of growing stock cut for timber products, 25 million cubic feet of nongrowing-stock timber were cut for products. Over and above the 417 million cubic feet of roundwood cut for all products (including fuelwood), the estimate of total output includes 48 million cubic feet of mill byproducts. In all, some 465 million cubic feet of timber products were produced in 1979.

About 414 million cubic feet of roundwood destined for industrial products were removed from Florida's timberland in 1979. Of this, 50 million cubic feet were exported to other states. Another 128 million cubic feet were imported to Florida from other states. Net imports of roundwood used for industrial products totaled 78 million cubic feet--69 million cubic feet of softwoods and 9 million cubic feet of hardwoods. Consumption of roundwood by Florida mills for all industrial products approached 492 million cubic feet. In effect, Florida's timberland produced 84 percent of the total roundwood utilized by Florida mills for industrial products. The margin of growth over removals (see figure 2) suggests that Florida's timberland could have supplied all the needs of Florida's mills if the equivalent of all net roundwood imports to the State

³ U.S. Department of the Census. County business patterns, 1979, Florida. CBP-79-11. Washington, DC: 1981. 156 p.

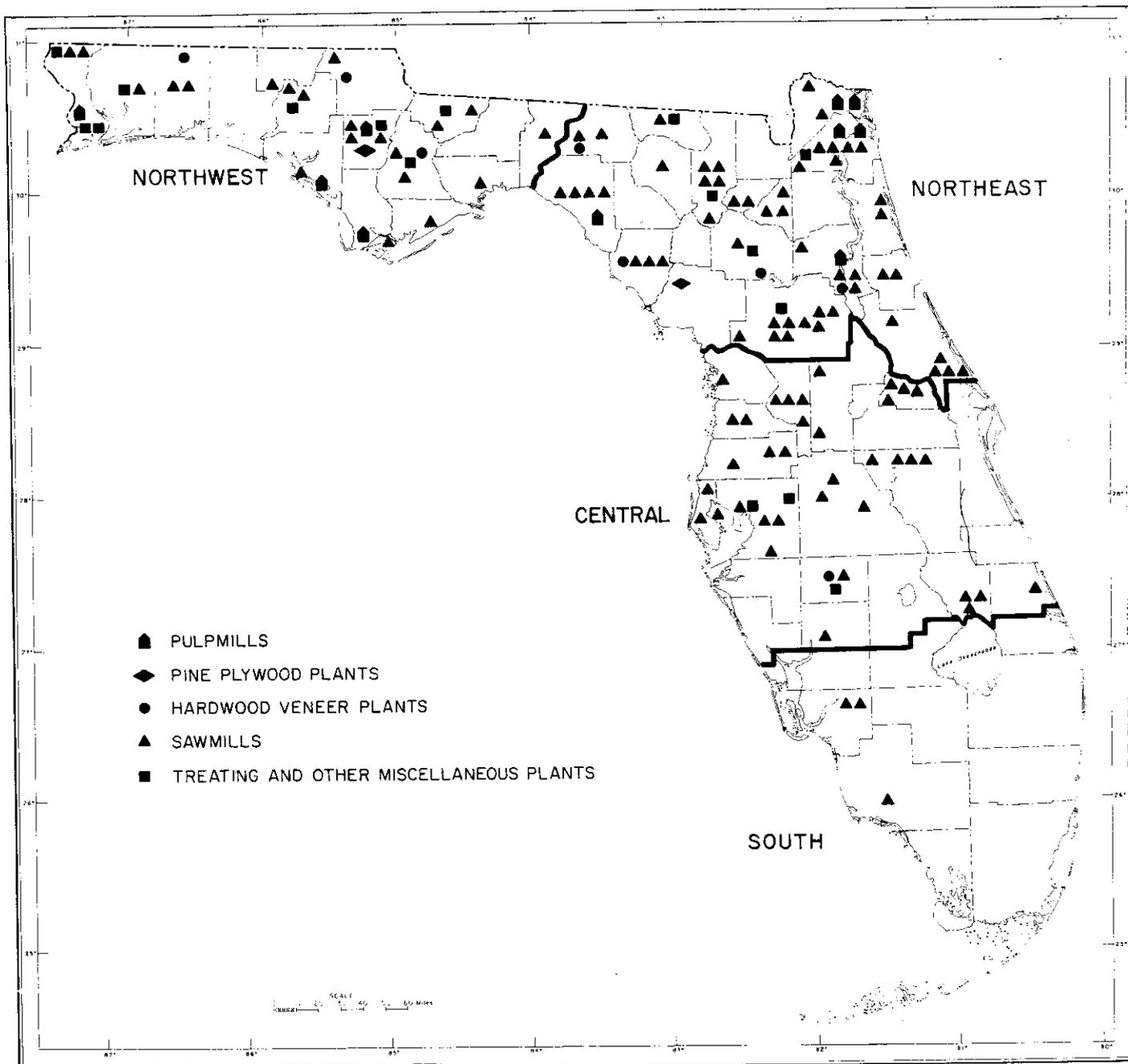


Figure 7.--Location of primary wood-using industries in Florida, 1979.

had been cut from Florida's growing-stock trees.

About 262 million cubic feet, or 63 percent, of Florida's total industrial roundwood output came from Northeast Florida. This proportion is consistent with the high concentration of forest industry and the intense management of commercial forest in this area. Even though heavy demands were made on the timberland in Northeast

Florida, growth still exceeded removals by a large margin. About 135 million cubic feet of roundwood came from Northwest Florida, 16 million cubic feet from Central Florida, and 1 million cubic feet from South Florida.

Pulpwood Is the Leading Timber Product

In 1979, pulpwood production in Florida reached a record high. Except

for a slight downturn during the economic recession of the midseventies, pulpwood production has historically been increasing (fig. 8). Between 1969 and 1979, annual production rose from 3.4 to 3.8 million cords, up by 11 percent. About 81 percent of the total increase was attributed to softwoods. Altogether, pulpwood accounted for 64 percent of the total product output and 62 percent of the roundwood output of the State.

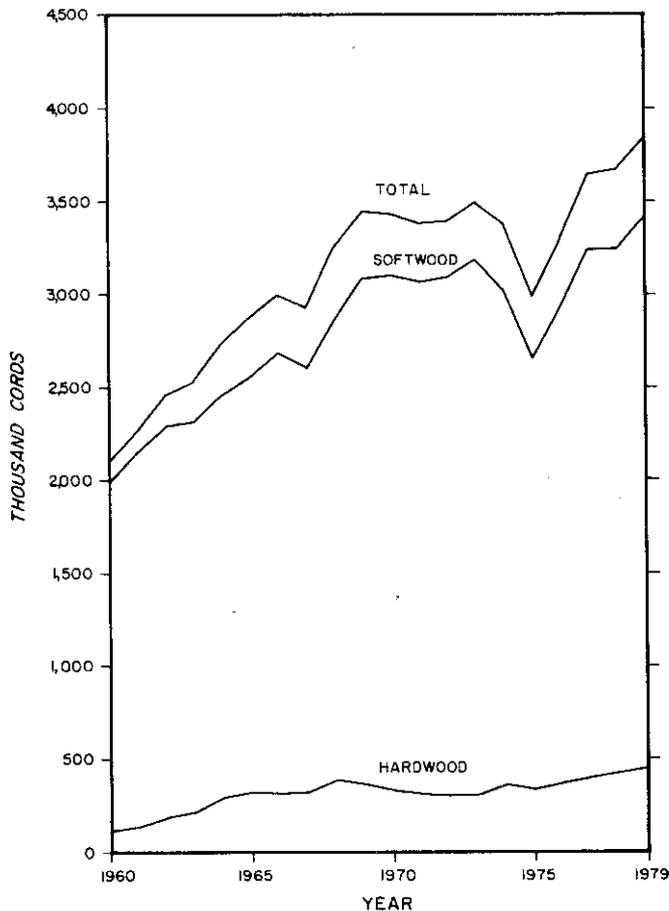


Figure 8.--Pulpwood production in Florida, 1960-1979.

Over the remeasurement period, expansion of existing facilities and the addition of a new pulpmill boosted the State's daily pulping capacity from 9,048 to 10,716 tons per day, or by 18 percent. Florida is a net importer of both roundwood and mill byproducts used in the production of fiber products. Some 3.3 million cords of round pulpwood were produced in Florida in 1979. Of these, 545,000 cords were exported to other states. Another 1.5 million

cords were imported to Florida from other states. Total roundwood consumption by Florida's pulp industry approached 4.3 million cords. The combined total consumption of roundwood and mill byproducts by the pulp industry neared 5.6 million cords. The volume of roundwood cut from the State's forests added to that of mill residues utilized for fiber products (including exports to other states), totals 3.8 million cords. Thus, the equivalent of 31 percent of the total receipts of Florida's pulpmills originated in other states.

Development of portable chipping installations has made it increasingly difficult to distinguish between roundwood chips and byproduct chips utilized in the pulping process. Although 1979 Florida pulpwood production figures agree with those previously published in "Southern Pulpwood Production, 1979," differences are acknowledged in estimates of the volumes of roundwood and byproducts. A more refined byproduct figure was obtained from the Statewide industry canvass. The canvass yielded a higher but more accurate volume of roundwood chipped.

Of the total volume of pulpwood produced, 80 percent originated from growing stock, 13 percent from mill byproducts, and the remainder from nongrowing-stock roundwood. A 20 percent increase in the use of mill byproducts attests to improved utilization within the industry. This improved utilization, however, was not enough to offset increased demand for fiber products. The 11 percent increase in pulpwood production was accompanied by a 20 percent increase in growing-stock removals destined for fiber products.

A stronger demand for softwood saw logs has caused a shift of pulpwood supply sources. In 1979, 470 million board feet of sawtimber were used for fiber products--12 percent less than in 1969. Also, since 1969 the use of cull and other nongrowing-stock trees for pulp products fell by 6 percent. Increased utilization of mill byproducts partly compensated for the loss of these sources, but most of the increase in Florida pulpwood production came

from poletimber growing-stock trees.

By Survey Unit, 65 percent of the total roundwood pulp production came from Northeast Florida, 33 percent from Northwest, 2 percent from Central, and less than 1 percent from South Florida. This distribution reflects the relatively intense management of commercial forests in the northern half of the State as well as the high concentration of pulpmills in this region.

Saw-Log Production Increases Sharply

Total annual output of saw logs from Florida's forests increased from 313 million board feet in 1969 to 733 million board feet in 1979, or by 134 percent. Saw logs accounted for 29 percent of the total product output and 32 percent of the roundwood output in 1979. Most of the recent boom in saw-log production came between 1975 and 1979. All of the increase was in softwood species. Over the remeasurement period, softwood saw-log production skyrocketed by 170 percent. On the other hand, hardwood production fell by 14 percent.

In contrast to the high proportion of pulpwood imported to the State, effectively 96 percent of the logs processed in Florida sawmills were grown in Florida. Total saw-log output from roundwood was 732 million board feet. Of this, about 31 million board feet were exported to other states. An additional 58 million board feet were imported from other states. Net imports of saw logs totaled about 27 million board feet. Total consumption of saw logs processed by Florida's sawmills was nearly 760 million board feet.

Saw logs accounted for 34 percent of the total growing-stock removals in 1979. Of the total volume of saw logs produced, over 99 percent came from growing-stock sources. Less than 1 percent originated from cull or salvable dead trees and from mill by-products such as veneer cores. Over 93 percent of the total saw-log output came from sawtimber trees.

By Survey Unit, 60 percent of the total saw-log production came from

Northeast Florida, 34 percent from Northwest, 6 percent from Central, and less than 1 percent from South Florida.

Veneer Market Shifts to Softwoods

Production of veneer logs declined slightly between 1969 and 1979. Production fell from 88 million board feet to 83 million board feet during this period. All of the decline was in hardwoods. Of significance is the shift from a market previously dominated by hardwoods to a market now dominated by softwoods. Increased production of pine plywood was largely responsible for this turnaround. Since 1969, production of pine peeler logs increased from 26 million board feet to 62 million board feet, or by 139 percent. Production of hardwood peeler logs fell by 65 percent--from 62 million board feet to 22 million board feet. Softwoods now constitute 74 percent of the veneer market.

In 1979, veneer logs accounted for 3 percent of the total product output and 4 percent of the roundwood output. About 4 percent of the total growing-stock removals went into veneer logs. Of the total volume produced, 97 percent came from growing-stock trees, most of them sawtimber trees.

About 7 million board feet of peeler logs produced in Florida were exported to other states. Another 2 million board feet were imported from other states. Total consumption of veneer logs by Florida mills approached 78 million cubic feet.

By Survey Unit, 74 percent of total production came from Northeast Florida, 21 percent from Northwest, 4 percent from Central, and 1 percent from South Florida. Over 86 percent of the softwood veneer production came from forests in Northeast Florida. Most of the hardwood veneer production was split between the two northern Units.

Output of Other Industrial Products Doubles

The combined roundwood output from poles, piling, posts, particleboard

furnish, and other miscellaneous products was up from 6.8 to 14.4 million cubic feet, or by 110 percent. Most of this increase was due to byproducts going into particleboard and to the output of roundwood for fenceposts. Altogether, these products accounted for 3 percent of the total output, 2 percent of the roundwood output, and less than 2 percent of the removals from growing stock. Softwood species were the source of 95 percent of these products.

Domestic Fuelwood Output Triples

The combined output of mill byproducts and roundwood used for household fuel rose from 1.5 million cubic feet to 4.5 million cubic feet, or by 206 percent. The use of mill byproducts such as slabs and edgings for household fuel increased from 0.3 to 1.2 million cubic feet, and the use of roundwood increased from 1.2 to 3.3 million cubic feet. The increase in fuelwood output reverses a long-term trend in Florida; this change was expected in light of rising costs of other sources of fuel since 1969.

Excluding industrial fuel, fuelwood accounted for about 1 percent of the total product output, 0.8 percent of the roundwood output, but only 0.3 percent of the growing-stock removals in 1979. Over 99 percent of all roundwood cut for domestic fuel was hardwood.

Net Decline in Timber Utilization

A 43 percent increase in product output between 1969 and 1979 was accompanied by a 46 percent increase in removals from growing-stock trees. Although utilization has improved in some areas, the net result was a reduction in the utilization of timber removed from Florida's forests.

The use of mill byproducts at primary wood-using plants has increased significantly. These byproducts include slabs, edgings, chips, cores, shavings, and sawdust. In 1979, about 96 percent of these byproducts were used, compared with 78 percent used in 1969. These estimates do not include those byproducts used for litter and

mulch because figures are not available for both periods. The majority of these byproducts were used in the production of fiber products by the pulp industry and for industrial fuel by all types of mills. The use of wood byproducts for fuel is a prudent step toward total utilization of timber removals. In addition to wood used for household fuel, approximately 12.6 million cubic feet of mill byproducts were used for industrial fuel. This amount represented a 96 percent increase over the amount of wood byproducts used for fuel by industry in 1969. Another 41 million cubic feet of bark were also used for fuel by industry in 1979.

The proportion of growing-stock material left in the woods as logging residue has remained unchanged. In both 1969 and 1979, about 7 percent of all growing-stock trees harvested remained in the woods as logging residue. Hopefully, rising timber prices and the increased deployment of portable chipper will make the recovery of this last 7 percent more economical in the future.

The use of nongrowing-stock timber such as cull trees, salvable dead trees, tops and limbs has declined. In 1969, 9 percent of the total roundwood harvested and used for products came from nongrowing-stock material. In 1979, only 6 percent of all products from roundwood originated from nongrowing-stock material. Much of this material is suitable for use by the pulp industry. Increased utilization of nongrowing-stock material would extend the existing growing-stock supplies.

A serious form of underutilization falls in the "other removal" category. Other removals are those trees destroyed by man or removed from commercial forest but not used for products. This situation arises frequently when forest land is cleared and put to some nonforest-land use without utilizing the timber. Many of these cleared tracts are on NIPF land and are too small for economical harvest by a logger. In 1969, 15 percent of all growing-stock removals fell in this category. In 1979, this figure rose to 21 percent.



TIMBER SUPPLY OUTLOOK

Except for possible gains from improved utilization and protection, timber supplies over the next decade or longer have already been determined by foregone actions. In this section, we appraise the 30-year outlook for timber supplies in Florida. Timber harvesting and regeneration constitute the most important factors regarding future supply, therefore we begin our evaluation with a review of these trends.

Most Young Pine Stands Are Plantations

Within 30 years, over three-fourths of Florida's softwood timber supplies will likely come from plantations. Pine plantations make up over

88 percent of all pine stands less than 10 years old and 85 percent of all pine stands less than 20 years old. About 95 percent of all pine stands less than 20 years old on land controlled by forest industry are manageable pine plantations. On public land, plantations account for 81 percent of all pine stands less than 20 years old. The proportion for NIPF land is 67 percent.

Two independent estimates of plantation acreage are presented in this analysis. First, based on annual reports of forest planting and seeding compiled by the U.S. Department of Agriculture Forest Service, an average of 161,000 acres was planted annually during the remeasurement period (table IV). Second, based upon our field

Table IV.—Acres of forest planting,^a by ownership class, Florida, 1959-1979

Fiscal year	Ownership class				All ownerships	Accumulative total
	National Forest	Other public	Forest industry	Other private		
..... Acres						^b 1,063,299
1959	7,173	4,391	55,572	137,017	204,153	1,267,452
1960	4,970	4,265	57,418	132,310	198,963	1,466,415
1961	4,323	4,884	99,189	71,532	179,928	1,646,343
1962	3,330	8,610	82,776	53,813	148,529	1,794,872
1963	2,580	12,407	84,445	41,151	140,583	1,935,455
1964	4,881	10,462	72,363	56,457	144,163	2,079,618
1965	5,933	10,295	81,641	42,233	140,102	2,219,720
1966	6,905	14,894	80,580	44,609	146,988	2,366,708
1967	8,228	11,650	89,511	48,447	157,836	2,524,544
1968	10,144	10,184	105,958	43,986	170,272	2,694,816
1969	13,221	10,021	112,909	25,694	161,845	2,856,661
1970	12,418	12,135	106,253	29,931	160,737	3,017,398
1971	15,003	9,966	138,419	14,101	177,489	3,194,887
1972	13,915	9,777	109,409	38,331	171,432	3,366,319
1973	14,599	10,808	96,907	31,815	154,129	3,520,448
1974	13,544	9,811	81,428	51,390	156,173	3,676,621
1975	13,549	6,246	139,323	37,455	196,573	3,873,194
1976	9,679	6,210	112,241	31,005	159,135	4,032,329
1977	11,766	6,484	117,697	24,150	160,097	4,192,426
1978	11,919	5,096	119,101	18,455	154,571	4,346,997
1979	12,430	6,699	84,424	18,116	121,669	4,468,666

^aIncludes acres of planting by direct seeding. Source: U.S. Department of Agriculture, Forest Service, "Forest Planting, Seeding, and Silvical Treatments in the United States."

^bAccumulative total prior to FY 1959.

crews' determination of stand origin at each sample location visited in this latest inventory, an average of 143,000 acres was planted annually (table V). Since some planting efforts fail because of poor survival and inadequate site preparation, the first estimate can logically be reduced. This estimate also includes an undetermined amount of replanting. Alternately, the second estimate is probably conservative since some planted stands are difficult to recognize on the ground. The average of the two estimates, 152,000 acres, is probably very close to the rate of successful plantation establishment.

Over 3 Million Acres Are in Pine Plantations

Altogether, nearly 3.5 million acres, or 22 percent of Florida's commercial timberlands, show evidence of artificial regeneration (table V). About 59 percent of this acreage occurs in Northeast Florida, 36 percent in Northwest Florida, 4 percent in Central

Florida, and 1 percent in South Florida. Within Units, 30 percent of all timberlands in Northeast Florida, 22 percent in Northwest, 6 percent in Central, and 5 percent of all commercial timberland in South Florida show evidence of artificial regeneration. Although regeneration efforts were undertaken on these acres, they did not, in some cases, result in a stocked pine forest type. Table VI shows that of the 3.5 million acres on which regeneration efforts were evident, only 3.3 million acres resulted in a pine type which was at least 16.7 percent stocked with trees of acceptable quality. On the remaining 207,000 acres, regeneration efforts either culminated in a nonstocked condition or hardwood growing stock made up more than 50 percent of the total stocking. An undetermined but relatively small number of these acres were planted to hardwoods.

Of the 3.3 million acres in stocked pine plantations, 64 percent occurs on forest industry land, 27 percent on NIPF land, and 9 percent on public land (table VI).

Table V.—Area of commercial forest land, by stand origin and Survey Unit, Florida, 1980

Stand origin	State		Survey Unit							
			Northeast		Northwest		Central		South	
	<i>M acres</i>	<i>Percent</i>								
Natural stands	12,189.6	77.8	4,788.5	70.0	4,271.9	77.5	2,334.0	94.4	795.2	95.3
Stands originating wholly or in part from artificial regeneration since previous inventory	1,434.5	9.2	833.8	12.2	530.5	9.6	55.4	2.2	14.8	1.8
Stands originating wholly or in part from artificial regeneration prior to the previous inventory	2,040.1	13.0	1,222.2	17.8	709.6	12.9	84.3	3.4	24.0	2.9
All stands	15,664.2	100.0	6,844.5	100.0	5,512.0	100.0	2,473.7	100.0	834.0	100.0

Table VI.—Area of commercial forest land, by broad management, ownership, and past treatment or disturbance classes, Florida, 1980

Broad management and ownership classes ^a	Total area	Primary treatment or disturbance between 1970 and 1980							
		Harvesting w/artificial regeneration	Harvesting w/natural regeneration	Other harvesting	Intermediate cutting	Artificial planting	Natural disturbance	Other ^b	None
<i>Thousand acres</i>									
Nonstocked forest:									
Public	257.4	—	—	62.4	2.0	2.5	18.2	82.8	89.5
Forest industry	458.5	—	—	238.5	1.8	—	3.7	41.9	172.6
Other private	1,295.1	—	—	222.4	—	9.1	114.7	396.8	552.1
Total	2,011.0	—	—	523.3	3.8	11.6	136.6	521.5	814.2
Pine plantations:									
Public	293.1	59.2	—	3.6	23.7	64.1	13.0	53.6	75.9
Forest industry	2,093.1	679.2	6.4	34.8	46.0	261.8	139.7	360.7	564.5
Other private	881.1	71.1	—	9.3	147.1	131.2	93.0	141.5	287.9
Total	3,267.3	809.5	6.4	47.7	216.8	457.1	245.7	555.8	928.3
Natural pine stands:									
Public	987.1	—	11.6	26.4	99.3	—	51.9	406.2	391.7
Forest industry	988.6	—	15.6	56.8	37.4	—	57.0	190.4	631.4
Other private	1,944.1	—	22.4	131.9	147.8	—	192.5	600.6	848.9
Total	3,919.8	—	49.6	215.1	284.5	—	301.4	1,197.2	1,872.0
Oak-pine stands:									
Public	186.4	3.0	—	5.0	10.0	2.5	5.5	62.7	97.7
Forest industry	351.1	42.7	3.9	42.3	12.7	7.0	13.6	30.6	198.3
Other private	781.9	3.8	10.4	101.1	21.2	2.7	44.1	165.4	433.2
Total	1,319.4	49.5	14.3	148.4	43.9	12.2	63.2	258.7	729.2
Upland hardwood stands:									
Public	88.9	2.5	3.0	17.6	6.2	—	—	26.2	33.4
Forest industry	202.7	3.1	24.8	46.5	19.5	—	—	20.0	88.8
Other private	948.0	—	56.8	154.3	60.6	—	44.7	145.9	485.7
Total	1,239.6	5.6	84.6	218.4	86.3	—	44.7	192.1	607.9
Bottomland hardwood stands:									
Public	365.3	—	2.7	5.0	15.7	—	17.1	12.1	312.7
Forest industry	1,343.1	—	63.6	171.1	76.6	—	54.5	45.0	932.3
Other private	2,198.7	—	23.7	156.6	93.7	5.9	108.0	297.9	1,512.9
Total	3,907.1	—	90.0	332.7	186.0	5.9	179.6	355.0	2,757.9
All classes:									
Public	2,178.2	64.7	17.3	120.0	156.9	69.1	105.7	643.6	1,000.9
Forest industry	5,437.1	725.0	114.3	590.0	194.0	268.8	268.5	688.6	2,587.9
Other private	8,048.9	74.9	113.3	775.6	470.4	148.9	597.0	1,748.1	4,120.7
Total	15,664.2	864.6	244.9	1,485.6	821.3	486.8	971.2	3,080.3	7,709.5

^aForest industry includes lands under long-term lease.

^bIncludes grazing, draining, prescribed burning, site preparation, and other miscellaneous treatments.

Annual Planting Declines

Between 1970 and 1980, over 1.4 million acres originated wholly, or in part, from artificial regeneration (see table V). Between 1959 and 1970, 2.1 million acres fell in this category. Comparing average annual planting rates between these two periods indicates a 24 percent decline in planting since the fourth survey. In support of this development are the decline in numbers of slash pine saplings and the overall decline in the pine sapling-seedling stand-size class.

Under the Conservation Reserve Soil Bank Program, a large amount of acreage on NIPF land was planted during the late 1950's and early 1960's. Also during the Soil Bank era, extensive acreages of idle cropland were available to revert naturally to pine stands. Increases in pine growth and inventory measured during the fifth survey can be attributed to the large acreage of pine stands established during this period. After the Soil Bank era, planting efforts on NIPF land were reduced by nearly half and have generally been declining until the present. This decline on NIPF land was partially countered by increased regeneration efforts on forest industry land. Although increased efforts on the part of forest industry have been substantial, they have not been adequate to offset NIPF planting declines. The net result has been an overall decline in the number of acres planted since the Soil Bank era.

Timber planted on NIPF land during the Soil Bank years has now developed to merchantable size and will support a higher rate of growth over the next two decades or so. Beyond that time, there likely will be a reduction in softwood supplies on NIPF land, along with an increase in softwood supplies on forest industry land. A net downturn in future softwood supplies may begin in about 20 years.

Timber Is Removed From 465,000 Acres Annually

Table VI summarizes the most significant treatments or disturbances

evidenced at each sample location over the remeasurement period. For the State as a whole, the remeasurement period averaged 10.1 years. In this summary, the broad management and ownership classes apply to the stands at the end of the remeasurement period, rather than at the beginning.

On the 8 million acres that were significantly treated or disturbed, timber harvesting was the most common forestry activity observed. On the average, 257,000 acres were harvested annually and retained in commercial forest, exclusive of intermediate cuttings and diversion of forest to some other land use. Over the period, thinnings and other intermediate cuttings occurred on an average of 81,000 acres annually.

An additional 127,000 acres were diverted from commercial forest to some other land use each year. Some timber was also harvested from these acres. When the estimates of harvesting, intermediate cutting, and diversions are grouped, they suggest that timber was removed from about 465,000 acres each year.

When average annual rates of final harvest over the remeasurement period are expressed in percent of the total commercial forest in each ownership class, significant differences result (table VI). These rates indicate that slightly less than 1 percent of the public forest is harvested each year. At the other extreme, 2.6 percent of the timberland owned or leased by forest industry is harvested annually. On NIPF forest, the rate is 1.2 percent. By broad ownership class, the annual rates of intermediate cutting average 0.7 percent on public forest, 0.4 percent on lands owned or leased by forest industry, and 0.6 percent on NIPF land.

About 1.4 million acres were artificially regenerated since the fourth survey. Nearly 64 percent of this reforestation occurred on forest where a final harvest took place. Another 29 percent of the planting effort was on the backlog of acreage needing regeneration. The remaining 7 percent was on old fields and other nonforest land.

One Acre Is Planted for Every Two Harvested

A comparison of total planting to total harvesting over the remeasurement period (table VI) shows that about 1 acre was planted for every 2 acres harvested and retained in forest. Although there is room for improvement, this ratio is the highest in the Southeast. Comparisons within ownerships show that on public and forest industry lands about 2 acres were planted for every 3 acres harvested and retained in forest. On NIPF lands, less than 1 acre was planted for every 4 acres harvested and retained in forest.

Natural regeneration followed a final harvest on some 245,000 acres. An additional 227,000 acres reverted naturally to forest from old fields and other nonforest lands. A total of 1.8

million acres of pine and hardwood types were regenerated, either naturally or artificially, to a stocking level of at least 16.7 percent. However, only 1.4 million acres, or effectively 79 percent of the regenerated areas support a manageable stand (fig. 9).

In addition to the acreage harvested or regenerated, other forestry practices or intentional disturbances significantly affected the conditions on some 3 million acres over the remeasurement period. These practices and disturbances include prescribed burning, site preparation, forest grazing, drainage, and other miscellaneous actions. Finally, natural disturbances such as insect infestation, disease, wildfire, and weather significantly affected the conditions on almost 1 million acres that were otherwise un-

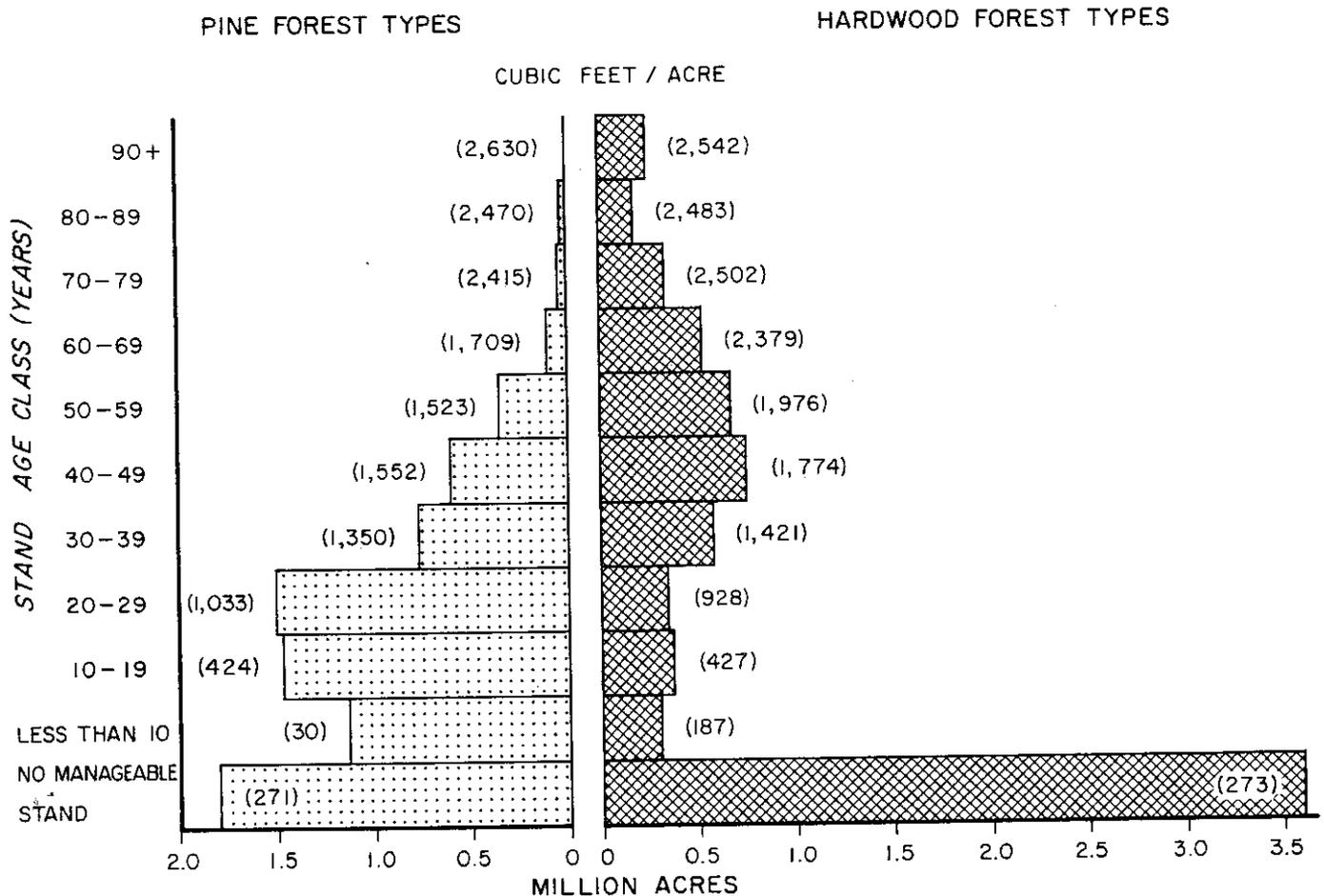


Figure 9.--Profile of area of commercial forest land, by stand age class, by pine and hardwood forest types, with average volume of growing stock per acre (in parentheses), Florida, 1980.

treated during the remeasurement period. No evidence of significant treatment or disturbance during the remeasurement period was found on 7.7 million acres, or 49 percent of the land classified as commercial forest in the new inventory.

Stand Age Distribution Reflects Decrease in Pine Regeneration

The distribution of commercial forest acreage by stand age class and major forest type provides another indicator of future timber supplies. A stand age profile of Florida's timberland clearly shows a decrease in the rate of pine establishment over the past decade (fig. 9). The largest concentration of pine stands, nearly 1.5 million acres, is in the 20- to 29-year age class. The concentration of pine stands in the 10- to 19-year age class follows close behind. If these stands are harvested and not adequately regenerated, pine acreage can be expected to decline, because there are fewer acres in the 0- to 9-year age class to replace them.

Over the last decade, final harvests took place on 1.7 million acres of pine forest types. Figure 9 shows that only 1.1 million acres of pine forest types are presently in the 0- to 9-year age class. In effect, this means that about 2 out of every 3 acres of pine forest harvested and retained in forest are being replaced by manageable pine stands. Under a regulated, even-aged management scheme, an additional 0.6 million acres of pine in the 0- to 9-year age class would be required to indefinitely sustain the rate of pine acres harvested and retained in forest during the past decade.

Many Hardwood Stands Are Poorly Stocked

In general, stocking levels have improved on Florida's timberland since the fourth survey, as has the overall hardwood outlook. Even so, 46 percent of all acres assigned a hardwood type are inadequately stocked with growing-

stock trees. These acres are displayed in figure 9 as having no manageable stand. Growing-stock volume averages 273 cubic feet per acre on these areas. Some of these acres support substantial additional volumes in rough and rotten trees. Conditions on some of these acres will improve, but most will require treatment before they can contribute to future timber supplies.

The largest concentration of the better stocked hardwood stands falls in the 40- to 49-year age class. Here again, as these stands develop and are harvested, the stand age profile suggests they will not be fully replaced, because the acreage in the next lower age class is smaller.

Although we stated earlier that there were increases in hardwood regeneration over the past decade, this increase is not evident in the 0- to 9-year age class of figure 9. This apparent discrepancy indicates that most of the stands on acres where additional hardwood regeneration occurred were inadequately stocked with acceptable trees, and therefore not manageable.

Approximately 0.9 million acres of hardwood forest types experienced a final harvest over the past 10 years and remained in forest. Only 0.3 million acres of manageable hardwoods were reestablished. This situation effectively means that about 1 out of every 3 hardwood stands harvested and retained in commercial forest is being replaced by a stand of manageable hardwoods. An additional 0.6 million acres of hardwoods in the 0- to 9-year age class would be required to indefinitely sustain the rate of hardwood acres harvested during the past decade under a regulated, even-aged management scheme.

When both hardwoods and softwoods are taken together, 55 percent of all stands harvested and retained in commercial forest are being replaced by manageable stands. This percentage includes regeneration by both natural and artificial means.

Average volume per acre shown for each condition or age class in figure 9 excludes the volume in rough and rotten trees and all trees less than 5.0 inches d.b.h. Mortality, thinnings,

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

Timber Supply Projections

Equipped with historical background information as a starting point, it becomes our task to project what bearing these latest trends could likely have on future timber supplies. The primary objective is to provide two future estimates. The first projection is an estimate of prospective net annual removals, net annual growth, and inventory if past trends are extrapolated for 30 years. The second projection is an estimate of potential net annual removals, net annual growth, and inventory attainable through improved timber management. Management opportunities are discussed in the next section.

These projections are made by using the Timber Resource Analysis System (TRAS) computer model. The results obtained from the TRAS model are highly sensitive to a set of basic assumptions. These results should not be misinterpreted as bold forecasts; they are reasonable estimates if the stated assumptions hold true.

Prospective Timber Supply Assumptions

Estimates of prospective timber supplies are based on the following assumptions:

1. Area of commercial timberland will continue to decline.--Commercial forest acreage has been declining in Florida since the first survey in 1936. The continuation of this trend in future years seems likely in light of the current influx of people and business interests into the State. An extrapolation of the trends measured between

1949 and 1979, weighted by the trend exhibited over the past 10 years, yields a 1.3-million-acre reduction of timberland over the next 30 years.

2. Declines in 2-inch softwoods will continue in the short run.--The number of all live softwoods in the 4-inch diameter class has decreased by 4 percent, and the number of softwoods in the 2-inch diameter class has decreased by 22 percent. More specifically, the number of 4-inch slash pines has increased by only 2 percent, and the number of 2-inch slash pines has actually declined by more than 31 percent. These findings indicate a recent slowdown in regeneration efforts. To assume that these trends will continue over the next 30 years would be unrealistic. If allowed to continue, reduced ingrowth into larger diameter classes would eventually deplete the softwood inventory. Therefore, we assume that the rate of decline in the number of 2-inch softwoods and the rate of increase of 2-inch hardwoods experienced between 1969 and 1979 will slow down and eventually reverse before the year 2010.

3. Softwood growth will continue to increase over the short run.--The increased softwood growth measured since 1970, largely due to a buildup in softwood inventory brought about by past regeneration efforts, will support future growth increases for awhile. However, as this current buildup is harvested, growth will continue to increase only to the point when softwood ingrowth becomes insufficient to replace it.

4. Softwood removals will increase.--Softwood removals, as a percentage of softwood growth, will continue to increase at about the same rate experienced between 1969 and 1979.

5. Hardwood growth will increase over the long run.--Due to the increased hardwood ingrowth measured over the past 10 years, it is reasonable to assume that hardwood growth will accelerate over the next 30 years. This

assumption is further supported by relatively low rates of hardwood removals in the past.

6. The gap between hardwood growth and removals will remain at 1979 levels.--Hardwood removals, as a percentage of hardwood growth, have been on the decline for the past 30 years. The hardwood industry in Florida has never developed to its full potential. Because of the projected hardwood growth increase, we think it is unrealistic to project a continuing decline in hardwood removals. On the other hand, unless new hardwood markets develop as a result of events such as the energy crisis, we foresee no significant upturn in the level of hardwood removals. We therefore assume that hardwood removals, as a percentage

of hardwood growth, will remain at 1979 levels.

TRAS Prospective Results

Prospective projections, based on these assumptions, are displayed in figures 10 and 11. Softwood growing-stock growth will continue to increase until around the year 2000, peaking at about 650 million cubic feet per year. At this point, ingrowth into larger diameter classes becomes insufficient to offset increased removals. Growth of softwood sawtimber continues to increase because reduced ingrowth has not yet fully passed into the sawtimber size class. The extrapolation of past softwood cutting trends brings softwood removals nearly into balance with

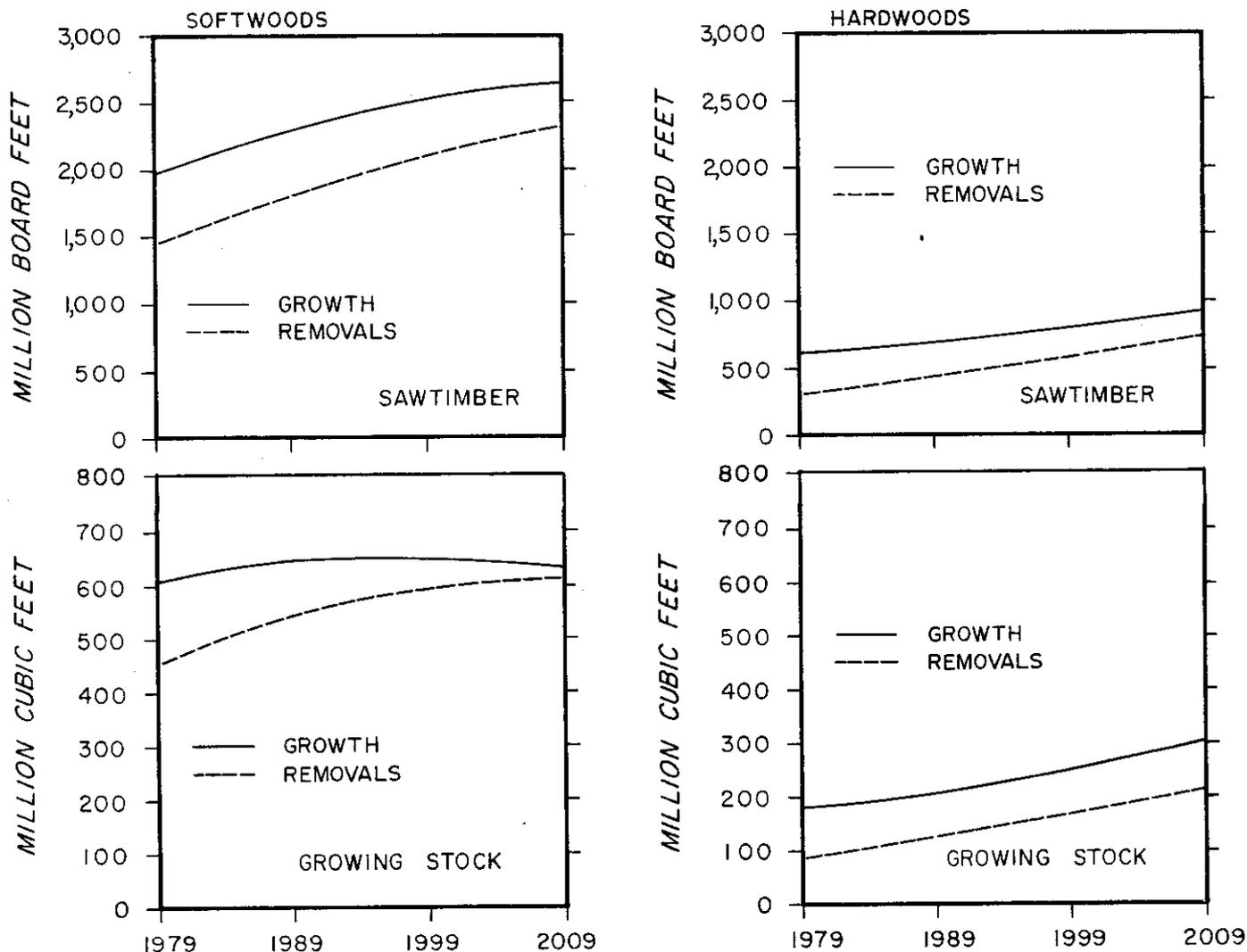


Figure 10.--Prospective growth and removals, Florida, 1980.

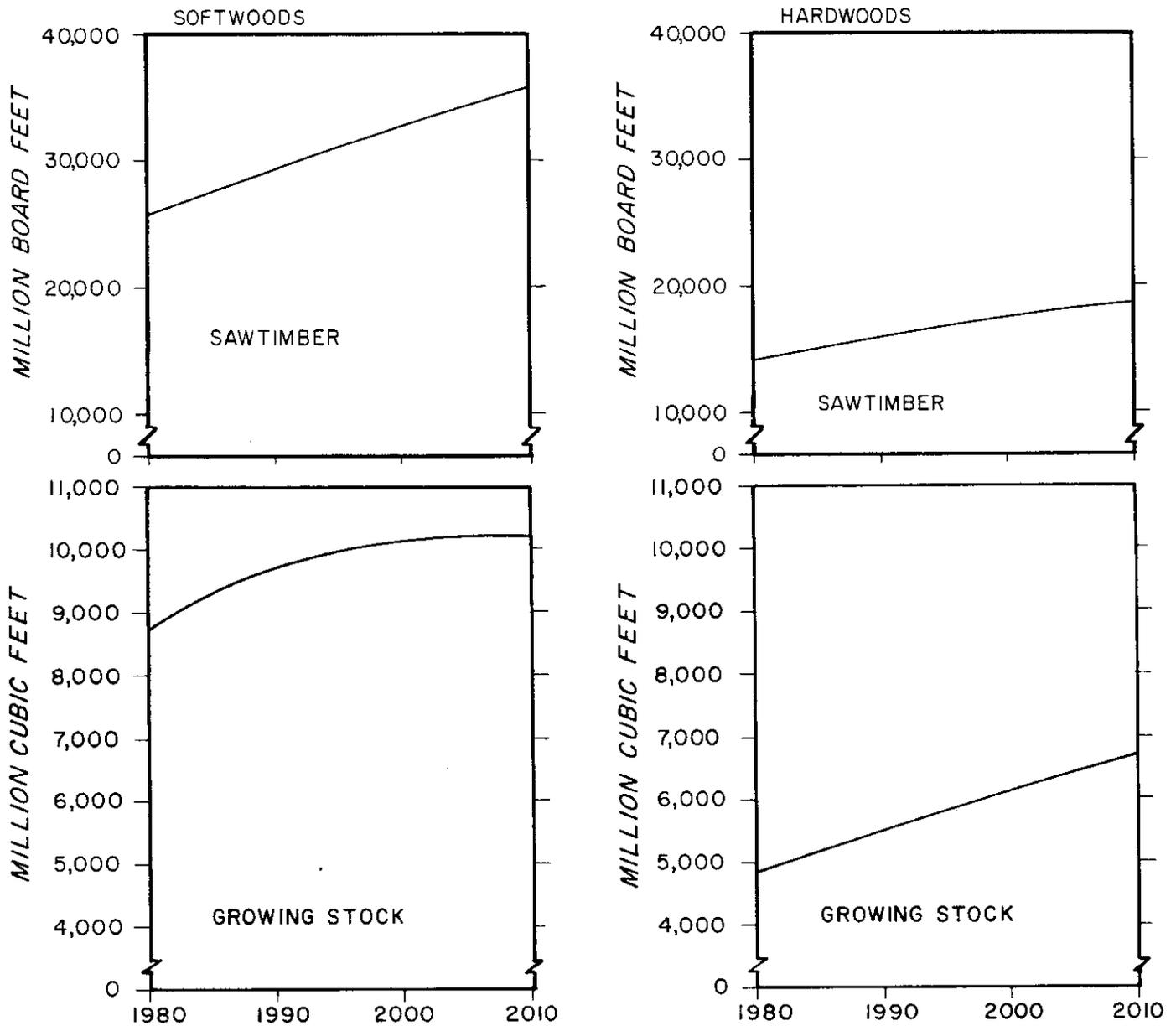


Figure 11.--Prospective inventory, Florida, 1980.

growth by the year 2009. However, a wide gap between softwood sawtimber growth and removals still exists because of increased sawtimber growth. By 2010, the inventory resulting from this combination of growth and removals will reach approximately 10.2 billion cubic feet of softwood growing stock and 35.7 billion board feet of softwood sawtimber, increases of 17 and 39 percent from the present inventory (fig. 11).

Fueled by increased ingrowth into the larger diameter classes, hardwood growth will continue to accelerate throughout the projection period (see

figure 10). Hardwood sawtimber growth does not increase as much as growing-stock growth because increased ingrowth has not fully filtered into the larger sawtimber-size classes. As stated in the assumptions, the gap between hardwood growth and removals is held constant at 1979 levels. At the end of the projection period, the inventory yielded by this combination of growth and removals will reach approximately 6.7 billion cubic feet of hardwood growing stock and 18.6 billion board feet of hardwood sawtimber, increases of 38 and 31 percent above present levels.

Potential Timber Supply Assumptions

Estimates of the potential timber supplies are based on the following assumptions:

1. Area of commercial forest land will decline by 1.3 million acres.-- This assumption is the same as that used in the prospective model.

2. The number of 2-inch softwoods will gradually increase, and the number of 2-inch hardwoods will gradually decrease.-- If increased planting efforts are undertaken soon, the effects of decreased softwood ingrowth into the larger diameter classes can be minimized.

3. Increased ingrowth will more than offset any acreage reduction.-- Reduced mortality rates and increased growth due to improved management will boost growth per acre slightly above the possible biological potential (based on site class) when all timberlands are fully stocked with natural stands. This assumption is certainly realistic because Florida has so much acreage in pine plantations.

4. Growth and removals will be brought into balance for both softwoods and hardwoods by 2009.

TRAS Potential Results

Based on the above assumptions, potential projections obtained from the TRAS model are displayed in figures 12 and 13. Both softwood growing-stock and sawtimber growth will increase throughout the projection period. Growing-stock growth will accelerate at a slightly lesser rate than sawtimber because of present depressed planting levels. Removals increase throughout the remeasurement period until 2009, when they come into balance with growth. At this point, a sustained inventory of 10.7 billion cubic feet of softwood growing stock and 38.6 billion board feet of softwood sawtimber is attained (fig. 13). The resulting inventory represents a 22 percent in-

crease of softwood growing stock, and a 50 percent increase of softwood sawtimber from present levels.

Growth of hardwood growing stock and sawtimber will continue to increase through the potential projection period. Present high levels of hardwood seedlings account for the accelerating hardwood growing-stock growth. Reduced mortality brought about by increased sawtimber removals helps to maintain increased hardwood sawtimber growth. Removals increase until they balance with growth by the year 2009. At this time, a sustained inventory of 6.1 billion cubic feet of growing stock and 16.3 billion board feet of sawtimber is achieved.

Comparison of Prospective and Potential Supplies

The potential softwood growing-stock growth exceeds the prospective by nearly 18 percent. Potential softwood growing-stock inventory by the year 2010 surpasses the prospective by 5 percent. Moreover, these increases in softwood growth and inventory would be available on a sustained basis despite a 20 percent higher cutting rate. The potential softwood sawtimber outlook exhibits similar improvements over the prospective. Softwood sawtimber growth and inventory could be increased by 7 and 8 percent over the prospective, and sawtimber removals could be increased by 21 percent if timber management is further intensified now.

Under the potential model, the hardwood growing-stock inventory would be reduced. This reduction would not necessarily inhibit any foreseeable expansion of the hardwood industry, because cutting rates can be increased on a sustained basis. If all stated assumptions hold true, hardwoods will comprise 40 percent of the total prospective growing-stock inventory but only 36 percent of the total potential inventory by 2010. The potential hardwood growing-stock growth is almost 5 percent less than the prospective, and the potential hardwood inventory is 9 percent less than the prospective. However, hardwood cutting rates under the potential model would be 37 percent higher than the prospective, and on a

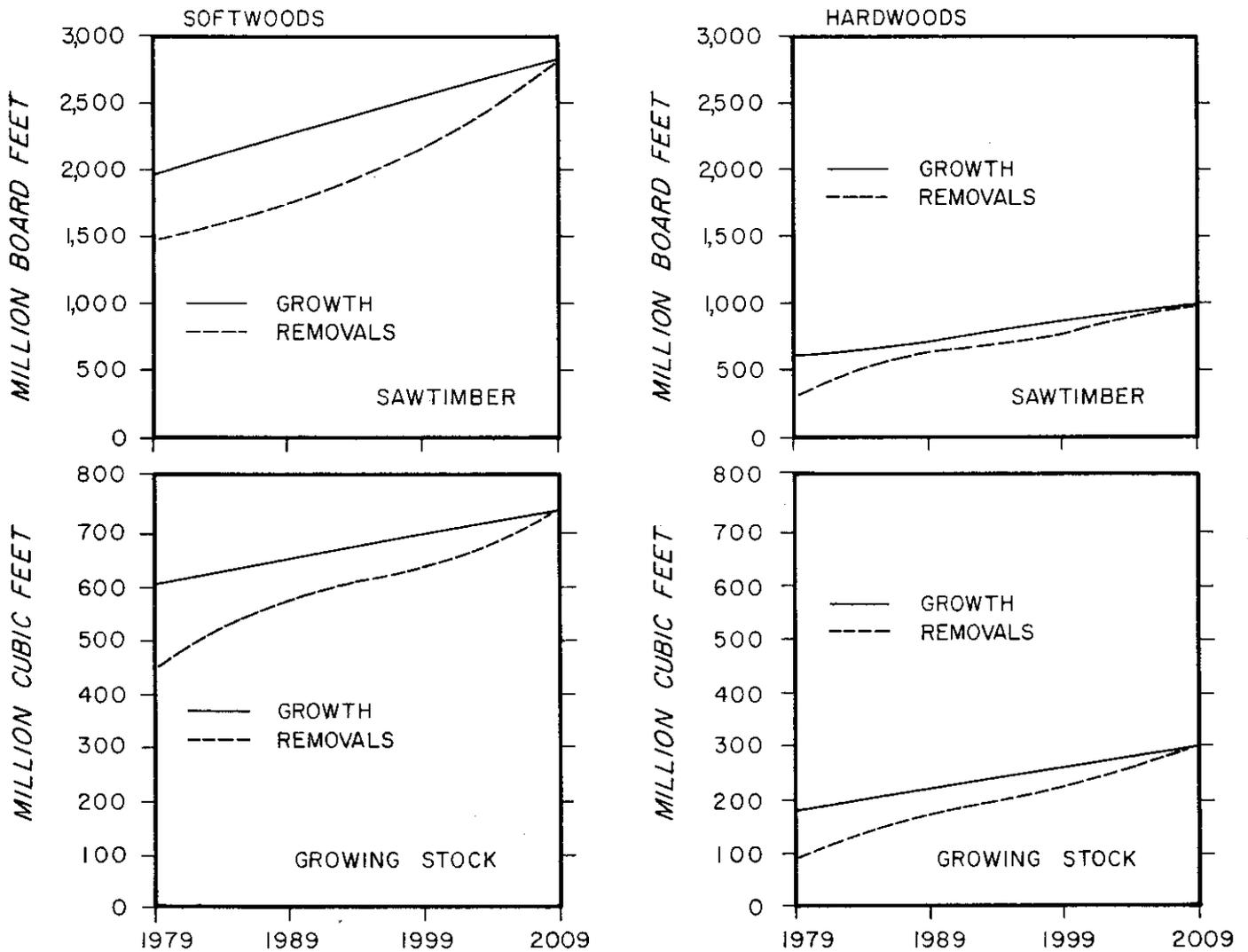


Figure 12.--Potential growth and removals, Florida, 1980.

sustained basis. Comparing the two models for hardwood sawtimber shows that the potential growth of hardwood sawtimber can be increased by 11 per-

cent, potential inventory reduced by 13 percent, and potential hardwood sawtimber removals increased by 40 percent over the prospective.

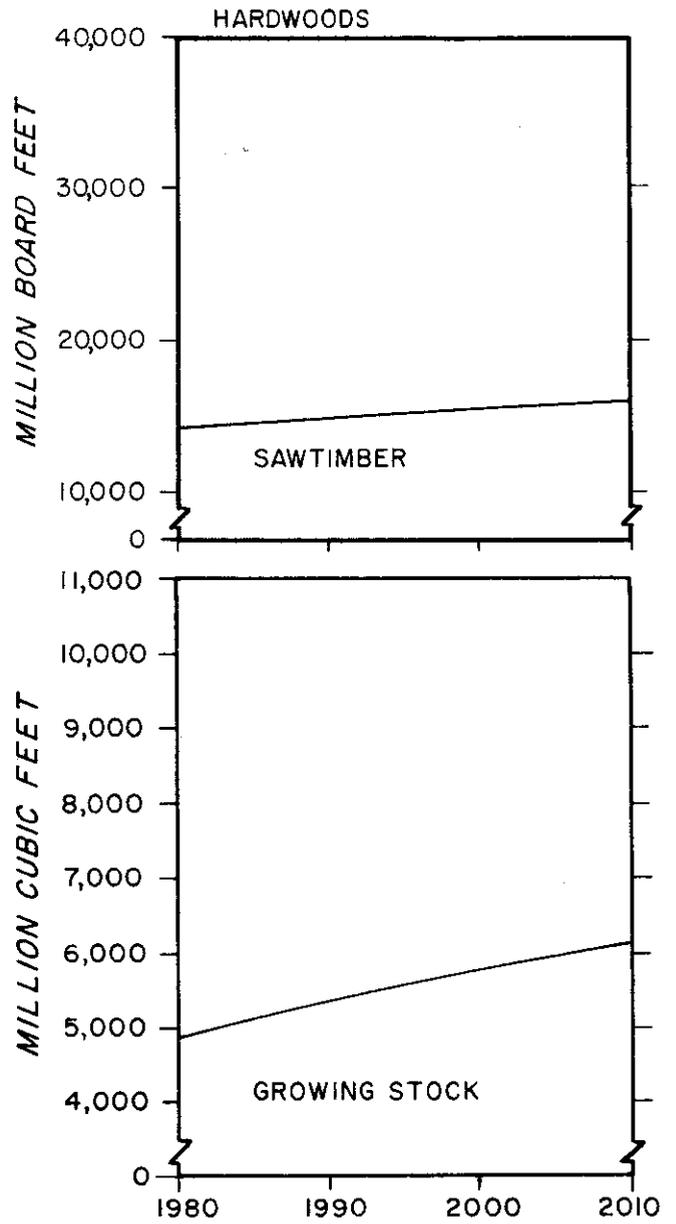
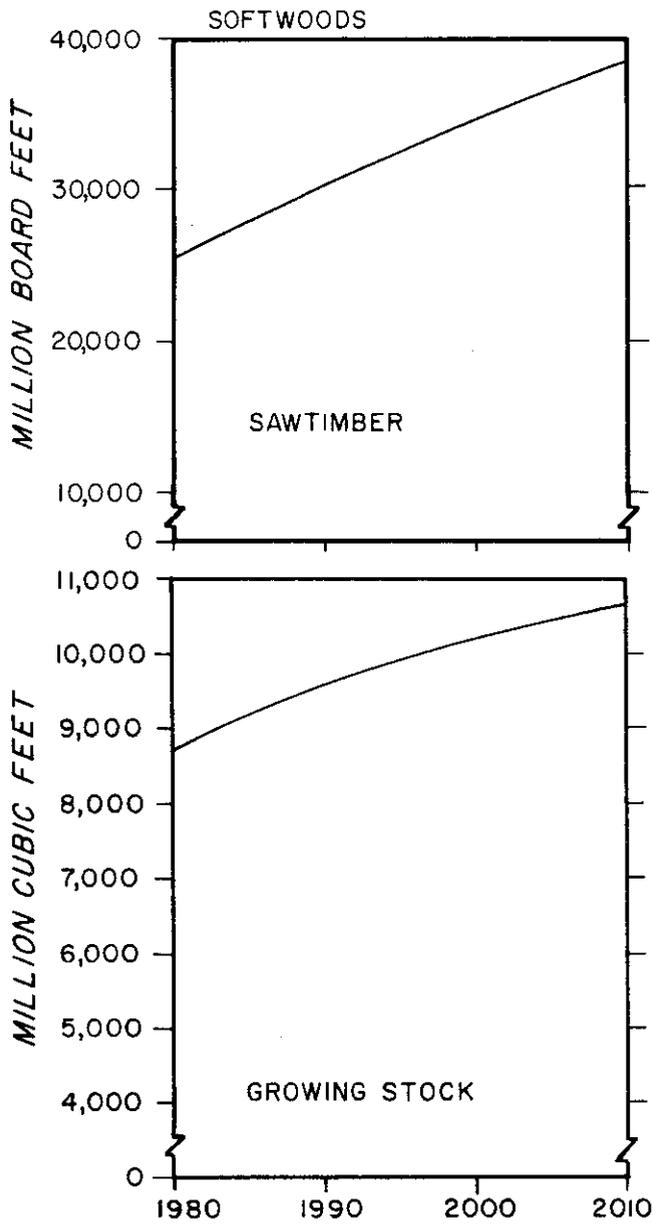


Figure 13.--Potential inventory, Florida, 1980.



MANAGEMENT OPPORTUNITIES

In the latest analysis of the timber situation in the United States, demand for roundwood timber in the country is projected to increase by over 89 percent between 1976 and 2010.⁴ As old-growth stands in the Western United States are harvested, forestry interests are focusing more attention on the South as an increasingly important source of timber. Rising demands on a diminishing forest-land base are certain to place heavy strains on Florida's forest resources. If these challenges are to be met, available opportunities to increase yields must be identified and implemented. Table VII provides a breakdown of various management opportunities in terms of acres by broad ownership classes.

Adverse Sites Limit Opportunities on 1.1 Million Acres

Adverse sites limit management on 1.1 million acres, or about 7 percent, of Florida's commercial forests. Most of these sites are limited by year-round water problems. Since 1970, only 15 percent of these sites have experienced any cutting or treatment. Most of these sites support bottom-land hardwood stands. For practical purposes, adverse sites have been excluded from the management opportunities in table VII.

Proportionately, the largest concentration of these sites is in Central Florida, where opportunities are limited on 17 percent of the total timberland. By ownership, the proportion of adverse sites on forest industry land is just slightly less than on public or NIPF land.

⁴ U.S. Department of Agriculture, Forest Service. An analysis of the timber situation in the United States, 1952-2030. Review draft. Washington, DC: U.S. Department of Agriculture, Forest Service; 1980. 789 p.

Over 7.2 Million Acres Are in Good Condition

More than 7.2 million acres, or 46 percent of the commercial forest land, support stands in relatively good condition. These stands are at least 50 to 60 percent stocked with trees of acceptable quality and are free from significant damage or competition. Pine plantations occupy 38 percent of this acreage, natural pine stands 32 percent, and hardwood stands (including oak-pine) 30 percent. Excluding adverse sites, 84 percent of all pine plantations are in good shape, 59 percent of all natural pine stands are in good condition, and 40 percent of all hardwood stands (including oak-pine) are in good condition. Protection and the prompt regeneration of harvested areas should sustain a high rate of timber growth on these lands.

By ownership class, 62 percent of the stands under forest industry control and suitable for management are in good condition, compared to 52 percent on public lands and 41 percent on other private holdings. By Survey Unit, 55 percent and 53 percent of all stands in Northeast Florida and Northwest Florida suitable for management are in good condition, compared to 32 percent and 31 percent in Central and South Florida.

Opportunities Exist on 7.3 Million Acres

Conditions on 7.3 million acres, or 47 percent, of Florida's timberland are inadequate for optimum timber production. Without treatment, these acres will contribute far below their potential yields. This evaluation identifies six management opportunities.

1. Salvage and regenerate seriously damaged stands on 80,000 acres.-- These stands contain substantial volume of merchantable timber which has been seriously damaged by fire, insects, disease, wind, ice, or other destruc-

Table VII.—Area of idle cropland and commercial forest land, by broad management, ownership, and treatment opportunity classes, Florida, 1980

Broad management and ownership classes ^a	Total area	Broad treatment opportunity classes							
		Salvage	Harvest	Commercial thinning	Other stand improvement	Stand conversion ^b	Regeneration	Stands in relatively good condition	Adverse sites or conditions ^c
<i>Thousand acres</i>									
Idle cropland:									
Public	—	—	—	—	—	—	—	—	—
Forest industry	—	—	—	—	—	—	—	—	—
Other private	593.5	—	—	—	—	—	593.5	—	—
Total	593.5	—	—	—	—	—	593.5	—	—
Nonstocked forest:									
Public	257.4	—	—	—	—	—	254.3	—	3.1
Forest industry	458.5	—	—	—	—	—	430.3	—	28.2
Other private	1,295.1	—	—	—	—	—	1,254.8	—	40.3
Total	2,011.0	—	—	—	—	—	1,939.4	—	71.6
Pine plantations:									
Public	293.1	—	—	10.1	15.7	—	6.3	261.0	—
Forest industry	2,093.1	9.3	—	138.8	65.1	—	62.3	1,813.9	3.7
Other private	881.1	9.8	—	93.6	50.6	7.6	37.7	681.8	—
Total	3,267.3	19.1	—	242.5	131.4	7.6	106.3	2,756.7	3.7
Natural pine stands:									
Public	987.1	8.4	26.8	32.2	53.8	3.1	223.5	620.7	14.6
Forest industry	988.6	7.7	11.3	46.8	49.3	—	216.2	650.3	7.0
Other private	1,944.1	9.8	46.0	64.7	119.6	—	664.4	1,025.9	13.7
Total	3,919.8	25.9	84.1	147.7	222.7	3.1	1,104.1	2,296.9	35.3
Oak-pine stands:									
Public	186.4	—	12.1	—	15.5	—	125.4	28.5	4.9
Forest industry	351.1	—	16.0	6.6	37.3	—	114.8	153.8	22.6
Other private	781.9	4.2	7.5	10.6	83.1	2.9	383.9	258.7	31.0
Total	1,319.4	4.2	35.6	17.2	135.9	2.9	624.1	441.0	58.5
Upland hardwood stands:									
Public	88.9	—	.3	—	5.0	2.1	62.4	19.1	—
Forest industry	202.7	—	3.5	—	25.3	12.2	78.3	79.9	3.5
Other private	948.0	—	35.8	3.3	78.3	32.1	442.7	351.4	4.4
Total	1,239.6	—	39.6	3.3	108.6	46.4	583.4	450.4	7.9
Bottomland hardwood stands:									
Public	365.3	5.9	34.5	—	15.3	2.7	47.5	115.7	143.7
Forest industry	1,343.1	7.1	115.7	43.9	138.9	14.8	285.5	484.5	252.7
Other private	2,198.7	18.2	182.5	55.4	168.8	15.6	503.1	687.9	567.2
Total	3,907.1	31.2	332.7	99.3	323.0	33.1	836.1	1,288.1	963.6
All classes:									
Public	2,178.2	14.3	73.7	46.3	105.3	7.9	719.4	1,045.0	166.3
Forest industry	5,437.1	24.1	146.5	236.1	315.9	27.0	1,187.4	3,182.4	317.7
Other private	8,642.4	42.0	271.8	227.6	500.4	58.2	3,880.1	3,005.7	656.6
Total	16,257.7	80.4	492.0	510.0	921.6	93.1	5,786.9	7,233.1	1,140.6

^aForest industry includes lands under long-term lease.

^bAreas occupied with species unsuitable for the site from the standpoint of timber production.

^cAreas where management opportunities are severely limited because of steep slopes or poor drainage.

tive agents. Risk of mortality for trees within these stands is high. The highest proportion of stands in need of salvage is found on NIPF land.

2. Harvest and regenerate mature and overmature stands on 492,000 acres.--These acres support old, high-risk stands with low growth and high mortality. The highest proportion of harvest opportunities is found on NIPF land.

3. Thin young, immature stands densely stocked with merchantable-size trees on 511,000 acres.--These acres support immature stands so heavily stocked that trees are receiving considerable competition from one another. Some of the future growth potential is likely to be lost to suppression mortality. Pine stands account for 76 percent of the commercial thinning opportunity. Because of dense planting during the Soil Bank era, high percentages of both NIPF and forest industry land are included in the thinning opportunity.

4. Remove undesirable trees and competing vegetation from other immature stands on 922,000 acres.--These acres support immature stands receiving serious competition from rough trees and other inhibiting vegetation. Some type of cleaning and release would enhance the future quality and growth of these stands. Oak-pine and other hardwood stands account for 62 percent of this timber stand improvement opportunity. The highest proportion of this opportunity is on NIPF land.

5. Convert stands with species obviously unsuitable for the site, from the standpoint of timber production, to more suitable species on 93,000 acres.--These acres support a manageable stand but will contribute very little net annual growth unless converted to species more suitable to the sites. About 85 percent of these acres support either upland or bottom-land hardwood stands. Many of these stands are on sites where low-grade hardwoods have replaced pines following a harvest.

Some pine stands were included in this opportunity where the existing species has been particularly susceptible to damage or disease. The highest proportion of conversion opportunity is on NIPF land.

6. Regenerate 5.2 million acres too poorly stocked with acceptable trees to manage for timber production.--These acres represent the backlog of needed regeneration on manageable sites in Florida. The addition of acres classified as idle cropland would add some 594,000 acres to this opportunity. Over 67 percent of all acres in this category occur on NIPF land.

Regenerate Acreage Harvested

NIPF land has the most opportunities for improvement of Florida's forests. Of the various treatment opportunities identified on 7.3 million acres of commercial forest, 60 percent occur on land controlled by private, nonindustrial owners. About 27 percent of the treatment opportunities on all manageable sites in commercial forest occur on forest industry land, and 13 percent occur on public land.

While examining opportunities available for increasing timber supplies, forestry interests in Florida should focus on the prompt regeneration of stands following final harvest. Altogether, recent rates of harvesting in Florida indicate a need to regenerate some 2.6 million acres to either manageable pine or hardwood each decade. Based on acreage identified as having no manageable stand, there is a backlog of 5.4 million acres in need of regeneration. Yet, only 1.4 million acres were adequately regenerated to either pine or hardwood over the last decade (see figure 9).

Of the 2.6 million acres harvested and retained in forest, only 33 percent were subsequently artificially regenerated. On forest industry land, about 51 percent of the final acres harvested and retained in forest were subsequently artificially regenerated. On public land, 32 percent were artificially regenerated. On NIPF land, only

8 percent of all commercial forest acres harvested and retained in forest were subsequently artificially regenerated. Failure to promptly regenerate harvested stands is the major cause of poor stocking. Corrective actions taken several years after the harvest are more costly and do not attack the source of the problem. Every year of delay results in substantial growth loss. If the landowner is to control the species composition and condition of his forest, it is vital that he exercise this control at the time of harvest.

Plant Idle Acres

Over and above the acres planted in conjunction with a final harvest, an additional 487,000 acres were planted over the last decade. About 55 percent of these acres were planted on land controlled by forest industry, 31 percent on NIPF land, and 14 percent on public land (see table VI).

Of the 5.4 million acres in need of regeneration, 5.2 million occur on manageable sites. Of the 5.2 million acres on manageable sites, about 191,000 acres could be regenerated with minimum effort. Included in this estimate are acres that had been site-prepared but not yet planted at the time of survey and acres that could be regenerated without any preliminary site preparation.

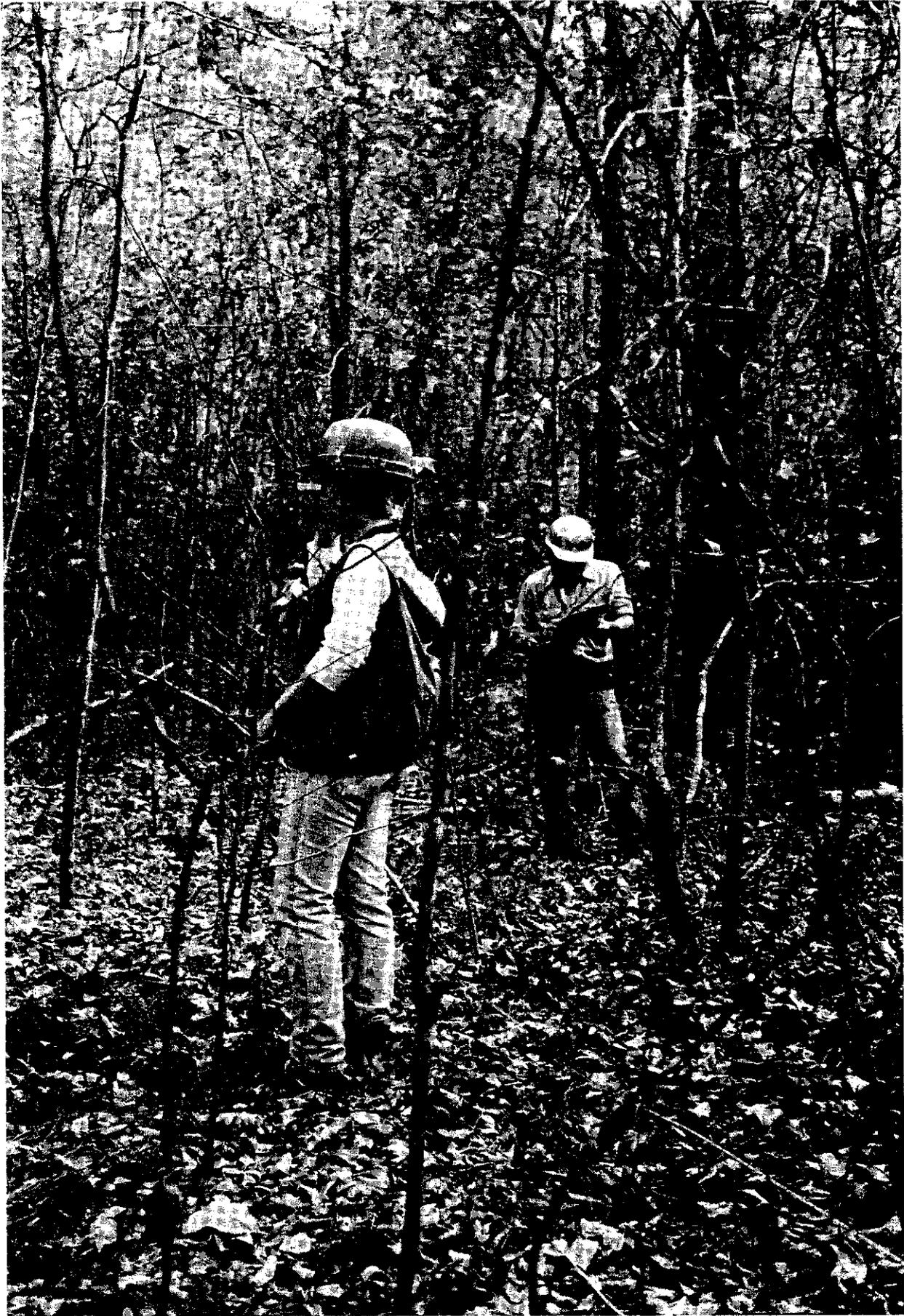
In addition, there are 594,000 acres of idle NIPF cropland that could

easily be planted to trees. In the past, such land has been the primary source of new forest acreage. Owners receptive to the idea of planting trees on these acres should be encouraged to do so. Site preparation and planting costs are considerably less on these acres than on cutover or poorly stocked forest land.

Help for NIPF Owners

The inventory findings clearly show that a disproportionately high percentage of NIPF land is in need of some forestry treatment. Of most concern is the high percentage of harvesting without regeneration. If Florida is to meet future demands on its timber resources, NIPF land must be managed more productively.

Since 1974, the Forestry Incentives Program (FIP) has been available to assist small NIPF landowners. Other Federal aid is provided in the form of tax incentives as outlined in the Reforestation Tax Credit Bill, approved in late 1980. Professional advice and services are also available to NIPF landowners through forestry consultants, the Division of Forestry, Florida Department of Agriculture and Consumer Services, and the University of Florida Cooperative Extension Service. In addition, some wood-using companies offer landowners technical assistance through various agreements made at the time of harvest.



APPENDIX

PROCEDURE

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

1. Except for South Florida, initial estimates of forest and non-forest acreages were developed from the classification of 69,766 sample clusters systematically spaced on the latest aerial photographs available. Field crews checked a subsample of 9,566 of these 16-point clusters on the ground. A linear regression was fitted to the data to develop the relationship between the photo and ground classification of the subsample. This procedure provided a means for adjusting the initial acreage estimates for change in land use since date of photography and for photo misclassifications.

2. In South Florida, estimates of forest and nonforest acreages were developed 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 24,471 sample points along the flight lines. An interval timer was used to determine the sample points. This direct aerial method was not used in the Keys because of their unique geographical layout. Instead, gross area estimates were made by planimeter of the U.S. Geological Survey boundaries as transferred from maps onto aerial photographs. The breakdowns of gross acreage into detailed land use were based upon the ground classification of 45 sample locations.

3. For the entire State, estimates of timber volume and forest classifications were based on measurements recorded at 4,680 ground sample locations systematically distributed within the commercial forest land. The plot

design at each location was based on a cluster of 10 points. In most cases, variable plots were systematically spaced within a single forest condition at 5 of the 10 cluster points using a basal-area factor of 37.5 square feet per acre. Trees less than 5.0 inches d.b.h. were tallied on fixed-radius plots around the point centers.

4. 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, soils, erosion, litter, water, snags, and tree-bole cavities.

5. 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. In addition, felled trees were measured at 97 active cutting operations to provide utilization factors for the different timber products and species groups and to supplement the standing-tree volume study.

6. Growth, removals, and mortality were estimated from the remeasurement of 4,614 permanent sample plots established in the 1970 inventory. A 1979 survey of timber products output, conducted by the Division of Forestry, Florida Department of Agriculture and Consumer Services, along with the annual pulpwood production study in the South, provided additional information for breakdowns of removals by product.

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

8. The Department of Defense provided special support for the inventory of lands on Eglin Air Force Base. Through a cooperative agreement, an additional 365 forest sample plots were established on Eglin Air Force Base to provide information needed for a special assessment of the Eglin forests.

9. Other special studies conducted in conjunction with this fifth inventory of Florida's forest resources included the sampling of (1) major bio-

mass components, and (2) occurrence of melaleuca. The Division of Forestry, Florida Department of Agriculture and Consumer Services, provided special support for each of these studies.

10. All field data were sent to Asheville to be edited, punched on cards, and stored on magnetic tape for computer processing, sorting, and tabulating. Final estimates were based on statistical summaries of the data. As each of the four Survey Units in Florida was completed, special summaries of the information were added to master data files of forest resource statistics maintained in Asheville for the entire Southeast. A Forest Information Retrieval (FIR) program is available for compiling information for any area of interest as a cooperative service.

RELIABILITY OF THE DATA

Statistical analysis of the data indicates a sampling error of ± 0.70 percent for the estimate of total commercial forest area, 1.75 percent for the total cubic-foot volume, 1.67 percent for total cubic-foot volume growth, and 3.88 percent for total cubic-foot removals. As the totals are

broken down by forest type, species, tree diameter, and other subdivisions, the sampling error increases. If homogeneity of variances is assumed, the order of this increase is suggested in the following tabulation showing the sampling errors in terms of one standard error, or two chances out of three.

Sampling errors for selected areas and volumes^a

Sampling error ^b (percent)	Commercial forest area	Volume of growing stock		
		Inventory	Net growth	Removals
	<u>M acres</u>	<u>Million cubic feet</u>		
1	7,675.5	--	--	--
2	1,918.9	10,427.7	547.7	--
3	852.8	4,634.5	243.4	--
4	479.7	2,606.9	136.9	509.7
5	307.0	1,668.4	87.6	326.2
10	76.8	417.1	21.9	81.5
15	34.1	185.4	9.7	36.2
20	19.2	104.3	5.5	20.4
25	12.3	66.7	3.5	13.0

^a Sampling error of breakdowns of county and unit totals may be computed with the following formula:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Hard hardwoods.—Hard-textured hardwoods such as sugar maple, birch, hickory, dogwood, persimmon (forest grown),

black locust, beech, ash, honeylocust, holly, black walnut, mulberry, and all commercial oaks.

Idle farmland.—Includes former croplands, orchards, improved pastures and farm sites not tended within the past 2 years, and presently less than 16.6 percent stocked with trees.

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

Industrial wood.—All roundwood products except fuelwood.

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

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

Land area.—The area of dry land and land temporarily or partly covered by water such as marshes, swamps, and river flood plains (omitting tidal flats below mean high tide), streams, sloughs, estuaries, and canals less than 1/8 of a statute mile in width, and lakes, reservoirs, and ponds less than 40 acres in area.

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

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

Manageable stand.—Commercial forest land at least 50-60 percent stocked with growing-stock trees which can be featured together under a management scheme.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Saw-log portion.—That part of the bole of sawtimber trees between the stump and the saw-log top.

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

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

Sawtimber volume.—Net volume of the saw-log portion of live sawtimber in board-foot International $\frac{1}{4}$ -inch rule.

Seedlings.—Live trees less than 1.0 inch in diameter at breast height that are expected to survive and develop.

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

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

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

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

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

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

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

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

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

Stand size class.—A classification of forest land based on the diameter class of growing-stock trees on the area.

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

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

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

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

Stocking.—The degree of occupancy of land by trees, measured by basal area or the number of trees in a stand and spacing in the stand, compared to a minimum standard, depending on tree size, to fully utilize the growth potential of the land. (See table at end of definitions.)

Fully stocked.—100 percent or more stocking

Medium stocked.—60 to 100 percent stocking

Poorly stocked.—Less than 60 percent stocking

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

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

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

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

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

Urban and other areas.—Areas within the legal boundaries of cities and towns, suburban areas developed for residential, industrial, or recreational purposes; school yards, cemeteries; roads; railroads; airports; beaches; powerlines and other rights-of-way; or other nonforest land not included in any other specified land use class.

STOCKING STANDARD

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

^aStocking percentages based on tally at all 10 points of a 10-point cluster of plots. Trees less than 5 inches d.b.h. were tallied on circular, 1/300-acre plots at each point. Trees 5.0 inches d.b.h. and larger were tallied on variable plots using a basal-area factor of 37.5 at each sample point.

- Overstocked—over 130 percent
- Fully stocked—100–130 percent
- Medium stocked—60–99 percent
- Poorly stocked—16.7–59 percent
- Nonstocked—less than 16.7 percent

CONVERSION FACTORS

Cubic feet of wood per average cord (excluding bark)

D.b.h	Pine	Other softwoods	Hardwood
6	61.0	68.2	60.0
8	68.1	76.0	68.4
10	73.1	81.4	73.4
12	76.7	85.2	76.4
14	79.4	88.1	78.4
16	81.6	90.4	79.8
18	83.4	92.3	80.8
20	84.8	93.8	81.5
22	86.0	95.2	82.1
24+	87.5	98.3	83.2
Average	71.9	81.8	74.3

$$\text{Rough cords per M cubic feet (without bark)} = a + b \left(\frac{1}{\text{d.b.h.}} \right) + c \left(\frac{1}{\text{d.b.h.}} \right)^2$$

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

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Table 1.—Area by land classes, Florida, 1980

Land class	Area
	<i>Acres</i>
Forest land:	
Commercial	15,664,177
Productive-reserved	411,844
Unproductive	1,057,868
Total	17,133,889
Nonforest land:	
Cropland	3,784,515
Pasture and range	6,991,503
Other ^a	6,622,456
Total	17,398,474
All land ^b	34,532,363

^aIncludes swampland, industrial and urban areas, other non-forest land, and 469,663 acres classed as water by Forest Survey standards but defined by Bureau of Census and Geological Survey as land.

^bFrom U.S. Bureau of Census, Land and Water Area of the United States, 1970, and U.S. Geological Survey.

Table 2.—Area of commercial forest land, by ownership classes, Florida, 1980

Ownership class	Area
	<i>Acres</i>
National Forest	1,005,757
Other Federal:	
Bureau of Land Management	—
Indian	6,305
Miscellaneous Federal	583,901
Total	590,206
State	541,535
County and municipal	40,682
Forest industry ^a	4,696,802
Farmer-owned	1,954,498
Miscellaneous private:	
Individual	3,859,384
Corporate	2,975,313
Total	6,834,697
All ownerships	15,664,177

^aNot including 740,321 acres of farmer-owned and miscellaneous private lands leased to forest industry.

Table 3.—Area of commercial forest land, by stand size and ownership class, Florida, 1980

Stand-size class	All ownerships	National Forest	Other public	Forest industry	Farmer and misc. private
	<i>Acres</i>				
Sawtimber	4,966,076	417,085	501,567	1,140,360	2,907,064
Poletimber	4,119,935	234,461	230,594	1,317,045	2,337,835
Sapling and seedling	4,567,087	255,408	281,647	1,830,463	2,199,569
Nonstocked	2,011,079	98,803	158,615	408,934	1,344,727
All classes	15,664,177	1,005,757	1,172,423	4,696,802	8,789,195

Table 4.—Area of commercial forest land, by stand volume and ownership class, Florida, 1980

Stand volume per acre ^a	All ownerships	National Forest	Other public	Forest industry	Farmer and misc. private
	<i>Acres</i>				
Less than 1,500 fbm	9,062,092	479,555	609,110	3,040,053	4,933,374
1,500 to 5,000 fbm	3,706,392	289,347	298,455	912,079	2,206,511
More than 5,000 fbm	2,895,693	236,855	264,858	744,670	1,649,310
All classes	15,664,177	1,005,757	1,172,423	4,696,802	8,789,195

^aInternational ¼-inch rule.

Table 6.—Area of commercial forest land, by ownership and stocking class,^a with percent occupancy by selected stand components, Florida, 1980

Ownership and stocking class	Area	Stand components					
		Growing-stock trees			Rough and rotten trees	Inhibiting vegetation	Nonstocked
		Total	Desirable	Acceptable			
		<i>Acres</i> <i>Percent of area</i>					
National Forest:							
Fully stocked	220,228	95.5	14.1	81.4	4.5	—	—
Medium stocked	423,153	76.8	17.4	59.4	10.0	9.6	3.7
Poorly stocked	362,376	31.2	5.2	26.0	20.1	33.8	14.9
All stands	1,005,757	66.1	12.4	53.6	12.0	15.4	6.5
Other public:							
Fully stocked	265,855	95.0	18.6	76.4	5.0	—	—
Medium stocked	347,905	74.3	16.2	58.1	15.1	6.4	4.1
Poorly stocked	558,663	26.9	8.8	18.1	35.7	20.7	16.6
All stands	1,172,423	58.3	13.5	44.8	21.8	11.2	8.7
Forest industry:							
Fully stocked	1,609,516	96.2	17.0	79.2	3.8	—	—
Medium stocked	1,678,834	78.1	18.1	60.0	10.7	7.9	3.3
Poorly stocked	1,408,452	30.1	6.2	23.8	21.8	32.6	15.5
All stands	4,696,802	71.6	14.4	57.2	11.1	11.8	5.4
Farmer & misc. private:							
Fully stocked	2,123,761	95.3	12.7	82.5	4.7	—	—
Medium stocked	2,735,563	76.3	12.3	63.9	14.3	5.7	3.7
Poorly stocked	3,929,871	26.7	6.6	20.1	33.1	24.3	15.9
All stands	8,789,195	60.3	10.0	50.3	19.7	12.1	7.9
All ownerships:							
Fully stocked	4,219,360	95.6	14.9	80.7	4.4	—	—
Medium stocked	5,185,455	76.7	14.9	61.8	12.9	6.8	3.6
Poorly stocked	6,259,362	27.7	6.7	21.0	30.2	26.2	15.8
All stands	15,664,177	63.7	11.8	52.0	16.9	12.1	7.2

^aBased on degree of growing-stock stocking.

Table 7.—Area of commercial forest land, by site and ownership class, Florida, 1980

Site class	All ownerships	National Forest	Other public	Forest industry	Farmer and misc. private
<i>Acres</i>					
165 ft ³ or more	10,344	—	—	3,854	6,490
120-165 ft ³	168,434	2,971	16,025	44,086	105,352
85-120 ft ³	1,918,232	103,798	134,539	652,662	1,027,233
50-85 ft ³	8,886,262	542,421	565,457	2,911,108	4,867,276
Less than 50 ft ³	4,680,905	356,567	456,402	1,085,092	2,782,844
All classes	15,664,177	1,005,757	1,172,423	4,696,802	8,789,195

Table 8.—Area of commercial forest land, by forest type and ownership class, Florida, 1980

Type	All ownerships	Public	Private
<i>Acres</i>			
Softwood types:			
Longleaf pine	1,242,811	447,094	795,717
Slash pine	5,297,588	553,728	4,743,860
Loblolly pine	411,759	17,452	394,307
Shortleaf pine	37,206	744	36,462
Eastern red cedar	—	—	—
Sand pine	537,348	283,848	253,500
Pond pine	233,028	65,867	167,161
Spruce pine	9,784	—	9,784
Total	7,769,524	1,368,733	6,400,791
Hardwood types:			
Oak-pine	1,424,133	212,276	1,211,857
Oak-hickory	1,130,568	58,176	1,072,392
Southern scrub oak	1,002,703	139,570	863,133
Oak-gum-cypress	4,271,148	391,398	3,879,750
Elm-ash-cottonwood	66,101	8,027	58,074
Total	7,894,653	809,447	7,085,206
All types	15,664,177	2,178,180	13,485,997

Table 9.—Area of noncommercial forest land, by forest type, Florida, 1980

Type	All areas	Productive-reserved areas	Unproductive areas
<i>Acres</i>			
Longleaf-slash pine	154,457	100,968	53,489
Loblolly-shortleaf pine	—	—	—
Oak-pine	—	—	—
Oak-hickory	66,365	40,890	25,475
Oak-gum-cypress ^a	1,242,161	269,986	972,175
Elm-ash-cottonwood	6,729	—	6,729
All types	1,469,712	411,844	1,057,868

^aIncludes tropical and other noncommercial forest types.

Table 10.—Number of growing-stock trees on commercial forest land, by species and diameter class, Florida, 1980

Species	All classes	Diameter class (inches at breast height)										29.0 and larger
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9		
..... Thousand trees												
Softwood:												
Longleaf pine	126,371	35,001	27,965	29,583	20,947	9,142	2,798	613	163	159	—	
Slash pine	654,324	377,303	165,101	28,126	13,050	2,172	5,920	834	499	9		
Shortleaf pine	5,473	2,447	1,093	588	467	92	26	21	—	—		
Loblolly pine	44,819	16,338	8,388	6,444	5,480	3,552	2,014	1,228	599	563	13	
Pond pine	24,180	10,053	6,003	3,763	2,561	978	413	221	135	53	—	
Spruce pine	2,030	478	306	438	306	21	190	176	70	45	—	
Sand pine	55,280	31,399	13,259	6,977	2,237	962	351	85	—	10	—	
Baldcypress	41,152	12,811	9,433	6,434	4,606	3,072	1,811	1,338	749	782	116	
Pondcypress	241,279	99,101	66,065	38,977	19,783	9,954	4,221	1,631	837	659	51	
Cedars	8,309	3,120	1,792	1,323	858	662	350	153	24	27	—	
Total	1,203,217	588,051	299,405	156,134	85,492	41,860	18,160	7,671	3,437	2,818	189	
Hardwood:												
Select white oaks ^a	2,392	598	563	294	277	357	185	43	61	8	6	
Select red oaks ^b	264	115	—	62	28	31	—	—	12	16	—	
Other white oaks	16,602	4,549	2,348	2,266	1,520	1,641	905	1,008	679	1,325	361	
Other red oaks	97,787	37,568	22,891	15,185	8,690	5,403	3,141	2,003	1,037	1,601	268	
Hickory	10,104	2,908	2,796	1,296	1,213	867	456	316	97	144	11	
Hard maple	793	150	209	96	164	47	55	59	13	—	—	
Soft maple	38,517	14,659	8,935	5,856	4,206	2,473	1,286	590	239	260	13	
Beech	289	—	69	—	102	27	—	29	24	33	5	
Sweetgum	46,903	18,056	12,540	6,740	4,320	2,743	1,340	460	409	274	21	
Tupelo and blackgum	138,808	57,760	30,289	18,825	13,449	8,389	4,484	2,493	1,487	1,502	130	
Ash	33,050	14,978	6,760	4,927	2,550	1,732	906	576	402	211	8	
Cottonwood	117	105	—	—	—	—	—	—	12	—	—	
Basswood	731	114	213	134	114	44	68	25	12	7	—	
Yellow-poplar	3,929	1,205	828	623	675	275	80	100	114	29	—	
Bay and magnolia	77,492	37,483	16,742	10,179	6,314	3,153	1,774	933	546	335	33	
Black cherry	688	264	232	59	82	34	17	—	—	—	—	
Black walnut	52	—	52	—	—	—	—	—	—	—	—	
Sycamore	179	—	69	—	36	—	18	29	12	15	—	
Elm	7,696	3,269	1,850	957	609	548	212	129	60	58	4	
Other eastern hardwoods	6,808	3,022	1,953	755	562	272	127	95	13	9	—	
Total	483,201	196,803	109,339	68,254	44,911	28,036	15,054	8,888	5,229	5,827	860	
All species	1,686,418	784,854	408,744	224,388	130,403	69,896	33,214	16,559	8,666	8,645	1,049	

^aIncludes white, swamp white, swamp chestnut, and chinquapin oaks.
^bIncludes cherrybark, northern red, and Shumard oaks.

Table 11.—Volume of timber on commercial forest land, by class of timber, and by softwood and hardwood, Florida, 1980

Class of timber	All species	Softwood	Hardwood
<i>..... Thousand cubic feet</i>			
Sawtimber trees:			
Saw-log portion	7,906,714	5,116,485	2,790,229
Upper-stem portion	826,741	457,028	369,713
Total	8,733,455	5,573,513	3,159,942
Poletimber trees	4,886,433	3,156,585	1,729,848
All growing-stock trees	13,619,888	8,730,098	4,889,790
Rough trees:			
Sawtimber-size trees	775,498	50,818	724,680
Poletimber-size trees	817,572	70,746	746,826
Total	1,593,070	121,564	1,471,506
Rotten trees:			
Sawtimber-size trees	159,535	28,821	130,714
Poletimber-size trees	28,629	3,762	24,867
Total	188,164	32,583	155,581
Salvable dead trees:			
Sawtimber-size trees	15,367	12,128	3,239
Poletimber-size trees	11,398	9,811	1,587
Total	26,765	21,939	4,826
All timber	15,427,887	8,906,184	6,521,703

Table 12.—Volume of growing stock and sawtimber on commercial forest land, by ownership class, and by softwood and hardwood, Florida, 1980

Ownership class	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
		<i>Thousand cubic feet</i>			<i>Thousand board feet^a</i>	
National Forest	1,082,501	893,733	188,768	3,494,336	2,994,096	500,240
Other public	1,068,660	788,019	280,641	3,701,304	2,901,208	800,096
Forest industry	3,751,392	2,321,813	1,429,579	9,871,204	5,839,823	4,031,381
Farmer and misc. private	7,717,335	4,726,533	2,990,802	22,784,588	13,889,161	8,895,427
All ownerships	13,619,888	8,730,098	4,889,790	39,851,432	25,624,288	14,227,144

^aInternational ¼-inch rule.

Table 13.—Volume of growing stock on commercial forest land, by species and diameter class, Florida, 1980

Species	All classes	Diameter class (inches at breast height)											29.0 and larger
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9			
<i>Thousand cubic feet</i>													
Softwood:													
Longleaf pine	1,363,747	87,305	174,098	337,173	390,041	236,204	91,573	27,882	8,959	10,512	—	—	—
Slash pine	3,771,997	880,062	953,936	676,314	518,430	343,673	211,998	99,134	48,833	38,229	1,388	—	—
Shortleaf pine	52,812	7,000	6,858	6,666	11,092	12,390	3,161	2,480	1,736	1,429	—	—	—
Loblolly pine	587,121	32,019	47,403	72,263	104,101	98,503	78,181	63,342	39,102	50,009	2,198	—	—
Pond pine	184,585	20,073	28,502	35,746	40,874	22,900	14,604	10,330	7,204	4,352	—	—	—
Spruce pine	38,157	1,188	1,779	4,239	5,839	459	7,630	9,247	4,378	3,398	—	—	—
Sand pine	325,894	86,622	86,995	77,631	37,269	22,613	10,364	3,683	—	717	—	—	—
Baldcypress	554,209	40,521	59,406	70,176	78,209	75,562	58,805	57,008	39,709	56,731	18,082	—	—
Pondcypress	1,773,899	252,243	373,742	379,557	303,274	210,544	115,091	55,480	36,129	39,898	7,941	—	—
Cedars	77,677	7,503	9,330	13,601	13,032	14,840	10,400	6,144	1,179	1,648	—	—	—
Total	8,730,098	1,414,536	1,742,049	1,673,366	1,502,161	1,037,688	601,807	334,730	187,229	206,923	29,609	—	—
Hardwood:													
Select white oaks ^a	31,731	1,193	2,458	2,872	4,992	7,342	6,208	1,876	3,405	557	828	—	—
Select red oaks ^b	4,177	386	—	581	687	723	—	—	695	1,105	—	—	—
Other white oaks	394,887	9,655	11,868	18,198	23,609	37,956	29,155	44,072	36,424	109,500	74,450	—	—
Other red oaks	1,034,546	92,523	123,344	150,427	138,573	125,646	96,976	83,542	53,699	125,788	44,028	—	—
Hickory	123,892	5,546	13,661	12,419	19,730	22,615	15,009	15,494	6,573	11,133	1,712	—	—
Hard maple	13,027	170	1,330	1,078	2,848	1,443	2,289	3,016	853	—	—	—	—
Soft maple	370,500	35,998	49,172	58,229	68,919	56,856	41,386	24,369	13,218	20,649	1,704	—	—
Beech	10,534	—	492	—	1,697	770	—	1,586	1,350	3,651	988	—	—
Sweetgum	453,664	36,672	66,883	71,163	81,492	75,122	48,831	22,612	24,783	22,476	3,630	—	—
Tupelo and blackgum	1,339,581	139,190	160,201	184,157	222,078	199,110	139,357	100,806	74,332	102,179	18,171	—	—
Ash	313,323	35,650	38,340	51,632	43,067	43,763	33,972	25,930	22,452	17,690	827	—	—
Cottonwood	1,036	394	—	—	—	—	—	—	642	—	—	—	—
Basswood	11,111	282	1,282	1,507	1,975	1,256	2,133	1,180	644	852	—	—	—
Yellow-poplar	50,623	2,685	5,005	6,750	13,194	6,724	2,587	4,468	6,818	2,392	—	—	—
Bay and magnolia	604,061	91,453	91,706	102,151	102,012	70,177	53,422	37,583	27,830	23,193	4,534	—	—
Black cherry	3,922	736	856	436	982	535	377	—	—	—	—	—	—
Black walnut	182	—	182	—	—	—	—	—	—	—	—	—	—
Sycamore	5,555	—	686	—	622	—	784	1,295	624	1,544	—	—	—
Elm	72,141	6,020	10,045	9,893	10,192	13,715	7,113	5,714	3,696	4,758	995	—	—
Other eastern hardwoods	51,297	5,567	9,600	7,124	10,264	7,133	4,958	4,585	1,105	961	—	—	—
Total	4,889,790	464,120	587,111	678,617	746,933	670,886	484,557	378,128	279,143	448,428	151,867	—	—
All species	13,619,888	1,878,656	2,329,160	2,351,983	2,249,094	1,708,574	1,086,364	712,858	466,372	655,351	181,476	—	—

^aIncludes white, swamp chestnut, and chinquapin oaks.
^bIncludes cherrybark, northern red, and Shumard oaks.

Table 14.—Volume of sawtimber on commercial forest land, by species and diameter class, Florida, 1980

Species	All classes	Diameter class (inches at breast height)										29.0 and larger
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9				
..... Thousand board feet												
Softwood:												
Longleaf pine	5,331,988	1,370,921	1,876,651	1,260,688	527,142	169,692	56,876	70,018	—	—	—	—
Slash pine	9,047,785	2,512,239	2,377,267	1,786,018	1,203,196	596,467	308,075	254,349	10,174	—	—	—
Shortleaf pine	189,080	24,655	49,188	63,040	17,581	14,820	10,663	9,133	—	—	—	—
Loblolly pine	2,607,144	254,061	459,636	498,283	433,355	374,358	242,633	329,280	15,538	—	—	—
Pond pine	646,998	133,241	185,771	116,674	80,362	59,747	43,694	27,509	—	—	—	—
Spruce pine	174,252	18,486	27,202	2,259	38,189	47,290	22,779	18,047	—	—	—	—
Sand pine	663,084	289,329	170,732	117,658	58,413	22,265	—	4,687	—	—	—	—
Baldcypress	2,060,355	201,272	290,673	327,463	281,585	293,307	216,151	332,126	117,778	—	—	—
Pondcypress	4,605,232	1,163,223	1,178,346	934,682	558,991	287,786	197,820	232,247	52,137	—	—	—
Cedars	298,370	53,490	59,936	75,338	56,725	35,656	6,976	10,249	—	—	—	—
Total	25,624,288	6,020,917	6,675,402	5,182,103	3,255,539	1,901,388	1,105,667	1,287,645	195,627	—	—	—
Hardwood:												
Select white oaks ^a	108,427	—	16,643	28,352	27,519	9,586	17,229	3,490	5,608	—	—	—
Select red oaks ^b	15,606	—	2,626	2,792	—	—	3,789	6,399	—	—	—	—
Other white oaks	1,925,802	—	84,766	160,205	136,097	222,886	195,013	637,058	489,777	—	—	—
Other red oaks	3,247,371	—	520,024	546,433	459,112	426,297	288,597	727,789	279,119	—	—	—
Hickory	408,605	—	67,037	91,399	67,233	75,730	34,646	62,047	10,513	—	—	—
Hard maple	44,159	—	10,611	5,919	9,957	13,644	4,028	—	—	—	—	—
Soft maple	887,331	—	215,793	212,427	171,206	108,696	62,738	106,920	9,551	—	—	—
Beech	40,222	—	6,207	2,896	—	6,323	5,447	15,173	4,176	—	—	—
Sweetgum	1,258,705	—	287,486	321,959	233,464	118,984	138,145	134,090	24,577	—	—	—
Tupelo and blackgum	3,663,386	—	706,941	766,280	613,548	486,998	384,589	584,695	120,335	—	—	—
Ash	782,153	—	139,323	168,557	146,111	120,130	110,036	93,255	4,741	—	—	—
Cottonwood	3,273	—	—	—	—	—	3,273	—	—	—	—	—
Basswood	34,141	—	7,047	4,945	9,224	5,381	3,029	4,515	—	—	—	—
Yellow-poplar	166,000	—	48,476	28,660	12,382	23,726	38,287	14,469	—	—	—	—
Bay and magnolia	1,312,709	—	329,335	271,101	230,729	178,658	139,918	133,285	29,683	—	—	—
Black cherry	6,862	—	3,218	2,053	1,591	—	—	—	—	—	—	—
Black walnut	—	—	—	—	—	—	—	—	—	—	—	—
Sycamore	23,095	—	1,823	—	3,499	6,042	3,110	8,621	—	—	—	—
Elm	190,952	—	34,131	53,419	30,452	25,758	17,565	23,983	5,644	—	—	—
Other eastern hardwoods	108,345	—	32,056	25,725	20,362	20,269	5,118	4,815	—	—	—	—
Total	14,227,144	—	2,513,543	2,693,122	2,172,486	1,849,108	1,454,557	2,560,604	983,724	—	—	—
All species	39,851,432	6,020,917	9,188,945	7,875,225	5,428,025	3,750,496	2,560,224	3,848,249	1,179,351	—	—	—

^aIncludes white, swamp white, and chinquapin oaks.
^bIncludes cherrybark, northern red, and Shumard oaks.

Table 15.—Volume of sawtimber on commercial forest land, by species and quality class, Florida, 1980

Species	All grades	Log grade			
		1	2	3	4
..... Thousand board feet					
Softwood:					
Yellow pines ^a	18,660,331	3,881,543	2,527,170	12,251,618	(b)
Cypress ^c	6,665,587	848,076	4,438,622	1,378,889	—
Other eastern softwoods ^c	298,370	60,527	135,119	102,724	—
Total	25,624,288	4,790,146	7,100,911	13,733,231	—
Hardwood:^d					
Select white and red oaks	124,033	21,921	27,713	64,357	10,042
Other white and red oaks	5,173,173	2,047,380	835,494	2,140,515	149,784
Hickory	408,605	110,074	104,653	185,956	7,922
Hard maple	44,159	4,421	13,474	17,930	8,334
Sweetgum	1,258,705	181,793	391,791	672,534	12,587
Ash, walnut, and black cherry	789,015	316,833	198,635	264,152	9,395
Yellow-poplar	166,000	28,319	30,417	67,004	40,260
Other hardwoods	6,263,454	1,149,865	2,183,972	2,866,983	62,634
Total	14,227,144	3,860,606	3,786,149	6,279,431	300,958
All species	39,851,432	8,650,752	10,887,060	20,012,662	300,958

^aBased on "Southern Pine Log Grades for Yard and Structural Lumber," Research Paper SE-39, published by the Southeastern Forest Experiment Station in 1968.

^bNot applicable.

^cBased on the "Trial Log Grades for Eastern White Pine," prepared by the Northeastern Forest Experiment Station in 1960.

^dGraded according to "Hardwood Log Grades for Standard Lumber," published by the U.S. Forest Products Laboratory in 1953. Specifications for the grade 4 tie and timber log are based chiefly on knot size and log soundness.

Table 16.—Net annual growth and removals of growing stock on commercial forest land, by species, Florida, 1979

Species	Net annual growth	Annual timber removals
<i>..... Thousand cubic feet</i>		
Softwood:		
Yellow pines	543,892	426,912
Cypress	58,506	25,332
Other eastern softwoods	3,355	1,381
Total	605,753	453,625
Hardwood:		
Select white and red oaks	787	1,237
Other white and red oaks	60,628	34,942
Hickory	3,960	4,341
Hard maple	489	400
Sweetgum	17,696	12,802
Ash, walnut, and black cherry	8,840	4,514
Yellow-poplar	2,336	1,139
Tupelo and blackgum	34,417	10,302
Bay and magnolia	25,702	8,148
Other eastern hardwoods	24,890	10,262
Total	179,745	88,087
All species	785,498	541,712

Table 17.—Net annual growth and removals of growing stock on commercial forest land, by ownership class, and by softwood and hardwood, Florida, 1979

Ownership class	Net annual growth			Annual timber removals		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
<i>..... Thousand cubic feet</i>						
National Forest	60,377	53,463	6,914	21,854	20,934	920
Other public	51,920	42,749	9,171	41,569	27,797	13,772
Forest industry	251,656	199,246	52,410	210,551	180,397	30,154
Farmer and misc. private	421,545	310,295	111,250	267,738	224,497	43,241
All ownerships	785,498	605,753	179,745	541,712	453,625	88,087

Table 18.—Net annual growth and removals of sawtimber on commercial forest land, by species, Florida, 1979

Species	Net annual growth	Annual timber removals
<i>..... Thousand board feet</i>		
Softwood:		
Yellow pines	1,711,384	1,362,853
Cypress	250,916	86,361
Other eastern softwoods	15,842	4,707
Total	1,978,142	1,453,921
Hardwood:		
Select white and red oaks	3,431	4,260
Other white and red oaks	242,750	130,161
Hickory	17,658	18,079
Hard maple	2,079	1,246
Sweetgum	64,405	35,987
Ash, walnut, and black cherry	30,204	15,225
Yellow-poplar	11,200	5,073
Tupelo and blackgum	115,490	41,267
Bay and magnolia	59,500	24,044
Other eastern hardwoods	75,594	25,423
Total	622,311	300,765
All species	2,600,453	1,754,686

Table 19.—Net annual growth and removals of sawtimber on commercial forest land, by ownership class, and by softwood and hardwood, Florida, 1979

Ownership class	Net annual growth			Annual timber removals		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
<i>..... Thousand board feet</i>						
National Forest	242,980	223,167	19,813	63,496	60,331	3,165
Other public	215,051	183,591	31,460	156,590	106,769	49,821
Forest industry	670,848	483,258	187,590	675,707	568,229	107,478
Farmer and misc. private	1,471,574	1,088,126	383,448	858,893	718,592	140,301
All ownerships	2,600,453	1,978,142	622,311	1,754,686	1,453,921	300,765

Table 20.—Mortality of growing stock and sawtimber on commercial forest land, by species, Florida, 1979

Species	Growing stock	Saw-timber
	<i>M cubic feet</i>	<i>M board feet</i>
Softwood:		
Yellow pines	52,112	145,196
Cypress	7,866	14,129
Other eastern softwoods	794	3,366
Total	60,772	162,691
Hardwood:		
Select white and red oaks	376	1,649
Other white and red oaks	12,535	44,990
Hickory	933	4,179
Hard maple	—	—
Sweetgum	4,633	14,992
Ash, walnut, and black cherry	2,480	6,628
Yellow-poplar	169	1,019
Tupelo and blackgum	10,206	30,848
Bay and magnolia	5,570	16,255
Other eastern hardwoods	7,357	20,319
Total	44,259	140,879
All species	105,031	303,570

Table 21.—Mortality of growing stock and sawtimber on commercial forest land, by ownership class, and by softwood and hardwood, Florida, 1979

Ownership class	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	<i>Thousand cubic feet</i>			<i>Thousand board feet</i>		
National Forest	6,584	5,418	1,166	13,942	9,744	4,198
Other public	8,393	4,573	3,820	33,865	19,116	14,749
Forest industry	26,088	13,545	12,543	73,297	31,325	41,972
Farmer and misc. private	63,966	37,236	26,730	182,466	102,506	79,960
All ownerships	105,031	60,772	44,259	303,570	162,691	140,879

Table 22.—Mortality of growing stock and sawtimber on commercial forest land, by cause, and by softwood and hardwood, Florida, 1979

Cause of death	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	<i>Thousand cubic feet</i>			<i>Thousand board feet</i>		
Fire	14,230	12,834	1,396	30,063	28,804	1,259
Insects	8,857	8,857	—	31,129	31,129	—
Disease	9,384	8,283	1,101	19,715	14,536	5,179
Weather	17,514	7,497	10,017	76,692	33,888	42,804
Suppression	11,831	6,821	5,010	6,654	712	5,942
Animals	116	—	116	769	—	769
Undetermined	43,099	16,480	26,619	138,548	53,622	84,926
All causes	105,031	60,772	44,259	303,570	162,691	140,879

Table 23.—Output of timber products, by product, by source of material, and by softwood and hardwood, Florida, 1979

Product and species group	Standard units	Total output		Roundwood products		Plant byproducts	
		Number of units	Thousand cubic feet	Number of units	Thousand cubic feet	Number of units	Thousand cubic feet
Saw logs:							
Softwood	M fbm ^a	682,254	124,828	681,396	124,671	858	157
Hardwood	M fbm ^a	51,018	9,625	51,018	9,625	—	—
Total	M fbm ^a	733,272	134,453	732,414	134,296	858	157
Veneer logs and bolts:							
Softwood	M fbm ^a	61,552	12,055	61,552	12,055	—	—
Hardwood	M fbm ^a	21,593	3,749	21,593	3,749	—	—
Total	M fbm ^a	83,145	15,804	83,145	15,804	—	—
Pulpwood^b							
Softwood	Cords ^c	3,397,419	261,571	2,960,119	227,903	437,300	33,668
Hardwood	Cords ^c	435,541	34,554	362,003	28,720	73,538	5,834
Total	Cords ^c	3,832,960	296,125	3,322,122	256,623	510,838	39,502
Poles and pilings:							
Softwood	M pieces	375	5,822	375	5,822	—	—
Hardwood	M pieces	—	—	—	—	—	—
Total	M pieces	375	5,822	375	5,822	—	—
Posts (round and split):							
Softwood	M pieces	1,458	1,119	1,458	1,119	—	—
Hardwood	M pieces	—	—	—	—	—	—
Total	M pieces	1,458	1,119	1,458	1,119	—	—
Other^d							
Softwood	M ft ³	6,698	6,698	221	221	6,477	6,477
Hardwood	M ft ³	732	732	—	—	732	732
Total	M ft ³	7,430	7,430	221	221	7,209	7,209
Total industrial products:							
Softwood	—	—	412,093	—	371,791	—	40,302
Hardwood	—	—	48,660	—	42,094	—	6,566
Total	—	—	460,753	—	413,885	—	46,868
Fuelwood^e							
Softwood	Cords	16,817	1,226	357	26	16,460	1,200
Hardwood	Cords	50,431	3,289	50,385	3,286	46	3
Total	Cords	67,248	4,515	50,742	3,312	16,506	1,203
All products^f							
Softwood	—	—	413,319	—	371,817	—	41,502
Hardwood	—	—	51,949	—	45,380	—	6,569
Total	—	—	465,268	—	417,197	—	48,071

^aInternational 1/4-inch rule.

^bRoundwood figures include 21,523 thousand cubic feet of roundwood chipped at other primary wood-using plants.

^cRough-wood basis (includes chips converted to equivalent standard cords).

^dIncludes particleboard, charcoal, and specialty products.

^eExcludes approximately 12,597 thousand cubic feet of plant byproducts used for industrial fuel.

^fExcludes 9,650 thousand cubic feet of plant byproducts used for litter and mulch.

Table 24.—Output of roundwood products, by product, by source, and by softwood and hardwood, Florida, 1979

Product and species group	All sources	Growing-stock trees ^a			Cull trees ^a	Salvable dead trees ^a	Other sources ^b
		Thousand cubic feet					
		Total	Sawtimber	Poletimber			
Saw logs:							
Softwood	124,671	124,472	116,438	8,034	73	—	126
Hardwood	9,625	9,254	8,784	470	146	46	179
Total	134,296	133,726	125,222	8,504	219	46	305
Veneer logs and bolts:							
Softwood	12,055	12,055	11,668	387	—	—	—
Hardwood	3,749	3,329	3,248	81	269	—	151
Total	15,804	15,384	14,916	468	269	—	151
Pulpwood:							
Softwood	227,903	213,005	95,692	117,313	2,137	—	12,761
Hardwood	28,720	22,433	11,073	11,360	3,008	—	3,279
Total	256,623	235,438	106,765	128,673	5,145	—	16,040
Poles and piling:							
Softwood	5,822	5,822	5,822	—	—	—	—
Hardwood	—	—	—	—	—	—	—
Total	5,822	5,822	5,822	—	—	—	—
Posts (round and split):							
Softwood	1,119	163	—	163	—	—	956
Hardwood	—	—	—	—	—	—	—
Total	1,119	163	—	163	—	—	956
Other:							
Softwood	221	221	170	51	—	—	—
Hardwood	—	—	—	—	—	—	—
Total	221	221	170	51	—	—	—
Total industrial products:							
Softwood	371,791	355,738	229,790	125,948	2,210	—	13,843
Hardwood	42,094	35,016	23,105	11,911	3,423	46	3,609
Total	413,885	390,754	252,895	137,859	5,633	46	17,452
Fuelwood:							
Softwood	26	—	—	—	—	—	26
Hardwood	3,286	1,140	505	635	1,156	—	990
Total	3,312	1,140	505	635	1,156	—	1,016
All products:							
Softwood	371,817	355,738	229,790	125,948	2,210	—	13,869
Hardwood	45,380	36,156	23,610	12,546	4,579	46	4,599
Total	417,197	391,894	253,400	138,494	6,789	46	18,468

^aOn commercial forest land.
^bIncludes trees less than 5.0 inches in diameter, tree tops and limbs from commercial forest areas, or material from noncommercial forest land or nonforest land such as fence rows or suburban areas.

Table 25.—Annual timber removals from growing stock on commercial forest land, by item, and by softwood and hardwood, Florida, 1979

Item	All species	Softwood	Hardwood
..... <i>Thousand cubic feet</i>			
Roundwood products:			
Saw logs	133,726	124,472	9,254
Veneer logs and bolts	15,384	12,055	3,329
Pulpwood	235,438	213,005	22,433
Poles and piling	5,822	5,822	—
Posts	163	163	—
Other	221	221	—
Fuelwood	1,140	—	1,140
All products	391,894	355,738	36,156
Logging residues	38,081	28,744	9,337
Other removals	111,737	69,143	42,594
Total removals	541,712	453,625	88,087

Table 26.—Annual timber removals from live sawtimber on commercial forest land, by item, and by softwood and hardwood, Florida, 1979

Item	All species	Softwood	Hardwood
..... <i>Thousand board feet</i>			
Roundwood products:			
Saw logs	699,341	650,553	48,788
Veneer logs and bolts	81,052	60,900	20,152
Pulpwood	469,769	413,575	56,194
Poles and piling	32,229	32,229	—
Posts	—	—	—
Other	3,626	908	2,718
Fuelwood	—	—	—
All products	1,286,017	1,158,165	127,852
Logging residues	91,876	74,973	16,903
Other removals	376,793	220,783	156,010
Total removals	1,754,686	1,453,921	300,765

Table 27.--Volume of unused residues at primary manufacturing plants, by industry and type of residue, and by softwood and hardwood, Florida, 1979

Species group and type of residue	All industries	Lumber	Veneer and plywood	Other
..... <i>Thousand cubic feet</i>				
Softwood:				
Coarse ^a	1,327	1,327	—	—
Fine ^b	841	833	8	—
Total	2,168	2,160	8	—
Hardwood:				
Coarse ^a	186	186	—	—
Fine ^b	317	265	52	—
Total	503	451	52	—
All species:				
Coarse ^a	1,513	1,513	—	—
Fine ^b	1,158	1,098	60	—
Total	2,671	2,611	60	—

^aMaterial such as slabs, edgings, and veneer cores.

^bMaterial such as sawdust, shavings, and veneer clippings.

Table 28.—Projection of net annual growth, available cut, and inventory of sawtimber and growing stock on commercial forest land, by softwood and hardwood, Florida, 1979 to 2009^a

Species group	1979	Projected to—		
		1989	1999	2009
GROWING STOCK (in thousand cubic feet)				
Softwood:				
Cut	453,625	543,900	593,700	618,900
Growth	605,753	645,400	649,000	630,300
Inventory ^b	8,730,098	9,674,800	10,161,800	10,208,100
Hardwood:				
Cut	88,087	127,900	171,300	214,900
Growth	179,745	212,300	253,100	295,100
Inventory ^b	4,889,790	5,526,800	6,140,500	6,727,600
Total:				
Cut	541,712	671,800	765,000	833,800
Growth	785,498	857,700	902,100	925,400
Inventory ^b	13,619,888	15,201,600	16,302,300	16,935,700
SAWTIMBER (in thousand board feet)				
Softwood:				
Cut	1,453,921	1,827,400	2,106,800	2,344,300
Growth	1,978,142	2,287,500	2,537,300	2,637,400
Inventory ^b	25,624,288	29,327,800	32,939,000	35,668,200
Hardwood:				
Cut	300,765	447,700	589,900	724,100
Growth	622,311	694,100	799,300	917,200
Inventory ^b	14,227,144	16,022,400	17,448,300	18,647,400
Total:				
Cut	1,754,686	2,275,100	2,696,700	3,068,400
Growth	2,600,453	2,981,600	3,336,600	3,554,600
Inventory ^b	39,851,432	45,350,200	50,387,300	54,315,600

^aAssumptions:

1. Area of commercial forest will decline by 1,270,000 over the next 30 years.
2. The rapid rate of decrease in the number of 2-inch softwoods and the rate of increase of 2-inch hardwoods between 1969 and 1979 will gradually level off by 2010.
3. Softwood growth will continue to increase until about the year 2005, after which it will start to decline.
4. Softwood removals (as a percentage of softwood growth) will continue to increase at about the same rate experienced between 1969 and 1979.
5. Hardwood growth will increase at an accelerated rate.
6. The difference between hardwood growth and removals will remain at the same rate as that measured in 1979.

^bInventory as of January 1 of the following year.

Table 29.—Basal area per acre of growing stock and rough and rotten trees 5.0 inches d.b.h. and larger, by forest type and Survey Unit, Florida, 1980

Forest type	State	Survey Unit			
		Northeast	Northwest	Central	South
..... <i>Square feet</i>					
Longleaf-slash pine:					
Growing stock	38.8	43.2	35.9	33.8	28.6
Rough and rotten trees	1.1	.8	1.2	2.4	1.5
Total	39.9	44.0	37.1	36.2	30.1
Loblolly-shortleaf pine:					
Growing stock	34.6	32.7	38.8	28.3	—
Rough and rotten trees	2.9	1.7	4.2	3.2	—
Total	37.5	34.4	43.0	31.5	—
Oak-pine:					
Growing stock	37.2	43.7	36.0	29.2	20.6
Rough and rotten trees	8.8	8.3	8.6	10.8	1.9
Total	46.0	52.0	44.6	40.0	22.5
Oak-hickory:					
Growing stock	19.7	21.9	22.2	12.2	16.5
Rough and rotten trees	14.2	15.8	8.6	19.5	3.0
Total	33.9	37.7	30.8	31.7	19.5
Oak-gum-cypress:					
Growing stock	72.1	73.9	70.2	76.8	53.4
Rough and rotten trees	18.3	14.5	25.9	17.7	14.1
Total	90.4	88.4	96.1	94.5	67.5
Elm-ash-cottonwood:					
Growing stock	64.7	90.0	87.9	48.3	—
Rough and rotten trees	22.0	37.5	23.6	18.3	12.5
Total	86.7	127.5	111.5	66.6	12.5
All types:					
Growing stock	44.7	46.5	41.4	47.4	41.3
Rough and rotten trees	8.5	6.8	8.3	12.8	8.5
Total	53.2	53.3	49.7	60.2	49.8

Table 30.—Number of growing stock and rough and rotten trees 1.0 to 4.9 inches d.b.h., per acre, by forest type and Survey Unit, Florida, 1980

Forest type	State	Survey Unit			
		Northeast	Northwest	Central	South
..... <i>Number of trees</i>					
Longleaf-slash pine:					
Growing stock	213	237	221	122	106
Rough and rotten trees	72	56	102	50	27
Total	285	293	323	172	133
Loblolly-shortleaf pine:					
Growing stock	208	197	222	207	—
Rough and rotten trees	166	149	200	124	—
Total	374	346	422	331	—
Oak-pine:					
Growing stock	206	276	185	124	127
Rough and rotten trees	252	244	282	214	188
Total	458	520	467	338	315
Oak-hickory:					
Growing stock	109	143	111	44	12
Rough and rotten trees	296	269	306	328	432
Total	405	412	417	372	444
Oak-gum-cypress:					
Growing stock	313	396	275	273	201
Rough and rotten trees	257	262	333	206	176
Total	570	658	608	479	377
Elm-ash-cottonwood:					
Growing stock	171	150	86	253	60
Rough and rotten trees	414	270	283	560	300
Total	585	420	369	813	360
All types:					
Growing stock	224	261	212	178	156
Rough and rotten trees	178	157	205	189	128
Total	402	418	417	367	284

Table 31.—Area of commercial forest land, by stand volume (board feet), ownership class, and physiographic class, Florida, 1980

Ownership class and stand volume per acre ^a (board feet)	Physiographic class								Other misc. classes	
	All classes	Deep swamps	Broad stream margins	Narrow stream margins	Cypress strands & ponds	Flatwoods and dry pocosins	Bays and wet pocosins	Rolling uplands		Sandhills
Acres										
National Forest:										
Less than 1,500	479,555	—	—	3,061	3,188	149,602	79,642	3,061	229,289	11,712
1,500 to 5,000	289,347	2,441	3,044	25,046	18,637	109,712	58,628	—	64,013	7,826
More than 5,000	236,855	20,004	11,749	8,939	9,564	127,362	33,087	3,150	20,559	2,441
Total	1,005,757	22,445	14,793	37,046	31,389	386,676	171,357	6,211	313,861	21,979
Other public:										
Less than 1,500	609,110	407	7,859	22,429	8,283	155,673	27,606	27,114	334,867	24,872
1,500 to 5,000	298,455	2,033	9,935	20,373	15,446	69,671	12,668	30,863	127,552	9,914
More than 5,000	264,858	23,878	25,599	58,990	16,597	53,061	14,733	51,585	9,466	10,949
Total	1,172,423	26,318	43,393	101,792	40,326	278,405	55,007	109,562	471,885	45,735
Forest industry:										
Less than 1,500	3,040,053	36,964	—	105,765	90,543	1,793,252	372,844	263,083	289,838	87,764
1,500 to 5,000	912,079	50,377	56,127	117,025	75,469	327,073	105,898	72,065	37,415	70,630
More than 5,000	744,670	128,771	46,310	117,251	82,618	180,471	69,429	38,544	3,696	77,580
Total	4,696,802	216,112	102,437	340,041	248,630	2,300,796	548,171	373,692	330,949	235,974
Farmer and misc. private:										
Less than 1,500	4,933,374	18,325	20,557	200,355	162,305	2,408,483	175,520	442,104	1,273,711	232,014
1,500 to 5,000	2,206,511	61,891	52,530	298,720	273,312	792,453	162,440	280,930	181,107	103,128
More than 5,000	1,649,310	193,115	111,031	329,008	231,142	403,964	51,328	222,654	26,393	80,675
Total	8,789,195	273,331	184,118	828,083	666,759	3,604,900	389,288	945,688	1,481,211	415,817
All ownerships:										
Less than 1,500	9,062,092	55,696	28,416	331,610	264,319	4,507,010	655,612	735,362	2,127,705	356,362
1,500 to 5,000	3,706,392	116,742	121,636	461,164	382,864	1,298,909	339,634	383,858	410,087	191,498
More than 5,000	2,895,693	365,768	194,689	514,188	339,921	764,858	168,577	315,933	60,114	171,645
Total	15,664,177	538,206	344,741	1,306,962	987,104	6,570,777	1,163,823	1,435,153	2,597,906	719,505

^aInternational ¼-inch rule.

Table 32.—Area of commercial forest land, by stand volume (cubic feet), ownership class, and physiographic class, Florida, 1980

Ownership class and stand volume per acre ^a (cubic feet)	Physiographic class									
	All classes	Deep swamps	Broad stream margins	Narrow stream margins	Cypress strands & ponds	Flatwoods and dry pocosins	Bays and wet pocosins	Rolling uplands	Sandhills	Other misc. classes
Acres										
National Forest:										
Less than 500	405,849	—	3,044	3,061	6,376	138,343	70,827	3,061	172,468	8,669
500 to 1,000	214,345	—	—	6,249	6,376	62,789	43,107	—	84,955	10,869
More than 1,000	385,563	22,445	11,749	27,736	18,637	185,544	57,423	3,150	56,438	2,441
Total	1,005,757	22,445	14,793	37,046	31,389	386,676	171,357	6,211	313,861	21,979
Other public:										
Less than 500	569,820	407	—	22,429	4,020	146,019	26,251	23,734	330,323	16,637
500 to 1,000	223,229	2,033	12,584	5,956	6,297	53,838	6,402	28,287	89,683	18,149
More than 1,000	379,374	23,878	30,809	73,407	30,009	78,548	22,354	57,541	51,879	10,949
Total	1,172,423	26,318	43,393	101,792	40,326	278,405	55,007	109,562	471,885	45,735
Forest industry:										
Less than 500	2,483,178	30,083	4,105	67,013	46,320	1,421,114	355,979	214,420	281,822	62,322
500 to 1,000	782,317	23,538	27,450	75,460	52,539	364,553	97,919	58,321	33,097	49,440
More than 1,000	1,431,307	162,491	70,882	197,568	149,771	515,129	94,273	100,951	16,030	124,212
Total	4,696,802	216,112	102,437	340,041	248,630	2,300,796	548,171	373,692	330,949	235,974
Farmer and misc. private:										
Less than 500	4,257,729	14,120	17,213	172,558	76,784	2,035,614	136,806	343,150	1,248,933	212,551
500 to 1,000	1,546,355	11,653	32,094	150,283	108,295	700,105	96,592	250,856	132,432	64,045
More than 1,000	2,985,111	247,558	134,911	505,242	481,680	869,181	155,890	351,682	99,846	139,221
Total	8,789,195	273,331	184,118	828,083	666,759	3,604,900	389,288	945,688	1,481,211	415,817
All ownerships:										
Less than 500	7,716,576	44,610	24,362	265,061	133,500	3,741,090	589,863	584,365	2,033,546	300,179
500 to 1,000	2,766,246	37,224	72,128	237,948	173,507	1,181,285	244,020	337,464	340,167	142,503
More than 1,000	5,181,355	456,372	248,251	803,953	680,097	1,648,402	329,940	513,324	224,193	276,823
Total	15,664,177	538,206	344,741	1,306,962	987,104	6,570,777	1,163,823	1,435,153	2,597,906	719,505

^aGrowing-stock volume.

Table 33.—Average net volume and growth per acre on commercial forest land, by physiographic class, tree class, and species group, Florida, 1980

Physiographic class and tree class	Net volume per acre						Net growth per acre												
	Softwood			Hardwood			Total			Softwood			Hardwood			Total			
	Cubic feet	Board feet	Board feet	Cubic feet	Board feet	Board feet	Cubic feet	Board feet	Board feet	Cubic feet	Board feet	Board feet	Cubic feet	Board feet	Board feet	Cubic feet	Board feet	Board feet	
Deep swamps:																			
Growing stock	871.3	3,338	1,790.3	5,581	2,661.6	8,919	22.6	119	48.2	197	70.8	316							
Rough and rotten trees	30.0	—	433.9	—	463.9	—	.2	—	9.8	—	10.0	—							
Total	901.3	3,338	2,224.2	5,581	3,125.5	8,919	22.8	119	58.0	197	80.8	316							
Broad stream margins:																			
Growing stock	328.8	1,472	1,662.9	5,809	1,991.7	7,281	10.9	69	44.8	230	55.7	299							
Rough and rotten trees	15.8	—	412.6	—	428.4	—	.3	—	8.8	—	9.1	—							
Total	344.6	1,472	2,075.5	5,809	2,420.1	7,281	11.2	69	53.6	230	64.8	299							
Narrow stream margins:																			
Growing stock	528.1	2,136	951.8	2,568	1,479.9	4,704	23.9	119	33.3	112	57.2	231							
Rough and rotten trees	6.6	—	233.8	—	240.4	—	.1	—	6.0	—	6.1	—							
Total	534.7	2,136	1,185.6	2,568	1,720.3	4,704	24.0	119	39.3	112	63.3	231							
Cypress strands and ponds:																			
Growing stock	1,556.8	3,993	181.1	331	1,737.9	4,324	45.7	189	8.4	19	54.1	208							
Rough and rotten trees	62.8	—	47.2	—	110.0	—	1.0	—	1.8	—	2.8	—							
Total	1,619.6	3,993	228.3	331	1,847.9	4,324	46.7	189	10.2	19	56.9	208							
Flatwoods & dry pocosins:																			
Growing stock	559.8	1,464	92.2	285	652.0	1,749	52.5	147	4.3	13	56.8	161							
Rough and rotten trees	3.1	—	43.6	—	46.7	—	.2	—	1.1	—	1.3	—							
Total	562.9	1,464	135.8	285	698.7	1,749	52.7	147	5.4	13	58.1	161							
Bays and wet pocosins:																			
Growing stock	469.4	1,663	304.6	634	774.0	2,297	23.6	108	15.3	32	38.9	140							
Rough and rotten trees	11.3	—	84.5	—	95.8	—	.2	—	2.8	—	3.0	—							
Total	480.7	1,663	389.1	634	869.8	2,297	23.8	108	18.1	32	41.9	140							
Rolling uplands:																			
Growing stock	540.6	1,794	321.9	975	862.5	2,769	41.2	157	14.3	46	55.5	203							
Rough and rotten trees	5.4	—	74.6	—	80.0	—	.2	—	1.8	—	2.0	—							
Total	546.0	1,794	396.5	975	942.5	2,769	41.4	157	16.1	46	57.5	203							
Sandhills:																			
Growing stock	297.3	763	14.4	30	311.7	793	28.0	77	.9	2	28.9	79							
Rough and rotten trees	4.8	—	95.4	—	100.2	—	.3	—	3.2	—	3.5	—							
Total	302.1	763	109.8	30	411.9	793	28.3	77	4.1	2	32.4	79							
Other misc. classes:																			
Growing stock	222.2	780	750.5	2,299	972.7	3,079	12.3	42	27.8	120	40.1	162							
Rough and rotten trees	11.5	—	235.6	—	247.1	—	.5	—	6.1	—	6.6	—							
Total	233.7	780	986.1	2,299	1,219.8	3,079	12.8	42	33.9	120	46.7	162							
All classes:																			
Growing stock	557.3	1,636	312.2	908	869.5	2,544	38.7	126	11.5	40	50.2	166							
Rough and rotten trees	9.8	—	103.9	—	113.7	—	.3	—	2.8	—	3.1	—							
Total	567.1	1,636	416.1	908	983.2	2,544	39.0	126	14.3	40	53.3	166							

Table 34.—Land area, by class, major forest type, and survey completion date, Florida, 1959, 1970, and 1980

Land use class	Survey completion date			Change 1970-1980
	1959	1970 ^a	1980	
..... Acres				
Forest land:				
Commercial:				
Pine and oak-pine types	9,546,500	9,567,984	9,193,657	-374,327
Hardwood types	7,625,500	6,693,255	6,470,520	-222,735
Total	17,172,000	16,261,239	15,664,177	-597,062
Noncommercial:				
Productive-reserved	92,700	94,200	411,844	+317,644
Unproductive	1,785,000	1,590,744	1,057,868	-532,876
Total	1,877,700	1,684,944	1,469,712	-215,232
Nonforest:				
Cropland	3,554,100	3,671,347	3,784,515	+113,168
Pasture and range	5,028,900	6,456,018	6,991,503	+535,485
Other	6,740,200	6,464,601	6,622,456	+157,855
Total	15,323,200	16,591,966	17,398,474	+806,508
All land ^b	34,372,900	34,538,149	34,532,363	-5,786

^aThese figures differ slightly from previously reported figures because of revisions in the estimates of land area.

^bExcludes all water areas.

Table 35.—Volume^a of sawtimber, growing stock, and all live timber on commercial forest land, by species group, diameter class, and survey completion date, Florida, 1959, 1970, and 1980

Species group	Year	All classes	Diameter class (inches at breast height)									
			5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0 and larger	
			SAWTIMBER (in thousand board feet)									
Softwood	1959	16,635,191	—	—	4,556,355	4,916,137	3,303,158	1,777,636	953,236	547,500	581,169	
	1970	21,318,122	—	—	5,337,545	5,881,972	4,440,602	2,621,831	1,494,474	701,341	840,357	
	1980	25,624,288	—	—	6,020,917	6,675,402	5,182,103	3,255,539	1,901,388	1,105,667	1,483,272	
Hardwood	1959	10,763,188	—	—	—	1,973,443	2,164,137	1,772,136	1,393,506	1,088,852	2,371,114	
	1970	12,198,445	—	—	—	2,178,883	2,327,495	1,975,498	1,641,546	1,227,416	2,847,607	
	1980	14,227,144	—	—	—	2,513,543	2,693,122	2,172,486	1,849,108	1,454,557	3,544,328	
			GROWING STOCK (in thousand cubic feet)									
Softwood	1959	5,795,048	869,376	1,205,946	1,265,176	1,108,117	663,140	328,621	167,991	93,378	93,303	
	1970	7,298,292	1,180,012	1,421,858	1,481,678	1,323,259	890,916	484,768	262,849	118,938	134,014	
	1980	8,730,098	1,414,536	1,742,049	1,673,366	1,502,161	1,037,688	601,807	334,730	187,229	236,532	
Hardwood	1959	3,854,299	377,988	480,096	580,640	586,461	539,017	394,948	284,884	208,927	401,338	
	1970	4,257,423	403,709	533,935	599,109	647,386	579,875	440,445	335,556	235,533	481,875	
	1980	4,889,790	464,120	587,111	678,617	746,933	670,886	484,557	378,128	279,143	600,295	
			ALL LIVE TIMBER (in thousand cubic feet)									
Softwood	1959	5,905,963	904,644	1,232,144	1,285,497	1,118,922	669,061	332,542	168,920	93,933	100,300	
	1970	7,428,788	1,216,847	1,452,555	1,505,448	1,335,960	898,689	490,539	264,409	119,767	144,574	
	1980	8,884,245	1,453,753	1,777,340	1,699,853	1,517,428	1,047,053	608,891	336,610	188,534	254,783	
Hardwood	1959	5,138,493	617,222	693,381	777,793	734,772	655,453	491,008	346,794	266,228	555,842	
	1970	5,670,378	651,720	769,437	803,796	809,463	707,388	549,469	408,780	300,417	669,908	
	1980	6,516,877	744,647	847,130	909,764	934,285	817,264	606,061	462,249	357,201	838,276	

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

Table 36.—Volume of all live timber, by species group and Survey Unit, Florida, 1959, 1970, and 1980

Species group and Survey Unit	1959	1970	Change 1959-1970	1980	Change 1970-1980
	<i>Thousand cubic feet</i>	<i>Thousand cubic feet</i>	<i>Percent</i>	<i>Thousand cubic feet</i>	<i>Percent</i>
Softwood:					
Northeast	2,670,828	3,448,474	+29.1	4,150,047	+20.3
Northwest	1,803,160	2,322,041	+28.8	2,806,520	+20.9
Central	906,226	1,131,970	+24.9	1,346,069	+18.9
South	525,749	526,303	+0.1	581,609	+10.5
All units	5,905,963	7,428,788	+25.8	8,884,245	+19.6
Hardwood:					
Northeast	2,217,145	2,378,412	+7.3	2,695,125	+13.3
Northwest	1,887,286	2,070,309	+9.7	2,334,031	+12.7
Central	913,856	1,117,275	+22.3	1,387,239	+24.2
South	120,206	104,382	-13.2	100,482	-3.7
All units	5,138,493	5,670,378	+10.4	6,516,877	+14.9

Table 37.—Land area and total forest, by county, Florida, 1980

County	All land ^a	Total forest ^b		County	All land ^a	Total forest ^b	
	<i>Acres</i>	<i>Acres</i>	<i>Percent</i>		<i>Acres</i>	<i>Acres</i>	<i>Percent</i>
Alachua	592,947	320,684	54.1	Lake	640,554	269,376	42.1
Baker	373,733	331,860	88.8	Lee	569,547	171,039	30.0
Bay	493,392	423,722	85.9	Leon	436,954	292,968	67.0
Bradford	186,561	136,299	73.1	Levy	721,776	480,089	66.5
Brevard	658,846	128,103	19.4	Liberty	536,385	516,581	96.3
Broward	777,502	32,473	4.2	Madison	457,788	297,382	65.0
Calhoun	363,441	301,612	83.0	Manatee	479,858	66,378	13.8
Charlotte	458,729	111,561	24.3	Marion	1,035,667	633,423	61.2
Citrus	390,791	236,798	60.6	Martin	349,153	54,645	15.7
Clay	388,548	316,483	81.5	Monroe	645,715	372,589	57.7
Collier	1,297,035	743,661	57.3	Nassau	415,037	338,634	81.6
Columbia	511,587	371,622	72.6	Okaloosa	598,961	471,489	78.7
Dade	1,250,756	209,959	16.8	Okeechobee	495,998	42,120	8.5
De Soto	405,498	51,980	12.8	Orange	584,937	203,638	34.8
Dixie	453,981	395,155	87.0	Osceola	867,706	202,656	23.4
Duval	496,061	279,380	56.3	Palm Beach	1,254,622	131,765	10.5
Escambia	424,754	275,494	64.9	Pasco	483,683	163,832	33.9
Flagler	315,108	253,582	80.5	Pinellas	180,310	32,054	17.8
Franklin	350,738	316,998	90.4	Polk	1,191,263	271,189	22.8
Gadsden	330,251	229,213	69.4	Putnam	469,696	363,307	77.3
Gilchrist	224,901	141,989	63.1	St. Johns	396,909	292,696	73.7
Glades	570,440	99,717	17.5	St. Lucie	368,443	53,325	14.5
Gulf	361,423	281,739	78.0	Santa Rosa	653,397	500,681	76.6
Hamilton	332,069	242,683	73.1	Sarasota	369,620	65,159	17.6
Hardee	408,445	86,999	21.3	Seminole	199,572	90,968	45.6
Hendry	745,872	120,181	16.1	Sumter	364,897	170,486	46.7
Hernando	313,240	179,228	57.2	Suwannee	440,943	202,759	46.0
Highlands	661,215	101,984	15.4	Taylor	668,092	595,277	89.1
Hillsborough	670,891	145,958	21.8	Union	158,611	118,107	74.5
Holmes	307,994	188,003	61.0	Volusia	726,145	517,786	71.3
Indian River	320,367	44,071	13.8	Wakulla	395,507	340,201	86.0
Jackson	596,396	300,884	50.4	Walton	683,559	544,768	79.7
Jefferson	388,361	279,130	71.9	Washington	387,383	301,899	77.9
Lafayette	351,465	285,418	81.2				
				Total	35,002,026	17,133,889	49.0

^aExcludes inland water.

^bIncludes both commercial and noncommercial forest.

Table 38.—Commercial forest land, by county and ownership, Florida, 1980

County	All ownerships	National Forest	Other public	Forest industry	Other private	County	All ownerships	National Forest	Other public	Forest industry	Other private
Acres						Acres					
Alachua	309,353	—	6,049	103,271	200,033	Lake	263,130	64,104	13,816	318	184,892
Baker	331,542	75,507	3,881	127,527	124,627	Lee	120,016	—	—	—	120,016
Bay	421,111	—	27,114	249,761	144,236	Leon	290,981	103,938	8,882	44,590	133,571
Bradford	136,299	—	9,023	62,065	65,211	Levy	466,584	—	742	235,730	230,112
Brevard	119,334	—	22,673	7,200	89,461	Liberty	515,494	255,033	—	173,832	86,629
Broward	—	—	—	—	—	Madison	297,353	—	80	159,207	138,066
Calhoun	301,612	—	64	150,493	151,055	Manatee	55,501	—	88	—	55,413
Charlotte	65,648	—	1,027	—	64,621	Marion	631,402	252,595	29,010	70,898	278,899
Citrus	236,229	—	44,379	—	191,850	Martin	34,201	—	292	—	33,909
Clay	315,100	—	46,614	80,168	188,318	Monroe	—	—	—	—	—
Collier	415,191	—	2,530	—	412,661	Nassau	337,175	—	3,349	174,538	159,288
Columbia	366,138	77,256	373	69,627	218,882	Okaloosa	470,230	—	269,819	44,358	156,053
Dade	—	—	—	—	—	Okeechobee	40,534	—	187	—	40,347
De Soto	51,980	—	892	—	51,088	Orange	179,487	—	1,594	—	177,893
Dixie	395,155	—	290	372,484	22,381	Osceola	193,644	—	6,214	—	187,430
Duval	277,344	—	21,661	44,381	211,302	Palm Beach	—	—	—	—	—
Escambia	268,028	—	3,960	80,006	184,062	Pasco	163,497	—	23,661	29,169	110,667
Flagler	250,483	—	648	52,050	197,785	Pinellas	23,061	—	573	—	22,488
Franklin	313,812	21,969	17,820	247,665	26,358	Polk	254,021	—	34,827	—	219,194
Gadsden	228,519	—	10,094	82,575	135,850	Putnam	363,204	20,689	12,592	71,447	258,476
Gilchrist	141,989	—	288	34,396	107,305	St. Johns	288,592	—	258	74,161	214,173
Glades	88,904	—	220	—	88,684	St. Lucie	51,504	—	234	—	51,270
Gulf	280,001	—	16,272	221,220	42,509	Santa Rosa	500,356	—	180,486	166,743	153,127
Hamilton	241,382	—	55	87,799	153,528	Sarasota	55,277	—	44	—	55,233
Hardee	86,492	—	751	—	85,741	Seminole	89,037	—	1,345	—	87,692
Hendry	110,011	—	6,146	—	103,865	Sumter	164,859	—	53,632	5,360	105,867
Hernando	179,228	—	37,846	—	141,382	Suwannee	200,884	—	496	25,111	175,277
Highlands	95,709	—	23,833	—	71,876	Taylor	588,605	—	381	519,818	68,406
Hillsborough	134,226	—	18,980	—	115,246	Union	118,107	—	5,606	71,833	40,668
Holmes	187,690	—	1,108	55,843	130,739	Volusia	502,361	—	19,013	78,842	404,506
Indian River	36,925	—	963	—	35,962	Wakulla	315,027	134,666	31,852	55,903	92,606
Jackson	298,467	—	6,026	62,896	229,545	Walton	541,959	—	136,364	127,200	278,395
Jefferson	277,030	—	2,548	133,324	141,158	Washington	301,744	—	2,396	53,375	245,973
Lafayette	285,418	—	462	189,618	95,338						
Total							15,664,177	1,005,757	1,172,423	4,696,802	8,789,195

Table 39.—Commercial forest land, by county and broad forest type, Florida, 1980

County	Acres						County	Acres					
	All types	Planted pine	Natural pine	Oak-pine	Upland hardwood	Lowland hardwood		All types	Planted pine	Natural pine	Oak-pine	Upland hardwood	Lowland hardwood
Alachua	309,353	97,175	54,588	31,446	74,712	51,432	Lake	263,130	30,045	72,166	33,368	25,673	101,878
Baker	331,542	108,968	108,317	12,526	3,644	98,087	Lee	120,016	—	72,009	4,800	4,801	38,406
Bay	421,111	187,321	147,324	28,009	30,315	28,142	Leon	290,981	68,028	105,843	32,978	31,151	52,981
Bradford	136,299	34,620	37,116	25,869	15,524	23,170	L Levy	466,584	101,813	88,435	55,698	103,778	116,860
Brevard	119,334	9,668	48,986	—	11,696	48,984	Liberty	515,494	96,284	187,991	31,471	20,906	178,842
Broward	—	—	—	—	—	—	Madison	297,353	77,083	56,957	25,827	54,762	82,724
Calhoun	301,612	91,663	76,281	39,460	34,238	59,970	Manatee	55,501	—	15,393	3,078	9,236	27,794
Charlotte	65,648	3,801	35,239	3,801	—	22,807	Marion	631,402	122,581	235,773	64,730	141,971	66,347
Citrus	236,229	17,652	38,966	42,413	79,472	57,726	Martin	34,201	2,422	12,402	2,423	4,844	12,110
Clay	315,100	92,073	88,521	15,032	56,810	62,664	Monroe	—	—	—	—	—	—
Collier	415,191	—	79,353	15,872	5,291	314,675	Nassau	337,175	86,435	90,108	39,743	10,808	110,081
Columbia	366,138	100,652	111,597	14,195	50,361	89,333	Okaloosa	470,230	58,230	192,588	87,754	70,768	60,890
Dade	—	—	—	—	—	—	Okeechobee	40,534	6,207	6,207	—	—	28,119
De Soto	51,980	—	10,216	2,554	12,805	26,405	Orange	179,487	3,607	65,462	6,134	15,335	88,949
Dixie	395,155	156,097	36,873	26,231	52,544	123,410	Osceola	193,644	—	39,599	10,559	21,120	122,366
Duval	277,344	66,271	99,639	33,004	37,851	40,579	Palm Beach	—	—	—	—	—	—
Escambia	268,028	62,782	101,430	59,628	15,136	29,052	Pasco	163,497	6,413	22,161	14,177	43,258	77,488
Flagler	250,483	66,508	78,598	28,165	11,081	66,131	Pinellas	23,061	—	9,568	8,996	—	4,497
Franklin	313,812	92,837	124,464	17,430	24,203	54,878	Polk	254,021	14,341	39,639	20,188	32,847	147,006
Gadsden	228,519	39,214	36,764	41,351	58,829	52,361	Putnam	363,204	95,714	119,358	29,957	69,422	48,753
Gilchrist	141,989	59,527	13,068	3,267	46,842	19,285	St. Johns	288,592	68,702	91,543	16,639	17,499	94,209
Glades	88,904	23,648	23,649	2,956	—	38,651	St. Lucie	51,504	—	30,235	3,016	—	18,253
Gulf	280,001	28,322	148,542	16,643	—	86,494	Santa Rosa	500,356	125,187	201,666	68,981	26,322	78,200
Hamilton	241,382	89,158	57,817	22,051	18,884	53,472	Sarasota	55,277	2,301	18,413	2,301	2,301	29,961
Hardee	86,492	—	16,331	8,166	4,834	57,161	Seminole	89,037	—	17,129	19,802	19,801	32,305
Henry	110,011	—	51,932	5,193	5,239	47,647	Sumter	164,859	12,855	37,140	12,922	34,351	67,591
Hernando	179,228	10,876	39,055	26,292	78,986	24,019	Suwannee	200,884	64,189	25,364	15,789	76,520	19,022
Highlands	95,709	7,500	20,973	7,986	10,486	48,764	Taylor	588,605	251,466	89,992	10,164	38,527	198,456
Hillsborough	134,226	5,360	16,752	16,080	21,442	74,592	Union	118,107	39,796	32,066	2,763	9,964	33,518
Holmes	187,690	41,976	29,552	10,490	41,370	64,302	Volusia	502,361	71,317	196,620	46,101	30,978	157,345
Indian River	36,925	—	15,429	8,991	5,994	6,511	Wakulla	315,027	44,603	156,603	19,670	52,583	41,568
Jackson	298,467	44,780	50,730	20,941	107,382	74,634	Walton	541,959	103,106	197,540	52,749	101,427	87,137
Jefferson	277,030	33,571	57,678	30,458	52,705	102,618	Washington	301,744	69,029	51,439	27,637	62,452	91,187
Lafayette	285,418	88,419	54,141	37,218	31,190	74,450	Total	15,664,177	3,282,193	4,487,331	1,424,133	2,133,271	4,337,249

Table 40.—Volume of all live timber 5.0 inches d.b.h. and larger, by county and species group, Florida, 1980

County	Thousand cubic feet					County	Thousand cubic feet				
	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood		All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
Alachua	298,255	169,906	29,843	41,764	56,742	Lake	264,710	80,712	58,553	77,365	48,080
Baker	384,984	226,056	63,815	92,527	2,586	Lee	61,571	19,230	40,756	—	1,585
Bay	151,646	108,002	9,264	25,238	9,142	Leon	328,888	172,190	4,151	81,077	71,470
Bradford	134,442	92,814	6,899	16,515	18,214	Levy	515,304	201,742	93,862	92,035	127,665
Brevard	104,418	43,290	11,291	19,524	30,313	Liberty	595,869	235,492	102,182	169,986	88,209
Broward	—	—	—	—	—	Madison	331,204	87,152	58,489	124,713	60,850
Calhoun	243,219	138,217	14,096	54,932	35,974	Manatee	46,882	9,276	—	18,579	19,027
Charlotte	49,627	22,887	22,260	376	4,104	Marion	574,810	341,433	17,027	65,528	150,822
Citrus	165,033	38,423	34,400	24,659	67,551	Martin	14,525	9,947	—	—	4,578
Clay	263,602	133,126	19,134	50,152	61,190	Monroe	—	—	—	—	—
Collier	353,662	54,478	250,589	22,660	25,935	Nassau	379,439	171,283	31,825	109,601	66,730
Columbia	387,974	210,874	54,724	86,158	36,218	Oakaloosa	363,721	238,942	18,251	58,487	48,041
Dade	—	—	—	—	—	Okeechobee	69,131	11,893	16,820	31,348	9,070
De Soto	54,584	4,967	4,871	15,378	29,368	Orange	184,136	39,912	64,309	59,503	20,412
Dixie	366,634	82,986	78,600	78,620	126,428	Osceola	264,935	41,032	142,123	51,830	29,950
Duval	297,025	145,022	10,475	68,495	73,033	Palm Beach	—	—	—	—	—
Escambia	325,069	175,759	2,846	93,586	52,878	Pasco	240,796	41,239	79,928	44,840	74,789
Flagler	274,638	122,119	76,874	38,232	37,413	Pinellas	17,666	8,449	6,671	2,546	—
Franklin	206,977	66,567	45,947	78,112	16,351	Polk	317,373	48,200	124,687	84,498	59,988
Gadsden	303,480	115,538	—	95,650	92,292	Putnam	369,984	215,280	13,543	72,448	68,713
Gilchrist	124,089	79,421	16,973	3,734	23,961	St. Johns	334,091	148,346	36,853	82,173	66,719
Glades	61,498	19,580	27,474	5,267	9,177	St. Lucie	25,304	15,215	1,583	385	8,121
Gulf	293,127	76,079	51,104	109,023	56,921	Santa Rosa	512,219	318,369	38,121	113,218	42,511
Hamilton	235,339	109,591	30,503	59,411	35,834	Sarasota	34,860	11,838	—	4,401	18,621
Hardee	116,944	33,857	25,055	13,123	44,909	Seminole	70,974	22,496	276	19,690	28,512
Hendry	141,208	36,031	78,377	13,478	13,322	Sumter	241,896	26,287	72,311	54,191	89,107
Hernando	173,024	31,369	4,771	54,319	82,565	Suwannee	161,862	91,817	472	21,774	47,799
Highlands	105,351	20,142	35,122	29,323	20,764	Taylor	547,708	196,648	89,857	110,922	150,281
Hillsborough	198,511	22,418	84,578	34,766	56,749	Union	142,707	79,593	16,596	42,479	4,039
Holmes	185,506	72,246	6,934	76,578	29,748	Volusia	500,921	215,378	143,813	93,035	48,695
Indian River	36,780	15,464	12,241	623	8,452	Wakulla	299,344	155,441	7,651	65,611	70,641
Jackson	332,200	107,605	14,396	96,929	113,270	Walton	421,491	251,494	12,258	115,441	42,298
Jefferson	380,035	130,795	33,398	118,570	97,272	Washington	197,760	53,916	29,269	64,955	49,620
Lafayette	220,160	97,668	41,615	35,281	45,596						
						Total	15,401,122	6,363,539	2,520,706	3,485,662	3,031,215

Table 41.—Volume of growing stock, by county and species group, Florida, 1980

County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood	County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
<i>Thousand cubic feet</i>						<i>Thousand cubic feet</i>					
Alachua	275,385	169,151	29,499	34,922	41,813	Lake	227,430	80,141	57,185	62,276	27,828
Baker	370,840	225,237	62,434	81,739	1,430	Lee	55,163	19,230	35,933	—	—
Bay	136,332	107,229	9,264	14,093	5,746	Leon	306,957	171,043	4,151	75,301	56,462
Bradford	117,974	92,096	6,165	12,693	7,020	Levy	459,894	201,063	91,213	79,585	88,033
Brevard	84,622	42,894	11,085	13,493	17,150	Liberty	525,455	234,837	90,427	135,128	65,063
Broward	—	—	—	—	—	Madison	285,767	85,847	58,033	107,213	34,674
Calhoun	222,155	137,478	13,215	40,013	31,449	Manatee	29,778	8,993	—	16,361	4,424
Charlotte	44,081	22,887	20,566	—	628	Marion	515,098	340,859	17,027	56,236	100,976
Citrus	119,459	38,008	34,400	20,296	26,755	Martin	10,323	9,466	—	—	857
Clay	239,641	132,894	19,134	47,899	39,714	Monroe	—	—	—	—	—
Collier	306,776	54,146	225,139	17,816	9,675	Nassau	340,146	171,283	31,825	94,670	42,368
Columbia	359,808	210,250	53,384	69,584	26,590	Okaloosa	315,594	237,564	14,561	41,350	22,119
Dade	—	—	—	—	—	Okeechobee	52,896	11,893	16,369	22,474	2,160
De Soto	27,211	4,705	4,871	12,819	4,816	Orange	169,505	39,688	62,975	54,470	12,372
Dixie	313,114	82,986	78,057	68,974	83,097	Osceola	249,107	41,032	139,337	48,379	20,359
Duval	266,340	144,818	10,475	63,536	47,511	Palm Beach	—	—	—	—	—
Escambia	292,966	173,636	2,846	82,357	34,127	Pasco	204,303	41,239	77,159	39,727	46,178
Flagler	256,613	121,180	74,973	32,740	27,720	Pinellas	16,934	8,449	6,671	1,814	—
Franklin	185,012	66,266	42,123	67,205	9,418	Polk	272,578	47,669	119,688	68,615	36,606
Gadsden	269,118	112,576	—	83,591	72,951	Putnam	343,468	214,726	12,022	70,246	46,474
Gilchrist	109,765	78,516	15,511	3,246	12,492	St. Johns	308,412	147,314	33,747	76,739	50,612
Glades	53,799	19,580	27,199	4,825	2,195	St. Lucie	19,668	14,802	1,583	—	3,283
Gulf	232,321	75,433	45,781	85,967	25,140	Santa Rosa	466,973	317,635	36,203	87,358	25,777
Hamilton	214,096	109,183	30,110	49,430	25,373	Sarasota	19,412	11,838	—	3,664	3,910
Hardee	95,509	33,857	25,055	11,641	24,956	Seminole	59,047	22,496	276	17,042	19,233
Hendry	123,451	36,031	71,756	7,543	8,121	Sumter	209,228	26,287	72,311	46,561	64,069
Hernando	132,944	30,442	4,771	50,563	47,168	Suwannee	146,173	91,817	472	19,837	34,047
Highlands	90,004	20,142	35,122	27,172	7,568	Taylor	497,741	195,275	87,991	101,190	113,285
Hillsborough	170,325	21,912	84,314	29,620	34,479	Union	133,926	79,120	16,235	34,657	3,914
Holmes	154,681	71,222	6,041	56,435	20,983	Volusia	455,615	214,209	138,489	77,530	25,387
Indian River	29,196	14,634	12,241	216	2,105	Wakulla	276,155	153,666	5,336	55,063	62,090
Jackson	284,588	105,967	12,366	78,935	87,320	Walton	383,275	248,740	11,533	102,743	20,259
Jefferson	336,818	130,275	32,287	100,685	73,571	Washington	154,566	53,223	26,108	44,770	30,465
Lafayette	194,357	97,238	40,741	30,128	26,250						
Total							13,619,888	6,324,313	2,405,785	2,941,175	1,948,615

Table 42.—Volume of sawtimber, by county and species group, Florida, 1980

County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood	County	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
<i>Thousand board feet</i>						<i>Thousand board feet</i>					
Alachua	610,058	287,321	100,818	78,505	143,414	Lake	676,479	302,469	127,659	154,184	92,167
Baker	1,127,330	711,959	185,821	226,151	3,399	Lee	107,332	26,443	80,889	—	—
Bay	326,803	249,255	22,837	48,985	5,726	Leon	1,006,439	606,288	9,067	222,187	168,897
Bradford	310,370	239,648	11,460	22,428	36,834	Levy	1,288,180	516,403	261,150	200,721	309,906
Brevard	266,132	103,247	26,908	45,573	90,404	Liberty	1,925,484	850,827	365,545	432,238	276,874
Broward	—	—	—	—	—	Madison	857,038	258,901	178,309	303,487	116,341
Calhoun	696,841	412,367	46,697	130,452	107,325	Manatee	120,573	43,717	—	57,083	19,773
Charlotte	101,750	61,561	40,189	—	—	Marion	1,506,058	931,198	65,653	140,324	368,883
Citrus	427,591	144,670	136,817	60,941	85,163	Martin	33,764	32,810	—	—	954
Clay	632,570	317,316	65,051	127,115	123,088	Monroe	—	—	—	—	—
Collier	793,189	157,103	567,483	39,647	28,956	Nassau	884,704	492,714	87,420	176,352	128,218
Columbia	1,031,563	680,620	163,768	134,936	52,239	Okaloosa	1,149,692	944,741	60,706	73,829	70,416
Dade	—	—	—	—	—	Okeechobee	154,012	28,146	56,287	62,226	7,353
De Soto	87,027	19,565	16,258	31,036	20,168	Orange	468,011	126,876	161,675	141,237	38,223
Dixie	823,221	189,303	218,016	177,123	238,779	Osceola	739,244	189,696	371,212	122,142	56,194
Duval	726,471	389,182	20,659	162,616	154,014	Palm Beach	—	—	—	—	—
Escambia	912,555	513,354	12,151	276,560	110,490	Pasco	590,663	157,638	174,847	94,167	164,011
Flagler	740,089	286,165	222,058	87,206	144,660	Pinellas	52,553	28,287	18,647	5,619	—
Franklin	575,407	193,193	136,187	219,736	26,291	Polk	723,630	186,009	251,158	155,241	131,222
Gadsden	925,157	422,320	—	264,653	238,184	Putnam	935,511	511,228	43,179	206,517	174,587
Gilchrist	200,032	96,963	54,129	10,252	38,688	St. Johns	767,547	328,221	102,906	153,731	182,689
Glades	173,319	65,960	92,480	4,821	10,058	St. Lucie	64,847	55,480	5,411	—	3,956
Gulf	747,784	262,433	142,580	260,541	82,230	Santa Rosa	1,444,564	1,054,809	120,659	198,005	71,091
Hamilton	569,767	340,035	52,576	81,400	95,756	Sarasota	60,617	34,170	—	9,409	17,038
Hardee	378,846	152,193	83,712	30,026	112,915	Seminole	222,054	87,236	—	60,008	74,810
Hendry	391,245	103,586	231,719	23,270	32,670	Sumter	631,638	72,268	199,453	127,262	232,655
Hernando	419,278	93,464	18,852	140,837	166,125	Suwannee	339,596	154,845	2,589	52,200	129,962
Highlands	308,135	73,197	143,774	68,106	23,058	Taylor	1,179,524	350,602	268,567	219,672	340,683
Hillsborough	500,689	82,370	195,441	88,347	134,531	Union	299,422	169,519	39,164	86,757	3,982
Holmes	414,319	209,208	25,802	122,565	56,744	Volusia	1,264,618	635,635	370,413	165,785	92,785
Indian River	121,731	60,914	48,930	—	11,887	Wakulla	963,172	567,157	22,093	158,937	214,985
Jackson	799,921	307,965	45,207	191,567	255,182	Walton	1,135,832	764,907	48,298	275,481	47,146
Jefferson	1,165,322	528,515	115,242	265,767	255,798	Washington	475,897	172,706	112,629	104,516	86,046
Lafayette	478,225	223,433	114,750	40,665	99,377	Total	39,851,432	18,660,331	6,963,957	7,621,144	6,606,000

Table 43.—Net annual change of growing stock on commercial forest land, by species group and county, Florida, 1979

County	Net change	Pine	Other soft-wood	Soft hard-wood	Hard hard-wood	County	Net change	Pine	Other soft-wood	Soft hard-wood	Hard hard-wood
<i>Thousand cubic feet</i>						<i>Thousand cubic feet</i>					
Alachua	+5,949	+8,225	+711	-1,378	-1,609	Lake	+7,028	+3,578	+1,584	+2,135	-269
Baker	+3,306	-1,039	+1,480	+2,654	+211	Lee	-317	-849	+532	-	-
Bay	+4,656	+3,812	+332	+169	+343	Leon	+3,438	+1,208	+126	+1,540	+564
Bradford	-5,131	-4,719	-856	+491	-47	Levy	+6,864	+4,144	+904	+1,494	+322
Brevard	+5,644	+4,776	+255	+224	+389	Liberty	+15,008	+10,561	+1,462	+2,612	+373
Broward	-	-	-	-	-	Madison	-3,289	-6,422	+327	+2,541	+265
Calhoun	+8,344	+5,627	+217	+1,286	+1,214	Manatee	+801	+319	-	+365	+117
Charlotte	+1,111	+540	+5,161	-	+55	Marion	+17,015	+11,824	+220	+1,791	+3,180
Citrus	+4,222	+2,539	+753	+417	+513	Martin	-53	-113	-	-	+60
Clay	+8,952	+5,732	+471	+1,399	+1,350	Monroe	-	-	-	-	-
Collier	-211	+1,753	+2,917	-1,676	-3,205	Nassau	+17	-3,632	+909	+2,021	+719
Columbia	+9,702	+5,579	+1,193	+2,635	+295	Okaloosa	+6,229	+4,782	+373	+1,039	+35
Dade	-	-	-	-	-	Okeechobee	+2,553	+1,438	+424	+634	+57
De Soto	+712	+117	+123	+426	+46	Orange	+1,707	+774	-97	+1,369	-339
Dixie	-3,053	-6,211	+1,046	+1,400	+712	Osceola	+2,872	+348	+779	+1,537	+208
Duval	+9,690	+6,430	+374	+2,438	+448	Palm Beach	-	-	-	-	-
Escambia	+7,542	+4,184	+81	+1,912	+1,365	Pasco	+5,468	+1,123	+1,802	+1,341	+1,202
Flagler	-3,747	-4,578	+384	-135	+582	Pinellas	-248	-217	+144	+34	-209
Franklin	+1,632	+34	+722	+638	+238	Polk	+3,006	-3,282	+3,245	+2,783	+260
Gadsden	+3,660	+2,854	-	+507	+299	Putnam	+19,364	+15,130	+360	+2,884	+990
Gilchrist	+5,342	+4,261	+380	+250	+451	St. Johns	+12,726	+8,020	+641	+2,494	+1,571
Glades	+2,284	+1,356	+420	+389	+119	St. Lucie	-161	-401	+39	-	+201
Gulf	+203	-1,269	+1,446	-109	+135	Santa Rosa	+15,353	+9,920	+1,510	+2,544	+1,379
Hamilton	+5,349	+3,302	-895	+1,439	+1,503	Sarasota	-874	-1,101	-	+134	+93
Hardee	+3,386	+1,552	+632	+333	+869	Seminole	+358	+381	-281	+104	+154
Hendry	+2,049	+1,465	-89	+180	+493	Sumter	+5,090	+1,943	+228	+1,077	+1,842
Hernando	+3,884	+1,617	+168	+903	+1,196	Suwannee	+4,453	+3,155	+19	+485	+794
Highlands	+2,803	+1,073	+712	+586	+432	Taylor	+415	-5,592	+905	+2,045	+3,057
Hillsborough	+2,626	+210	+1,564	-59	+911	Union	+4,432	+4,266	+57	+759	-650
Holmes	-548	-1,193	+86	+28	+531	Volusia	+12,512	+7,568	+1,263	+2,697	+984
Indian River	-117	-444	+292	+2	+33	Wakulla	-985	-4,791	+108	+1,335	+2,363
Jackson	-3,189	-5,006	+382	+852	+583	Walton	+11,309	+11,067	+147	+513	-418
Jefferson	+246	-1,667	+366	+1,313	+234	Washington	-1,606	-2,608	+417	-52	+637
Lafayette	+6,003	+3,527	+818	+933	+725						
						Total	+243,786	+116,980	+35,148	+60,702	+30,956

Table 44.—Net annual change of sawtimber on commercial forest land, by species group and county, Florida, 1979

County	Net change	Pine	Other soft-wood	Soft hard-wood	Hard hard-wood	County	Net change	Pine	Other soft-wood	Soft hard-wood	Hard hard-wood
<i>Thousand board feet</i>						<i>Thousand board feet</i>					
Alachua	+17,336	+27,640	+3,091	-4,180	-9,215	Lake	+24,206	+13,755	+6,199	+4,568	-316
Baker	+12,138	-2,590	+7,279	+7,342	+107	Lee	+3,835	+1,100	+2,735	—	—
Bay	-5,084	-7,191	+684	+1,012	+411	Leon	+9,507	-445	+398	+6,533	+3,021
Bradford	-22,448	-24,045	+35	+2,038	-476	Levy	+18,531	+1,176	+6,309	+8,847	+2,199
Brevard	+14,882	+10,599	+1,863	+706	+1,714	Liberty	+71,213	+51,262	+8,128	+9,561	+2,262
Broward	—	—	—	—	—	Madison	+14,260	-3,818	+4,107	+9,770	+4,201
Calhoun	+42,222	+25,821	+1,431	+4,576	+10,394	Manatee	+4,335	+2,214	—	+1,596	+525
Charlotte	+970	-478	+1,448	—	—	Marion	+61,058	+41,457	+1,475	+3,421	+14,705
Citrus	+12,831	+3,775	+4,272	+1,992	+2,792	Martin	+1,412	+1,024	—	—	+388
Clay	+28,564	+17,701	+969	+4,972	+4,922	Monroe	—	—	—	—	—
Collier	+6,319	+12,506	+9,764	-1,042	-14,909	Nassau	-3,091	-8,586	+2,961	+3,639	-1,105
Columbia	+46,420	+35,819	+4,089	+7,200	-688	Okaloosa	+18,581	+15,662	+4,381	+630	-2,092
Dade	—	—	—	—	—	Okeechobee	+8,851	+2,297	+2,905	+3,436	+213
De Soto	+4,133	+996	+1,258	+1,634	+245	Orange	+1,697	-408	-1,465	+4,415	-845
Dixie	-36,260	-43,955	+5,356	+2,018	+321	Osceola	+10,870	+4,009	+2,449	+3,195	+1,217
Duval	+30,172	+18,970	+1,011	+8,642	+1,549	Palm Beach	—	—	—	—	—
Escambia	+24,794	+10,387	+360	+7,947	+6,100	Pasco	+22,350	+4,275	+8,284	+5,244	+4,547
Flagler	-17,736	-26,752	+5,717	+316	+2,983	Pinellas	+956	-411	+1,219	+148	—
Franklin	+3,252	-1,781	+2,968	+1,181	+884	Polk	+14,948	-7,332	+13,046	+6,819	+2,415
Gadsden	+11,954	+5,798	—	+3,487	+2,669	Putnam	+40,367	+27,273	+1,636	+8,225	+3,233
Gilchrist	+26,704	+22,657	+2,193	+381	+1,473	St. Johns	+30,119	+13,439	+2,898	+7,719	+6,063
Glades	+4,371	+347	+2,552	+1,007	+465	St. Lucie	-991	-1,446	+280	—	+175
Gulf	+2,150	-6,693	+5,701	+1,012	+2,130	Santa Rosa	+44,802	+29,325	+4,944	+6,469	+4,064
Hamilton	+13,190	+8,866	-3,549	+3,563	+4,310	Sarasota	-5,997	-6,876	—	+365	+514
Hardee	+16,866	+9,626	+3,206	+1,006	+3,028	Seminole	+6,385	+5,725	-1,451	+1,244	+867
Hendry	+13,184	+5,238	+2,424	+3,413	+2,109	Sumter	+18,164	+4,736	+1,107	+5,124	+7,197
Hernando	+19,889	+8,638	+1,115	+4,117	+6,019	Suwannee	+14,796	+9,253	+114	+2,272	+3,157
Highlands	+11,800	+3,148	+4,543	+2,836	+1,273	Taylor	-28,527	-53,407	+3,348	+4,644	+16,888
Hillsborough	+18,126	+1,236	+11,862	-176	+5,204	Union	+8,225	+8,410	+1,733	+1,208	-3,126
Holmes	+5,149	+6,798	+468	-2,182	+65	Volusia	+40,011	+26,863	+2,981	+4,859	+5,308
Indian River	+496	-1,531	+1,793	—	+234	Wakulla	+12,705	-827	+365	+5,066	+8,101
Jackson	+12,035	+4,650	+1,573	+2,345	+3,467	Walton	+52,981	+47,281	+918	+6,544	-1,762
Jefferson	+13,097	+8,766	+2,068	+2,871	-608	Washington	-12,831	-16,617	+2,457	-721	+2,050
Lafayette	+10,523	+3,202	+3,685	-1,130	+4,766	Total	+845,767	+348,531	+175,690	+193,744	+127,802

Bechtold, William A.; Knight, Herbert A.

1982. Florida's forests. Resour. Bull. SE-62. Asheville, NC: U.S. Department of Agriculture, Southeastern Forest Experiment Station. 84 p.

Since 1970, area of commercial forest land has declined by 597,000 acres. Growing-stock volume on commercial forest has increased from 11.6 to 13.6 billion cubic feet. Net annual growth has increased from 33 to 50 cubic feet per acre of commercial forest. The acreage planted to pine each year has declined by 24 percent, pine sapling-seedling stands have decreased by 14 percent, and hardwood sapling-seedling stands have increased by 39 percent. Growing-stock removals have increased by 56 percent. About 1 acre was replaced by a manageable stand for every 2 acres harvested and retained in forest. Opportunities exist to improve production on 7.3 million acres of forest.

KEYWORDS: Forest trends, commercial forest land, forest ownership, timber volume, timber growth, timber removals.

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