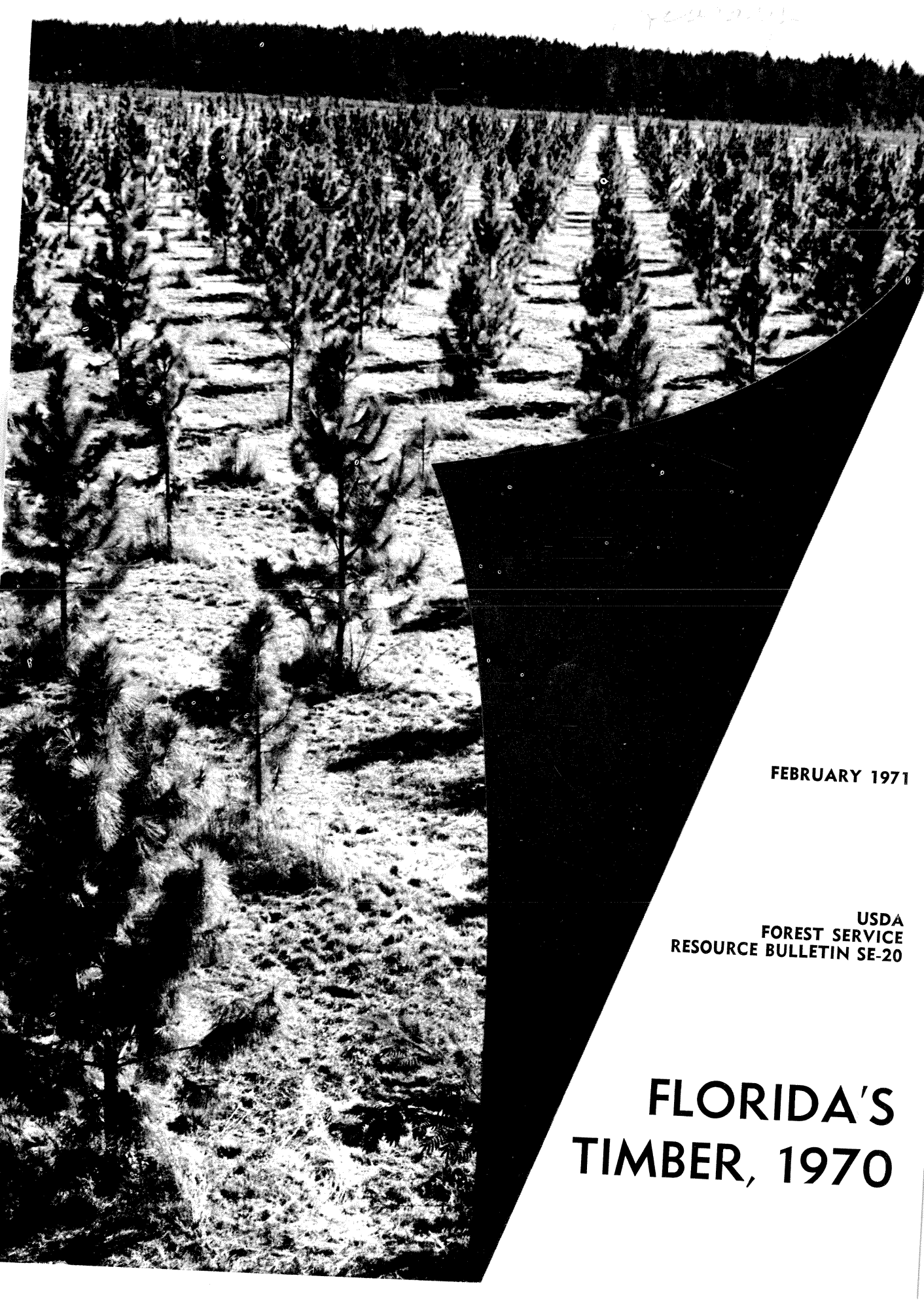


FEBRUARY 1971

USDA
FOREST SERVICE
RESOURCE BULLETIN SE-20

FLORIDA'S TIMBER, 1970

Contents

Foreword

This report presents the principal findings of the fourth Forest Survey of Florida's timber resource. The survey was started in July 1968 and completed in June 1970. Findings of the three previous surveys, completed in 1936, 1949, and 1959, provide the basis for measuring changes that have occurred and trends that have developed over the past 34 years. In this report, however, the primary emphasis is on the changes and trends that have taken place since the last survey.

More detailed breakdowns of these data, including many county tables, are found in four Survey Unit reports issued as the survey progressed through the State. Copies of these reports are available from the Southeastern Forest Experiment Station.

Forest Survey, authorized by the McSweeney-McNary Forest Research Act of 1928, is a continuing nationwide undertaking by the regional experiment stations of the Forest Service, USDA. In Florida, Georgia, North Carolina, South Carolina, and Virginia, Forest Survey is an activity of the Southeastern Forest Experiment Station, with headquarters at Asheville, North Carolina. The objective is to inventory periodically the forest lands, their extent, condition, and volume of timber, and to ascertain rates of timber growth and depletion. It is necessary to keep this basic information up to date to provide a sound basis for the formulation of forest policies and programs.

The combined efforts of many people have gone into the Forest Survey in Florida. Appreciation is expressed to all Station personnel who participated in the field and office work. The Southeastern Station also gratefully acknowledges the cooperation and substantial assistance provided by the Division of Forestry, Florida Department of Agriculture and Consumer Services.

Joe P. McClure, Project Leader of the Forest Survey in the Southeast, planned and coordinated the various phases of the Survey. Noel D. Cost was in charge of data collection. William H. B. Haines, assisted by Robert A. Cathey, was in charge of the processing and computations. Richard L. Welch was in charge of the remeasurement studies. Herbert A. Knight was in charge of analysis and reporting. Thomas R. Bellamy and John D. Nesbit supervised the field crews, and Nolan D. Snyder was responsible for the special studies on volume, ownership, and utilization.

The discussion of other recognized forest values in Florida—water, fish and wildlife, range, and recreation—is beyond the scope of this report. The purpose of this publication is to appraise the timber situation.

DEAN N. QUINNEY, Assistant Director
Division of Watershed, Utilization,
Resources, and Marketing Research

The authors wish to express their thanks to the Division of Forestry, Florida Department of Agriculture and Consumer Services for providing the cover photograph and the illustrations on pages 4, 11, 16, 21, and 26.

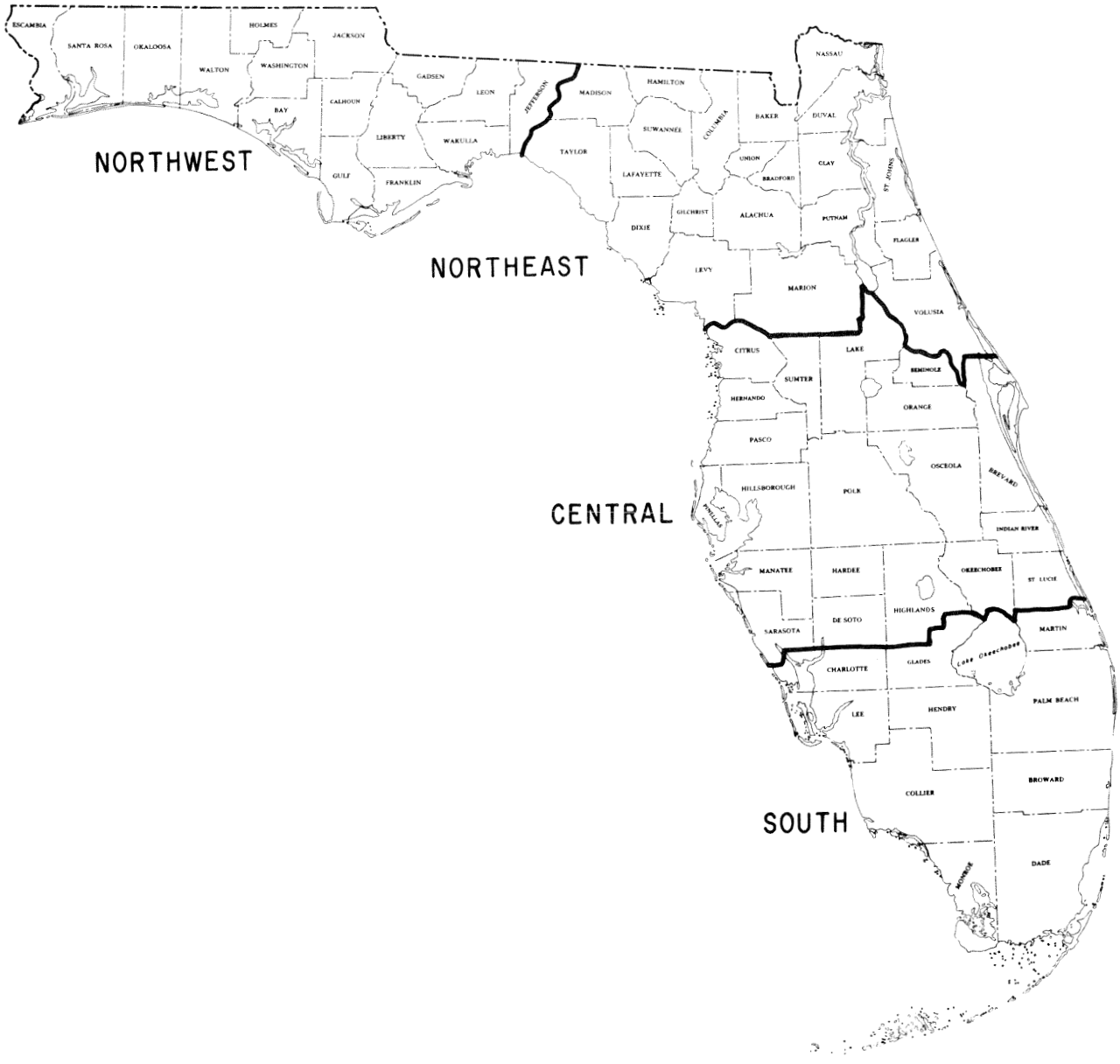


Figure 1.—Forest Survey Units in Florida.

FLORIDA'S TIMBER, 1970

by

HERBERT A. KNIGHT, Associate Resource Analyst

and

JOE P. McCLURE, Principal Resource Analyst

Highlights

Since the third Forest Survey in Florida was completed in 1959—

—area of commercial forest has actually decreased by 0.9 million acres, or about 5 percent, because of land clearing for agricultural use and urban development. An additional 2.7 million acres in South and Central Florida formerly classified as commercial forest were reclassified either to natural rangeland or unproductive forest in this latest survey. Together, these changes have reduced the commercial forest base to 16.2 million acres, which is 46 percent of the total land.

—area of commercial forest owned or controlled by forest industry has increased from 4.5 to over 5.2 million acres, or about 15 percent. Forest industry controls a greater portion of the commercial forest area, about one-third, in Florida than in any other State in the South. Practically all of the decrease in commercial forest area has occurred in the private, nonindustrial holdings which now total 8.9 million acres. The remaining 2.1 million acres are publicly owned.

—area of commercial forest in the slash pine type has increased from 5.3 to over 5.4 million acres, in spite of the sharp reduction in total forest area. Area in the longleaf pine type has dropped sharply from 4.2 to 1.5 million acres. Improved fire protection and the preference given to slash pine in artificial regeneration have contributed to the replacement of longleaf pine with slash pine. Oak-gum-cypress is the second leading type with almost 4.0 million acres.

—area of nonstocked forest land has been reduced from 6.9 to 2.6 million acres. These lands are less than 16.7 percent stocked with growing-stock trees of any size; however, rough and rotten trees or other inhibiting vegetation occupy much of this growing space. Of course, the reclassification of 2.7 million acres in South and Central Florida accounts for part of the reduction. Nevertheless, the trend still shows that considerable progress has been made through the natural and artificial regeneration of areas formerly nonstocked.

—about 2.0 million acres, or 12 percent, of the commercial forest land have been artificially regenerated, which brings the total area planted up to 2.8 million acres. The peak planting years were 1957 through 1960, when the area planted averaged over 200,000 acres annually. The planting effort has been most extensive in Northeast Florida, where about one out of every four acres of commercial forest has been artificially regenerated.

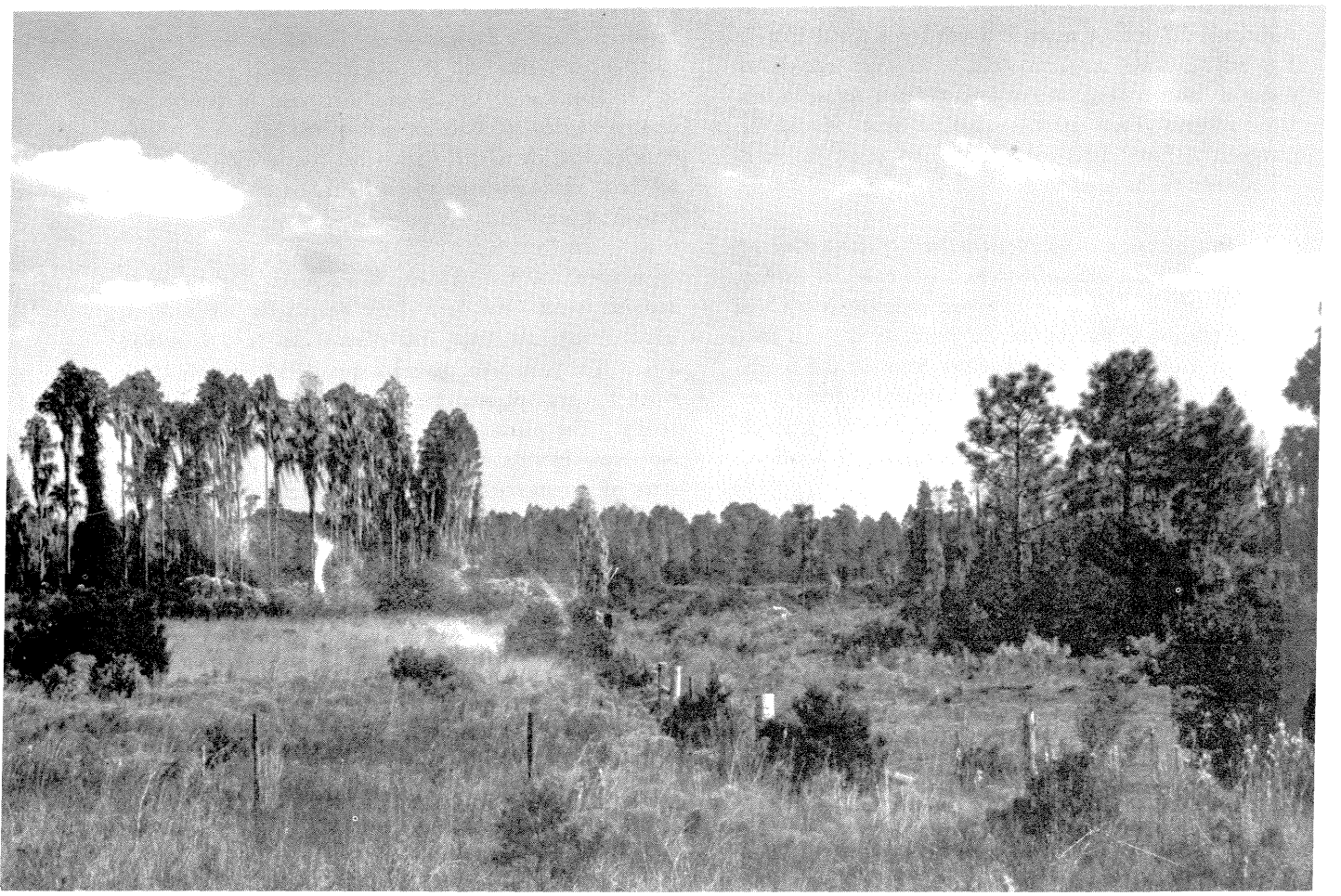
—stocking on commercial forest land has improved, but almost one-half of the stands are still poorly stocked with growing-stock trees. Average basal area of all live trees 5.0 inches d.b.h. and larger has increased from 30 to 43 square feet per acre, and there are about 87 more sapling-size trees per acre on the average than in 1959.

Rough trees (suitable only for fiber products), rotten trees, and other inhibiting vegetation occupy over one-fifth of the growing space.

—volume of growing stock has increased from about 9.1 to almost 10.9 billion cubic feet, or 20 percent. About 79 percent of this increase has been in softwood, primarily pine. In fact, the buildup in the inventory of slash pine alone accounts for 1.0 billion cubic feet of the net gain. Volume of hardwood growing stock has increased from 3.6 to almost 4.0 billion cubic feet, or about 11 percent. Across the entire State, volume of all growing stock averages 671 cubic feet per acre of commercial forest, and ranges from a high of 712 cubic feet in Northeast Florida to a low of 474 cubic feet in South Florida. By ownership class, volume is fairly well distributed in proportion to forest area owned, except on the National Forests where average volume per acre is one-third greater than the average for the State. The current inventory of growing stock includes over 30 billion board feet of sawtimber.

—net annual growth of growing stock has increased from 427 to 532 million cubic feet, or 25 percent, and now averages 33 cubic feet per acre of commercial forest. This is still less than half of the growth potential of Florida's existing forests. About 78 percent of this net growth is softwood. In 1969, ingrowth into the 6-inch diameter class accounted for 18 percent of the gross growth, and ranged as high as 20 percent in Northeast Florida where many of the older plantations are reaching poletimber size. Mortality of growing stock totaled almost 71 million cubic feet and reduced gross growth by nearly 12 percent. Over one-half of the mortality was hardwood. Fire, suppression, and weather were the leading identifiable causes of death, although insects and disease continue to take their toll each year. The highest incidence of mortality was found in South and Central Florida.

—it is estimated that the annual removals of growing stock have increased from 292 to 348 million cubic feet, or 19 percent. Pulpwood is the leading timber product in terms of volume, and the annual harvest of pulpwood is increasing rapidly in Florida. A decline in the annual production of lumber apparently bottomed out in 1962, and production since has shown an upward trend. Although it was estimated that net growth of growing stock exceeded removals by 184 million cubic feet, or 53 percent, in 1969, the likelihood is that the increases in annual timber requirements in Florida will exceed the prospective increases in net growth in the future.



Timber Trends

AREA OF COMMERCIAL FOREST DECLINING

The first Forest Survey in Florida was completed in 1936 when the population in the State totaled only about 1.7 million people. Forests occupied over two-thirds of the State's land area, and area of commercial timberland totaled 21.9 million acres. In the Nation, only Oregon had more commercial forest area at the time.

A review of the findings of that first Forest Survey in Florida, however, shows that forest conditions were certainly less than encouraging so far as the future timber supply was concerned. About 5 million acres had been clearcut and burned over until they were practically denuded, and forest land in general was badly understocked. Cattle raising was growing rapidly and most of the pine lands were burned over annually to improve the range for grazing. It was estimated that over half of the gross growth was being lost to mortality each year, and the annual harvest of timber exceeded net growth by over two-thirds.

During the 34 years which have elapsed since that first Forest Survey, many changes have occurred which have greatly altered the timber situation in Florida. As the result of the foresight and combined actions of public, industrial, and other private leaders and landowners, considerable progress has been made toward alleviating many of the problems which confronted forestry efforts in 1936. Most of the State's timberland has been brought under fire protection, some 2.8 million acres of commercial forest have been artificially regenerated, extensive areas have been placed under intensive forest management, better markets for timber products have been developed, and a more favorable relationship has been established between the net annual growth and removals of timber.

Over this same 34-year period, changes have presented forestry with some new problems. The State's climate and general environment has attracted an influx of an additional 5 million people into the State—a growth rate unmatched anywhere in the South. The housing, transportation, and utility requirements of these people have introduced keen competition among the various land uses, and have brought considerable pressure upon Florida's forest base in terms of the amount of land available for timber production. In addition, areas devoted to citrus, sugar, vegetable and other crop production, and pasture have been greatly expanded, particularly in the South and Central Survey Units (fig. 1). Land speculators have also tied up large areas which otherwise would provide some forestry opportunity. One measured result of all these developments has been a net reduction of 5.7 million acres in the forest base over the past 34 years.

The new Forest Survey findings show that the area of commercial forest land has been reduced to 16.2 million acres, or 46 percent of the total land, and that the erosion of the forest base is continuing. Since 1959, area of commercial forest land has actually decreased by 940,400 acres, or about 5 percent. An additional 2,673,500 acres in South and Central Florida formerly classified as commercial forest were reclassified either to natural rangeland or unproductive forest in this latest survey (table I). Practically no timber or evidence of reproduction occurs on the areas reclassified as rangeland, and very little timber is involved on the areas reclassified as unproductive. Some of these "wild lands" offer forestry opportunities, but apparently will not restock naturally under existing conditions. Until and unless actions are taken to alter these conditions, the continued inclusion of these marginal lands in the forest base would only tend to distort the forestry picture in Florida.

The continued diversion of commercial forest land to other uses at the rate described will eventually place rigid limitations on the amount of timber that can be grown in Florida. Wise and well-planned decisions on land use will be imperative to the achievement of a satisfactory balance among forestry and the other economic interests in the

Table I.—Changes in area of commercial forest land, by Survey Unit, Florida, 1959-1970

Survey Unit	Area of commercial forest land in:		Net change	Changes								
				Total gain	Additions from:		Total loss	Diversions to:				
					Non-forest	Noncommercial forest		Noncommercial forest	Agriculture	Urban and other	Water	Rangeland[2]
	1959[1]	1970		*Thousand acres*								
Northeast	7,251.0	7,060.9	— 190.1	323.2	299.8	23.4	513.3	1.5	291.1	209.2	11.5	—
Northwest	5,746.5	5,735.2	— 11.3	321.3	315.1	6.2	332.6	2.1	230.1	100.1	0.3	—
Central	4,961.7	2,708.0	—2,253.7	56.4	56.4	—	2,310.1	8.3	333.2	234.1	13.8	1,720.7
South	1,886.3	727.5	—1,158.8	22.9	22.9	—	1,181.7	[3]441.4	97.1	131.8	—	511.4
State	19,845.5	16,231.6	—3,613.9	723.8	694.2	29.6	4,337.7	453.3	951.5	675.2	25.6	2,232.1

[1]These figures differ slightly from reported figures because of revisions in the estimates of land area.
[2]Classified as nonstocked forest land in 1959, but reclassified as rangeland in this latest Forest Survey.
[3]Classified as commercial forest land in 1959, but reclassified as unproductive in this latest Forest Survey.

future. Up to some undetermined point, the loss in commercial forest land can be offset by greater timber yields per acre which in fact has been the past pattern. There is still a wide gap in Florida between current average growth per acre and the potential average yield. However, the long-range implications of a rapidly shrinking forest base should not be overlooked.

Almost 79 percent of the commercial forests are in the Northeast and Northwest Survey Units, and these areas are still the mainstay of the State's future timber supply (fig. 2). This does not mean that forestry has been written off in South and Central Florida. In spite of the silvicultural problems and competition from other endeavors, forestry will remain one of the economic alternatives available in much of the inland area of South and Central Florida for some time to come.

FOREST INDUSTRY HOLDINGS INCREASING

The condition of forest lands, the amount and kind of forest management applied, and prospective timber growth all depend to a great extent upon the decisions and interests of the various forest owners. Ownership thus represents a key factor in assessing timber trends. The forest ownership pattern in Florida is somewhat unique in that forest industry controls a greater portion of the commercial forest area than in any other State in the South.

In 1959, forest industry owned 4.5 million acres, or 23 percent of the commercial forest land in Florida. Forest industry now owns or controls over 5.2 million acres, or about one-third of the commercial forest. Almost two-thirds of this industry land is in Northeast Florida where

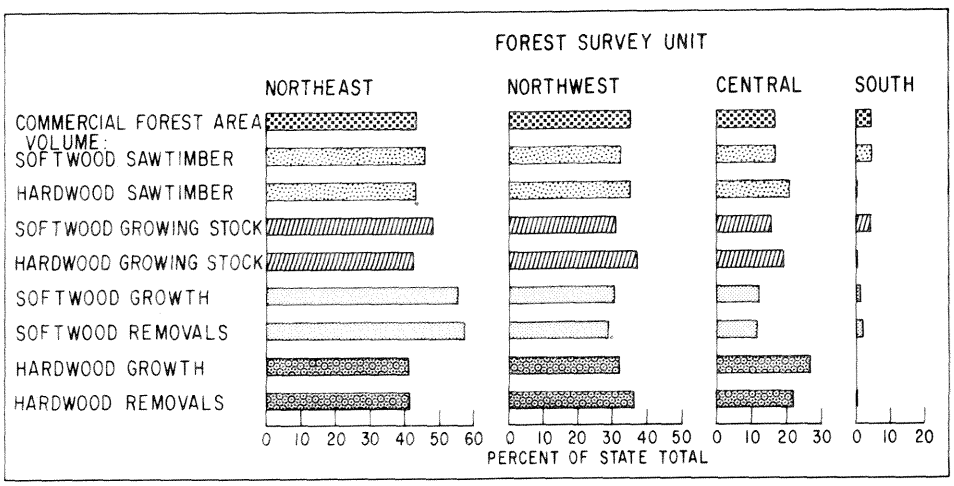


Figure 2.—Relative importance of forest resource by Survey Unit, Florida, 1970.

about half of the total commercial forest is either owned by forest industry or under forest industry management.

It is assumed that most of the industry land will be managed with the primary objective of growing timber. Most of this land is owned by pulp and paper companies which are well equipped with the silvicultural and technological tools to maximize timber growth. With today's growing concern over the management and use of the forests, perhaps it should be emphasized that most of the industry forests are open to the public for nontimber uses, such as hunting and recreation, with only reasonable restrictions. The Survey found various agricultural activities on forest industry lands in certain areas. For the most part they are temporary or intermediate endeavors undertaken to help defray the cost of site preparation required for regeneration.

Another 2.1 million acres, or 13 percent of the commercial forest land, are publicly owned, compared to 2.2 million acres in 1959. Over half of the publicly owned forest land is in the Northwest Survey Unit and is mostly in three large holdings: Apalachicola National Forest, Eglin Air Force Base, and the Blackwater River State Forest. Other similar holdings elsewhere in the State include the Ocala National Forest, Osceola National Forest, the Florida Military Department (Camp Blanding), Withlacoochee State Forest, Avon Park Air Force Range, J. W. Corbett Wildlife Management Area, and the Big Cypress Indian Reservation. These latest survey statistics show that considerable progress has been made toward building up the timber inventories on these public lands. The wise management of these publicly owned forests should help achieve and sustain a well-balanced timber supply in Florida in the future, and at the same time provide enjoyment and other forest values for all the people.

The remaining 8.9 million acres, or 55 percent of the commercial forest land, are owned by farmers and other miscellaneous private individuals and corporations. There is great diversity of interest in timber growing among the thousands of landowners who are grouped into this private, nonindustrial ownership category. Within this broad ownership group, at least two trends merit mention here. First, practically all of the diversion of commercial forest land to other uses has occurred in this group. Second, there has been a substantial shift of farmer-owned forest land to the miscellaneous-private owner class.

Altogether, this sector is still providing half of the annual timber harvest in Florida. This important source of timber must be nurtured and sustained through forestry programs and policies that will stimulate interest in timber growing and maintain an economic environment which will make forestry endeavors profitable to the landowners. Florida's present and future forest economy depends to a large measure upon the actions taken and progress made in this area.

SLASH PINE REPLACING LONGLEAF PINE

Although cypress and hardwoods occupy about half of the commercial forest land, pine is the lifeblood of Florida's forest industries. At the time of the first Forest Survey in 1936, longleaf pine was the leading forest type and occupied about 45 percent of the total commercial forest land. Today, longleaf pine occupies less than 10 percent of the forest land, and slash pine has taken over as the leading type and occupies one-third of the total forest area. Improved fire protection and the preference of slash pine in artificial regeneration have contributed greatly to the replacement of longleaf pine with slash pine. Although the differences in wood properties and product suitability between these two species do not warrant belaboring the trend, differences in the silvicultural characteristics are recognized and give the findings significance. Generally, pine sites in Florida support a higher level of tree stocking and produce greater timber yields with slash pine than with longleaf pine because of differences in seeding habits and seedling growth.

Another pine species and forest type, sand pine, also shows an upward trend in Florida. The area occupied with sand pine has increased by about 20 percent since 1959 and now totals over a half million acres. About 55 percent of the sand pine forests are publicly owned and the species is prevalent in the Ocala National Forest and Eglin Air Force Base. Sand pine shows considerable promise on selected sites in Florida in terms of prospective timber yields.

Although this analysis has already characterized Florida as a "pine timber" State, the second leading forest type is oak-gum-cypress which occupies almost 4 million acres of the commercial forest land. These forests have the highest average volume of timber per acre of all the timber types in the State. The species which make up this forest type provide a needed balance to the timber supply and are important to many of the State's wood-using industries, particularly the hardwood veneer industry. The oak-gum-cypress timber type occurs throughout the State, and about 92 percent of these forests are privately owned. Accessibility is a problem in many of

these stands and the management of these forests presents foresters with a real challenge. The treatment of these forests will largely determine Florida's future supply of cypress and hardwood timber.

Oak-pine is another important timber type in Florida and occupies almost 1.7 million acres of commercial forest land. Hardwoods are dominant in this type, although pine makes up from 25 to 50 percent of the stocking. The type occupied less than a million acres in 1959, and the increase is attributed to the practice of harvesting the pine and leaving a residual of low-quality hardwood timber and mixed reproduction. Treatment that would reestablish the pine offers the most promising opportunity for improving the timber yields on these lands.

Finally, the 2.3 million acres of oak-hickory forest type, in their present condition, are the least productive of all Florida's forests. This type has the lowest average volume per acre in the State and turkey oak, bluejack, blackjack, and other scrub oaks dominate the stocking in over half of the stands. Other stands within this type contain nothing better than poorly formed live oak and other low quality hardwoods. Almost a third of the volume is in trees which do not qualify as growing stock, even when Forest Survey's most lenient specifications are applied. Most of the dry, upland sites involved will never produce quality hardwood; therefore, removal operations, site preparation, and artificial establishment of pine are required if the growth potential of these areas is to be realized.

LESS FOREST LAND IS NONSTOCKED

In 1959 there were slightly less than 4.0 million acres of sapling and seedling stands in Florida; today there are over 4.5 million acres. Much of this increase can be attributed to the extensive tree planting programs which have been carried on throughout the remeasurement period. There is an average of 365 sapling-sized trees per acre of commercial forest land and about 200 of these trees are considered growing stock. The greatest abundance of young growing-stock trees occurs in the Northeast Survey Unit.

Over this same remeasurement period, the area occupied with poletimber and sawtimber stands has increased from 8.7 to 9.1 millian acres, or about 5 percent. Volume of all live trees 5.0 inches d.b.h. and larger averages 773 cubic feet per acre of commercial forest land and about 671 cubic feet of this volume is in growing-stock trees. Volume of sawtimber averages 1,877 board feet per acre.

Area of nonstocked forest land has been reduced from 6.9 to 2.6 million acres since 1959. These stands are less than 16.7 percent stocked with growing-stock trees of any size; however, rough and rotten trees or other inhibiting vegetation occupy much of this growing space. Of course, the reclassification of almost 2.7 million acres in South and Central Florida accounts for part of the reduction in the area of nonstocked forest. Nevertheless, the trend still shows that considerable progress has been made through the natural and artificial regeneration of many areas that were nonstocked in 1959.

MORE TIMBER ON FEWER ACRES

Although area of commercial forest land is declining in Florida, volume of timber is on the increase (fig. 3). Since 1959, volume of growing stock has increased from about 9.1 to almost 10.9 billion cubic feet, or 20 percent. About 79 percent of this increase has been in softwood, primarily southern yellow pine. In fact, the buildup in the inventory of slash pine alone accounted for 1.0 billion cubic feet of the net gain. This means that slash pine has now taken a commanding lead over both cypress and longleaf pine in Florida in terms of timber volume.

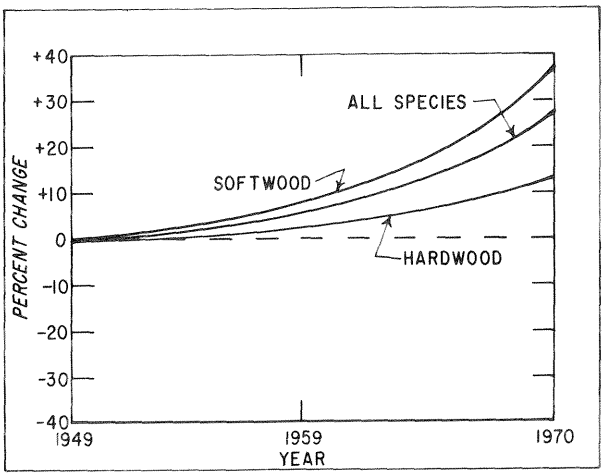


Figure 3.—Percent change in the volume of growing-stock timber in Florida since 1949.

Volume of hardwood growing stock has increased from 3.6 to almost 4.0 billion cubic feet, or about 11 percent. Together, blackgum, sweetgum, and tupelo make up over 1.5 billion cubic feet of the hardwood inventory and have accounted for over half of the increase. Volume of the various species of oak totals almost 1.1 billion cubic feet. Bay and magnolia account for another 0.5 billion cubic feet of the hardwood inventory.

Across the entire State, volume of growing-stock timber averages 671 cubic feet per acre of commercial forest land. By Forest Survey Unit, the average ranges from a high of 712 cubic feet in Northeast Florida to a low of 474 cubic feet in South Florida. By ownership class, volume is fairly well distributed in proportion to forest area owned, except on the National Forests where average volume per acre is a third greater than the average for the State.

In this section, the analysis of volume has been based on cubic volume of growing stock; however, changes in the volume of sawtimber since 1959 follow a similar pattern. Across the State, volume of sawtimber averages 1,877 board feet per acre of commercial forest land.

In addition to the 10.9 billion cubic feet of growing-stock timber in Florida, there is almost 1.7 billion cubic feet of wood in scrub oaks, other poorly formed trees, and trees with an excessive amount of internal rot. Much of this material is suitable for fiber products, fuelwood, or other local use, but it has practically no commercial value to producers of lumber, veneer, and plywood.

Questions continue to arise among the readers of Forest Survey reports concerning the terminology used in the breakdowns and discussion of timber volume. Although the definitions of terms in the Appendix are intended to answer the questions, perhaps a few statements here will help to clarify some of the most common misinterpretations:

1. Volume of all timber includes the net cubic volume of all live trees 5.0 inches d.b.h. and larger measured from the 1-foot stump to 4.0 inches d.o.b. (In table 11, the volume of salvable dead trees is added.)

2. Volume of growing stock differs from volume of all timber in that rough trees and rotten trees are excluded.

3. Volume of sawtimber is the net board-foot volume in the saw-log portion of all live, softwood growing-stock trees 9.0 inches d.b.h. and larger, and all live, hardwood growing-stock trees 11.0 inches d.b.h. and larger.

To provide a basis for valid comparisons, we have applied current volume equations and merchantability standards to the stem counts made in the previous surveys. This means that the volumes published previously have been adjusted, and changes in volume between surveys are based on changes in number of trees by size classes.

ANNUAL GROWTH UP 25 PERCENT

Net annual growth, especially the growth of softwood, has responded to an improvement in stocking and the buildup in inventory (fig. 4). Since 1958, net annual growth of growing stock has increased from about 427 to 532 million cubic feet, or 25 percent, and now averages 33 cubic feet per acre of commercial forest land. About 78 percent of this growth is softwood and the remaining 22 percent is hardwood. In 1969, net growth of growing stock exceeded removals by 184 million cubic feet, or 53 percent.

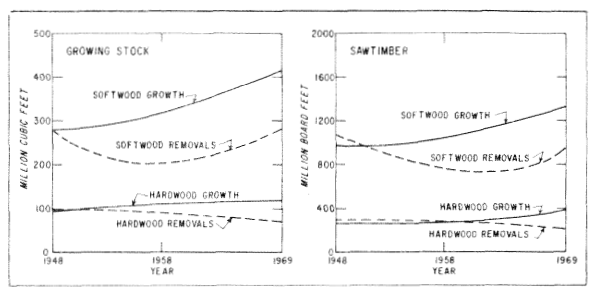


Figure 4.—Trend in net growth and timber removals in Florida since 1948.

The remeasurement of permanent sample plots, established in 1958 and 1959, made possible a more efficient and accurate procedure for determining growth, removals, and mortality. The procedure also provided data for a more detailed breakdown and analysis of these components of change (table II). For example, the findings show that survivor growth accounted for 79 percent of the gross growth in 1969. Survivor growth is the volume increment of growing-stock trees 5.0 inches d.b.h. and larger which were in the inventory at the beginning of the year and were still in the inventory at the end of the year. Ingrowth accounted for 18 percent of the gross growth, but ranged as high as 20 percent in Northeast Florida, where many of the older pine plantations are reaching poletimber size. Ingrowth is the net volume of growing-stock trees which grew into the 6-inch diameter class during the year. Growth on ingrowth, growth on removals before cutting, and growth on mortality before death made up the remaining 3 percent.

In 1969, mortality of growing stock totaled almost 71 million cubic feet and reduced gross growth by nearly 12 percent. Over half of the mortality was hardwood. Fire, suppression, and weather were the leading identifiable causes of death. Disease and insects, however, continue to take their toll each year. The highest incidence of mortality was found in South and Central Florida,

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, 1969

Survey Unit and species group	Gross growth	Components of growth					Mortality	Net growth	Removals	Net change
		Survivor growth	Ingrowth	Growth on ingrowth	Growth on removals	Growth on mortality				
	Million cubic feet									
Northeast:										
Softwood	240.7	181.9	49.8	4.1	4.6	0.3	10.8	229.9	159.3	+ 70.6
Hardwood	65.2	53.0	10.9	0.6	0.4	0.3	17.4	47.8	28.7	+ 19.1
Total	305.9	234.9	60.7	4.7	5.0	0.6	28.2	277.7	188.0	+ 89.7
Northwest:										
Softwood	133.0	105.4	23.2	2.0	2.2	0.2	6.1	126.9	80.1	+ 46.8
Hardwood	46.2	40.2	5.3	0.2	0.4	0.1	9.0	37.2	25.1	+ 12.1
Total	179.2	145.6	28.5	2.2	2.6	0.3	15.1	164.1	105.2	+ 58.9
Central:										
Softwood	59.2	46.8	10.4	1.0	0.8	0.2	7.3	51.9	32.8	+ 19.1
Hardwood	44.0	38.8	4.5	0.2	0.3	0.2	12.7	31.3	15.4	+ 15.9
Total	103.2	85.6	14.9	1.2	1.1	0.4	20.0	83.2	48.2	+ 35.0
South:										
Softwood	12.3	9.9	2.1	0.1	0.1	0.1	5.5	6.8	6.1	+ 0.7
Hardwood	2.0	1.4	0.6	[1]	[1]	[1]	2.0	—	0.4	— 0.4
Total	14.3	11.3	2.7	0.1	0.1	0.1	7.5	6.8	6.5	+ 0.3
State:										
Softwood	445.2	344.0	85.5	7.2	7.7	0.8	29.7	415.5	278.3	+137.2
Hardwood	157.4	133.4	21.3	1.0	1.1	0.6	41.1	116.3	69.6	+ 46.7
Total	602.6	477.4	106.8	8.2	8.8	1.4	70.8	531.8	347.9	+183.9

[1]Negligible amount.

where the destructive agents drained off over 20 percent of the gross growth.

Although the 71 million cubic feet of wood in those trees killed by destructive agents in Florida during 1969 could conceivably have provided for all of the State's wood requirements for at least 3 months, it still represents only a partial measure of the total loss. An additional but undetermined volume was lost through the retardation of growth and the reduction of quality in other trees damaged but not killed. Efforts and programs aimed at reducing mortality and minimizing the annual loss of timber in Florida's forests deserve the continued support of all its citizens.

Timber Products Output

TIMBER IS A LARGE CONTRIBUTOR TO FLORIDA'S ECONOMY

In early 1970, the Division of Forestry, Florida Department of Agriculture and Consumer Services, conducted a Statewide survey of timber products output. The results of this survey and other available data show that the output of roundwood products in Florida totaled 295 million cubic feet in 1969. The stumpage value of this amount of timber is estimated at $40 million. A conservative estimate of the value added to each dollar of stumpage is $25 during the harvesting, primary and secondary manufacturing, transportation, and marketing of this timber. This means that the harvest of 295 million cubic feet of timber contributed an additional $1 billion to the State's and Nation's economy.

There are also other statistics available which help to provide a measure of the importance of timber in Florida. For example, there are approximately 33,400 people directly employed in the timber-based industries. The estimated annual payroll of the timber-based industries

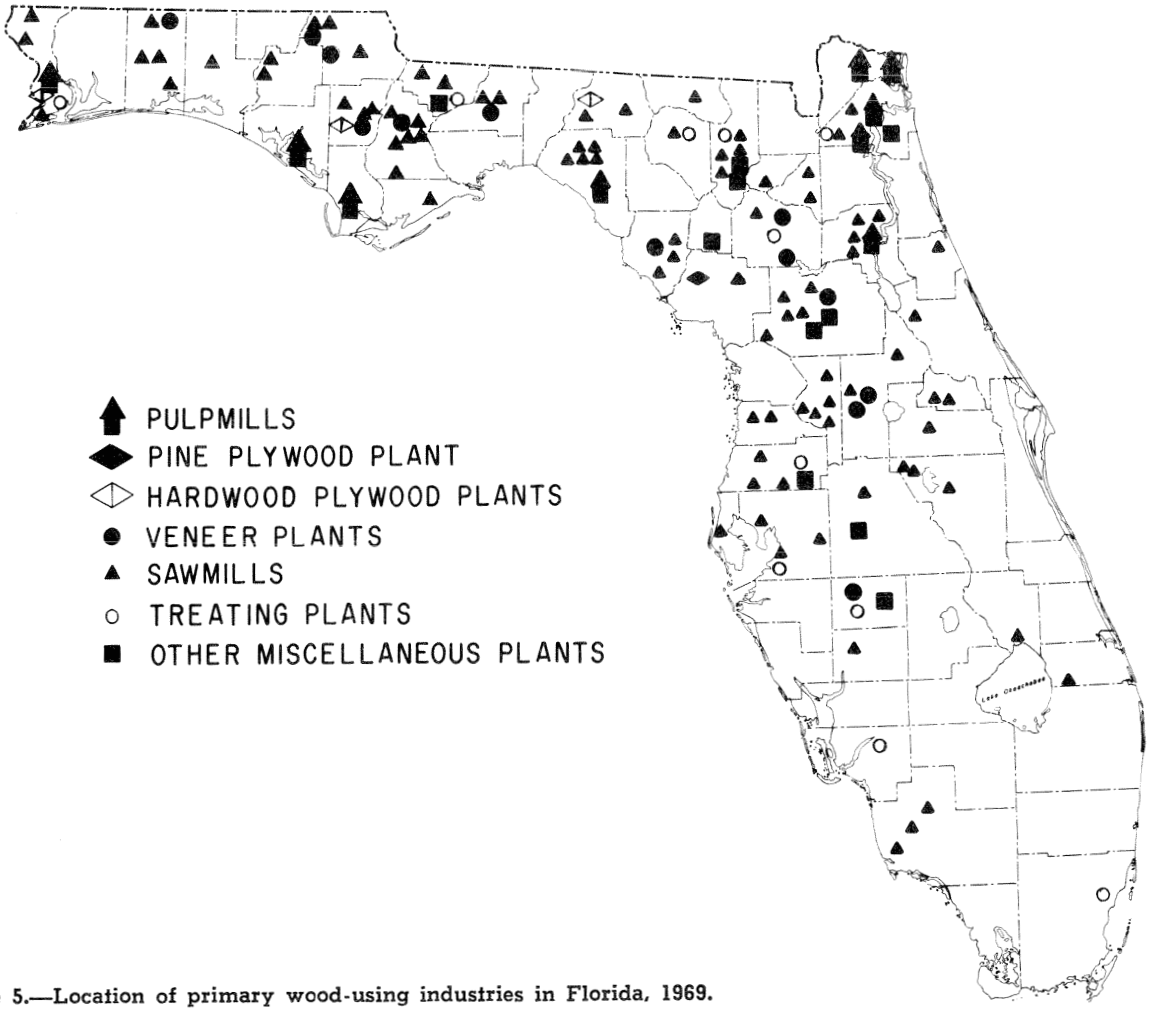


Figure 5.—Location of primary wood-using industries in Florida, 1969.

exceeds $215 million. This means that the forest products industry ranks second only to the food and kindred products industry in Florida in terms of number of employees and annual payroll.

In 1969, there were 139 primary wood-using plants operating in the State. These plants are highly concentrated in North Florida. Local markets for timber are extremely sparse in the southern part of the State (fig. 5).

PULPWOOD IS THE LEADING TIMBER PRODUCT

Since 1950, the annual production of pulpwood in Florida has increased from 1.4 to over 3.4 million cords, or almost 2½ times (fig. 6). In 1969, production of roundwood and plant byproducts together totaled 249 million cubic feet. About 12 percent of this total was chips and byproducts from sawmills and other wood-using plants and did not represent a direct drain from standing timber. Without this kind of wood utilization, 8 to 9 percent more timber would have had to be harvested to supply the mills in 1969.

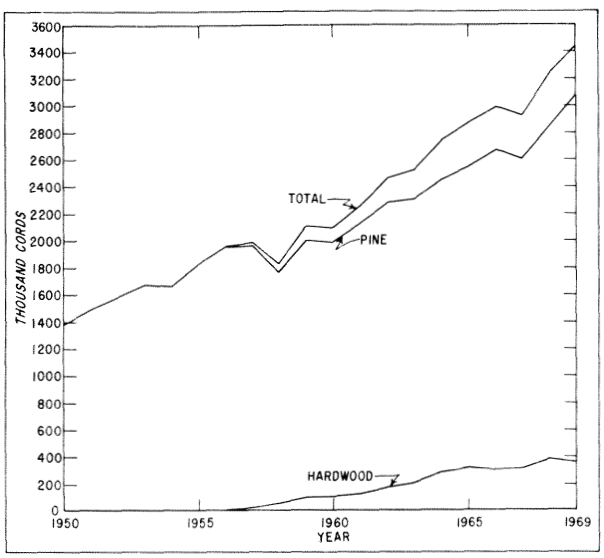


Figure 6.—Pulpwood production in Florida, including byproducts, 1950 to 1969.

Softwoods, primarily southern yellow pine, provided 90 percent of the pulpwood production, which means that only 10 percent of the total came from hardwood. Still, these figures show a trend toward greater use of hardwood. As recent as 1960, only 5 percent of the pulpwood production in Florida was hardwood.

The 1962 study, "Timber Trends in the United States," projected that the production of pulpwood in the Nation would double by 1995. A more recent study, "Projected Demands for Paper and Board," Forest Resource Report No. 18, issued by USDA Forest Service in 1967, indicates that the 1962 level of production will be double some 10 years sooner, or by 1985. Although these projections do not necessarily apply to any particular state, they do suggest that the annual production of pulpwood in Florida can be expected to climb from the present 249 million cubic feet to over 350 million cubic feet within the next 15 years.

In 1969, there were nine pulpmills in operation in Florida. In addition, several pulpmills located outside the State drew wood from Florida.

THE DECLINE IN SAW-LOG OUTPUT HAS ENDED

In contrast to the steady upward trend in pulpwood production, lumber production in Florida declined from 1950 up to 1962 (fig. 7). In fact, the decline in lumber production during this period was of such magnitude that the trend in total annual timber removals was downward throughout most of the fifties. This helps to explain the sizable buildup which has occurred in the sawtimber inventory.

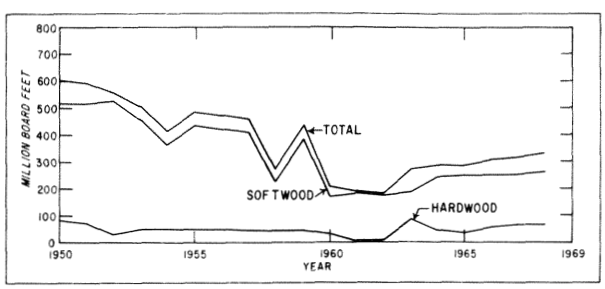


Figure 7.—Lumber production in Florida, 1950 to 1968. Source: Bureau of the Census.

Apparently, the downward trend in lumber production bottomed out in 1962, and since then the general trend has been upward. The State's industry canvass for 1969 showed that the annual output of saw logs in Florida was back up to 313 million board feet, or 53 million cubic feet. About 82 percent of this volume came from softwood and only 18 percent came from hardwood. There were 90 sawmills in operation within the State.

With the condition of today's economy and particularly with the many complex factors influencing the housing situation, it would be extremely difficult to predict with any reliability the future wood requirements for the lumber industry in Florida. If the housing goals for the Nation are achieved, however, there will likely be a rapid increase in lumber production during this decade. Findings of this fourth Forest Survey indicate that Florida's forests could absorb a sizable increase in the annual harvest of pine sawtimber so long as the increase is orderly, well planned, and tailored to fit the State's current and prospective timber supply. Currently, net growth of softwood sawtimber exceeds the annual removals by about 388 million board feet. This does not mean that this much additional sawtimber volume could be made available for harvest at this time, because there is a need for some further buildup in the inventory before a reasonable growth potential can be realized.

OUTPUT OF VENEER LOGS TOTALS 88 MILLION BOARD FEET

Hardwood veneer has been another leading timber product in Florida over the years, particularly container veneer used by manufacturers of crates and baskets sold to fruit and vegetable shippers. The annual output of veneer logs in Florida is somewhat sensitive to the yields of fruit and vegetables. Crop failures, such as those brought about by late seasonal freezes or abnormally severe winter freezes that extend south of the normal freeze lines, can affect the container veneer markets. Fluctuations in the annual output of veneer logs make it difficult to identify the trends in production.

In 1969 there were 13 veneer plants, three hardwood plywood plants, and one pine plywood plant in operation in Florida. Output of veneer logs totaled 88 million board feet, or almost 16 million cubic feet. Over two-thirds of this volume was hardwood, primarily soft-textured species, such as blackgum, tupelo, sweetgum, bay, magnolia, maple, and yellow-poplar.

For the Nation, the trend in hardwood plywood consumption is upward, with the annual increases averaging about 8 percent over the past decade. Foreign imports of hardwood plywood and veneer, however, have more than doubled during this period. Imports are likely to continue to supply much of the increased demand anticipated for hardwood plywood.

Florida's first and only pine plywood plant is located at Chiefland in Levy County. The plant began operation in 1967 and has an annual capacity of 90 million square feet (3/8-inch basis). As the pine plywood industry continues to develop in the South, the feasibility of establishing additional plants in Florida will certainly come under careful study because of the favorable trends in the supply of pine sawtimber.

OTHER INDUSTRIAL PRODUCTS

In addition to the pulpmills, sawmills, veneer, and plywood plants, there were at least 23 other primary wood-using plants operating in Florida in 1969. Most of these were treating plants and the leading product was poles. Output of all these miscellaneous products totaled almost 7 million cubic feet, and over 85 percent of this volume came from softwood timber, mainly pine.

Besides the output of industrial timber products, approximately 1.5 million cubic feet of domestic fuelwood was produced. This means that the amount of timber cut for fuelwood each year is almost insignificant. As recent as 1948, the annual production of fuelwood in Florida was well over 20 million cubic feet.

MOST PLANT WOOD RESIDUES USED

The primary wood-using plants in Florida generated an estimated 48 million cubic feet of wood residues in 1969, excluding bark. Over three-fourths of this material was subsequently used for fuel or for the manufacture of pulp and other products. It is estimated that about 11 million cubic feet was not used for any purpose. Over 60 percent of this total was fine residue, such as sawdust and shavings, which still has limited use.

LESS THAN 10 PERCENT OF BARK RESIDUE USED

The greatest volume of residue created at Florida's primary wood-using plants in 1969 was in the form of bark—perhaps as much as 95 million cubic feet. This estimate was determined from calculation of differences in volume outside and inside bark of the total output of roundwood products in 1969. Of course, because of the fissures, these calculations overestimate the solid-bark content; however, they still provide a basis for comprehending the quantity of material involved.

Unlike wood residue, there has been no major breakthrough in the utilization of bark which could absorb the huge quantity involved. Based on the 1969 industry canvass in Florida, less than 10 percent of the bark residue

was used and most of this was for industrial fuel. Currently, a large share is disposed of through incineration in refuse burners. With the growing concern over air quality, other means of disposition will need to be explored more vigorously.

OVER ONE-FIFTH OF REMOVALS NOT USED FOR PRODUCTS

Of the 295 million cubic feet of roundwood products harvested from Florida's forests during 1969, 269 million cubic feet, or over 90 percent, came from growing-stock trees 5.0 inches d.b.h. and larger on commercial forest land. An additional 79 million cubic feet of growing stock was removed from the inventory but was not used for products. The removals of all growing stock, therefore, totaled 348 million cubic feet. This means that almost 23 percent of the merchantable volume removed from the inventory was either left in the woods as logging residue or was removed by land clearing, urban development, and other land-use changes where the timber was not used.

About 80 percent of the growing-stock removals was softwood and only 20 percent was hardwood. Almost one-half of the unused material, however, was hardwood. The scarcity of local markets for primary wood products in South and Central Florida, where so much of the development and land-use change has occurred, probably contributed to the poor utilization.

Timber Supply Outlook

The preceding chapters of this report describe an improved timber supply in Florida. There has been a 20-percent increase in the inventory volume of growing stock since 1959, and net annual growth exceeds removals by 53 percent. The renewal of Florida's forests to the extent described has not been an easy task nor will its continuation be easily sustained. Although the supply of timber for the next decade or longer is already fairly well determined by actions already taken, the demands for timber could increase sharply over the current level. This appraisal of the timber situation, therefore, would be incomplete if it did not provide a basis for measuring the amount of timber which could be harvested over the next few decades without any serious overcutting.

The amount of growth over removals certainly establishes the limit to which cut could be increased without any depletion in the inventory. It should be remembered, however, that even with the buildup that has occurred in the inventory, volume of growing stock averages only 671 cubic feet and volume of sawtimber only 1,877 board feet per acre of commercial forest land. At least 8 million acres are still poorly stocked with growing-stock trees, which helps to explain why net annual growth averages only 33 cubic feet per acre, or less than one-half the potential. The point to be made is that there is an obvious need for further improvement in the stocking and a further buildup in inventory. Therefore, even if new markets were made available, it would not be to the long-term advantage of forestry interests in Florida to suddenly increase the annual harvest of timber by 184 million cubic feet, the amount of growth over removals estimated for 1969.

Nevertheless, the survey findings clearly indicate that some further expansion in the timber-based industries is possible now and in the future, from the standpoint of the timber supply. The county and unit statistics provided by Forest Survey in other reports released over the past two years should be used to help identify those areas where the timber supply could sustain increased wood requirements.

PROSPECTIVE AVAILABLE CUT WILL ALMOST DOUBLE BY 2000

A stand projection program developed at the Southeastern Station was used to project the current timber supply in Florida to the year 2000. The results of this projection are shown in table 28 and indicate a prospective available cut of 673 million cubic feet annually by the end of this century. This is almost 94 percent greater than the total volume of removals estimated for growing stock in 1969. The projection also allows for a further buildup in the inventory from the present 10.9 billion cubic feet to 13.4 billion cubic feet.

The primary control in this projection was an assumption that the current margin between growth and removals will gradually diminish over the next 30 years, until growth and removals are in balance by the year 2000. Current growth and mortality rates were applied throughout the projection, and it was assumed that increased yields per acre would continue to offset the reduction in area of commercial forest land.

Separate projections were made for softwoods and hardwoods (fig. 8). Although hardwoods make up over one-third of the current inventory, the projection results show that softwoods will provide almost 80 percent of the increase in prospective available cut of growing stock and over 90 percent of the prospective increase in available sawtimber. This means that the timber supply outlook for softwoods is much brighter than for hardwoods.

Over the 30-year period covered by this projection, an increasing share of the cut will come from the thinning and harvesting of pine plantations. *Tree Planters' Notes* show that almost 2.9 million acres had been planted in Florida through June 30, 1969 (table III). The peak planting years were 1957 through 1960, when the area planted averaged over 200,000 acres annually. The average dropped to around 140,000 acres in the mid-sixties but has increased again in recent years. During fiscal year 1969, about 162,000 acres were planted.

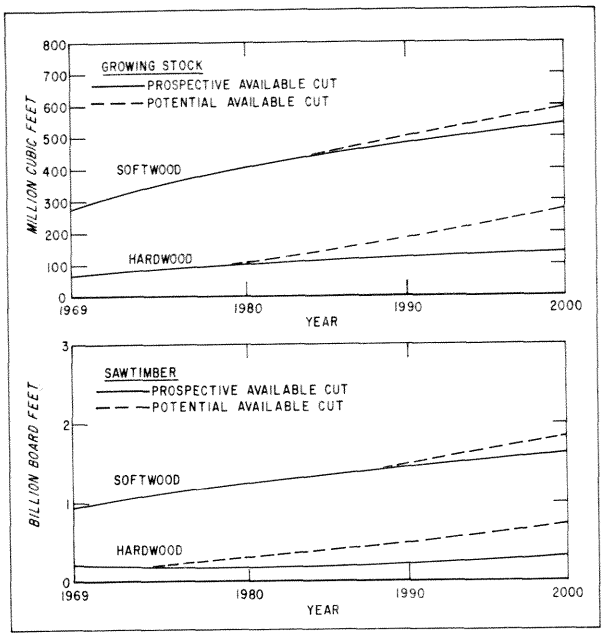


Figure 8.—Prospective and potential available cut, Florida, 1969-2000.

Table III.—Acres of forest planting,[1] by ownership class, Florida, 1959-1969

Fiscal year	Ownership class				All ownerships	Accumulative total
	National Forest	Other public	Forest industry	Other private		
			Acres			
						[2]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

[1]Includes acres of planting by direct seeding. Source: U. S. Department of Agriculture, Forest Service, **Tree Planters' Notes**, 1959-1969.

[2]Accumulative total prior to FY 1959.

The Forest Survey findings confirm that these planting figures are fairly reliable. For example, the Forest Survey showed that there was evidence of artificial regeneration on 2.8 million acres, or 17 percent of the total commercial forest (table IV). The planting effort has been most extensive in Northeast Florida where about 1 out of every 4 acres of commercial forest has been artificially regenerated. Slash pine has been the predominant species used for tree planting.

In contrast to the bright outlook for the pine timber supply in Florida, based largely upon the tremendous planting program, the outlook for hardwood is somewhat vague and uncertain. Unlike the pine supply, the supply of hardwood over this 30-year projection period will be almost entirely dependent upon natural stands where there is less control over species composition, spacing, and yields. Most of the existing hardwood stands have been heavily cut, with relatively little thought and effort given to their regeneration outside of protection against fire. Stands in general are cluttered with undesirable and poor quality trees, as evidenced by the fact that two out of every five hardwood trees 5.0 inches d.b.h. and larger fail to meet Forest Survey's minimum requirements for growing stock because of roughness, poor form, or excessive internal rot. Almost one-fifth of the hardwood growth each year is being added onto these rough and rotten trees which have no prospective value for saw logs and veneer logs.

The average annual growth rate for hardwood growing stock in Florida is only about 3 percent, or half the rate for softwoods. This low growth rate is attributed to the poor condition of so many of the stands, plus the fact that hardwoods occupy some 3 million acres which are better suited for growing pine.

Although Florida's forests are and will remain heavily oriented toward the production of pine, hardwood is an important part of the timber resource and gives needed

Table IV. Area of commercial forest land, by stand origin and Survey Unit, Florida, 1970

Stand origin	All Survey Units		Survey Unit							
			Northeast		Northwest		Central		South	
	M acres	*Percent*	*M acres*	*Percent*	*M acres*	*Percent*	*M acres*	*Percent*	*M acres*	*Percent*
Natural stands with no evidence of artificial regeneration	13,429.2	82.7	5,340.4	75.6	4,819.9	84.1	2,573.1	95.0	695.8	95.6
Stands originating wholly or in part from artificial regeneration since 1959	2,073.9	12.8	1,310.3	18.6	626.4	10.9	109.2	4.0	28.0	3.9
Stands originating wholly or in part from artificial regeneration prior to 1959	728.5	4.5	410.2	5.8	288.9	5.0	25.7	1.0	3.7	0.5
All stands	16,231.6	100.0	7,060.9	100.0	5,735.2	100.0	2,708.0	100.0	727.5	100.0

balance to the wood supply. It is estimated that there are approximately 4 million acres of commercial forest land in the State where site conditions favor the growth of hardwood. Although no accelerated hardwood management was assumed in this projection, the results show a prospective increase in the available cut of hardwood sawtimber of less than 30 percent over current levels of removal through year 2000. The same projection, however, shows a more optimistic outlook for the prospective available cut from hardwood poletimber.

POTENTIAL AVAILABLE CUT IS AT LEAST 2½ TIMES CURRENT LEVEL

A second projection was made to obtain estimates of potential available cut based upon reasonable assumptions about the gains which could be made in net annual growth through accelerated timber management over the next 30 years. Results from this projection indicate a potential available cut of 843 million cubic feet by year 2000, or 25 percent more than the prospective available cut. The potential available cut of sawtimber climbed to 2.5 billion board feet, compared to 1.9 billion board feet in the prospective projection. As might be expected, the potential projection shows that greater gains are possible in the future supply of hardwood through accelerated management efforts than for softwoods (fig. 8).

To sustain an annual cut of 843 million cubic feet on 16.2 million acres of commercial forest land would require that net annual growth be increased from the current average of 33 cubic feet per acre to 52 cubic feet per acre. Although an average annual growth of 52 cubic feet per acre is well below the potential, it does represent a reasonable measure of the gain that could be achieved in 30 years, particularly if one takes into consideration the likelihood of a further reduction in forest area. According to the site data collected in Florida, the growth potential is around 70 cubic feet per acre.

The basic assumptions used in the projection of potential available cut were as follows:

1. Some 7.4 million acres of nonstocked and poorly stocked forest land can be regenerated with desirable trees either naturally or artificially, by 1985.

2. The average basal area of growing-stock trees 5.0 inches d.b.h. and larger can be increased from the present 35 to 60 square feet per acre by 2000.

3. Mortality rates can be gradually reduced to one-fourth the current rates by 2000.

4. Net annual growth can be gradually increased to three-fourths of the potential estimated from the Forest Survey site classifications by 2000.

5. Any further reduction in the area of commercial forest land will be offset by increased yields per acre through 2000.

MANY FACTORS DETERMINE TIMBER AVAILABILITY

The primary objective of the Forest Survey in Florida was to measure the physical attributes of the total timber resource exclusive of the complex economic and social factors which determine the volume of timber available to the open markets at a particular point in time. The volume of net annual growth of growing stock, estimated at 532 million cubic feet, establishes the maximum measure of current availability without inviting a reduction in the inventory. When the current volume of annual removals, 348 million cubic feet, is subtracted from this figure it leaves an apparent "surplus" of 184 million cubic feet. Although timber owners in Florida might be unwilling to sell this much additional timber each year at existing prices, the figure still represents Forest Survey's best estimate of the possible increase in the annual cut.

When this volume of growth over removal is examined in terms of ownership, the findings show that 44 million cubic feet, or 24 percent of the total, is accumulating on forest industry lands. This volume is available to existing industry for the expansion of capacity, but would normally not be available to competing industry moving into the State. Another 49 million cubic feet, or 26 percent of the total, is accumulating on National Forests and other public lands. Here, long-term management plans usually determine the volume cut each year, and this volume is usually sold on bid and is therefore available to all on an equal basis. Finally, the remaining 91 million cubic feet, or 50 percent, is accumulating on private, nonindustrial lands where availability is usually determined through the normal negotiations among interested buyers and willing sellers. In the assessment of availability it should be remembered that about 5 percent of the private, nonindustrial land is under some type of lease to forest industry.

Of course, the volume of growth over removal and its ownership are only two of the many physical factors which influence availability. Some timber is not economically available to particular users because of location, low volumes per acre, small size, and other undesirable characteristics. Tables 31, 32, and 33 in the

appendix are presented to help guide decisions concerning availability and operability. For example, only 38 percent of the commercial forest land in Florida has 1,500 or more board feet of sawtimber per acre. Furthermore, about one-third of the forest land with 1,500 or more board feet per acre is located in deep swamps, bays, along stream margins, or other physiographic classes where accessibility and logging conditions are difficult and where only certain species can grow.

Although the tables just referred to, along with most of the other tables in this report, are for the entire State, Forest Survey at the Southeastern Station can generate similar tables for smaller, specified areas of interest, upon request, to help answer availability questions and assist in the future development and expansion of forest industry in Florida.

QUALITY MAKEUP OF INVENTORY LIMITS UTILIZATION

Up to now, this analysis has dwelled mainly on the quantity of timber in Florida. Some assessment of the quality of this timber is also needed. The question arises as to how much of the 12.5 billion cubic feet of wood in live trees 5.0 inches d.b.h. and larger is suitable for the production of saw logs, veneer logs, poles, and other products where quality rather than quantity is often the limiting factor. Although advances have been made and changes have taken place in the utilization of wood, high-quality timber is still required if forest products are to retain their relative position with respect to competitive substitutes.

The Forest Survey statistics explain why some of the plants are experiencing difficulties in procuring an adequate supply of high-quality timber during peak periods of demand from an inventory that totals 12.5 billion cubic feet. First of all, about 1.7 billion cubic feet, or 13 percent of the inventory, is in trees which do not qualify as growing stock because of species, roughness, poor form, or internal rot. Another 4.0 billion cubic feet, or 32 percent, is in trees still too small for sawtimber. When another 6 percent is deducted for volume in the upper-stem portions of sawtimber trees, only 6.2 billion cubic feet, or half of the original total remains. Of this amount, only 3.5 billion cubic feet is in pine trees of grade 1 and 2 quality, or in hardwood trees that contain grade 1 and 2 logs. Finally, an undetermined amount of this high-quality timber is scattered instead of concentrated in operable stands for harvest.

These statistics are not presented to imply that timber in Florida is inferior to timber in other States. Instead, the statistics are presented to emphasize the importance of careful evaluation of the timber supply both from the standpoint of quantity and quality during plant feasibility studies. Another point to be made is that there is a need to channel the better quality timber into those products which require high-quality trees so that the potential value of the resource can be realized.

Management Opportunities

The recommendation of specific forestry treatments and programs falls outside the scope of Forest Survey and this report; however, this chapter will elaborate on some of the opportunities for increasing the supply of timber as suggested by the Survey findings. Although net annual growth of timber is less than half the potential estimated for Florida's forests, one might conclude that there is no real need for concern over ways to increase timber yields so long as growth is exceeding removals. Those people engaged in the management of forest land and charged with the responsibility of achieving and sustaining an optimum balance between the supply and demand of this resource know better than to accept such a conclusion. Although timber is one of the few renewable natural resources, forestry is a long-term undertaking and most changes in forestry practices and programs do not produce tangible results for many years after their implementation. If efforts to increase the supply are delayed until shortages actually develop, the resource loses its competitive position and industry relying upon the resource can be driven out of business. The history of just about every major timber producing region in the Nation tends to confirm this fact.

Forest industry's position itself has changed, particularly in Florida and the South where commitments have already been made to develop the region's third forest. Plants are larger and more permanent, larger investments are involved, and the nontimber values of the forest resource to the overall environment are more widely recognized than perhaps ever before. Those people who voice displeasure over the expenditure of money and effort to grow more timber to harvest for products must take into consideration that no other resource has such potential for providing for so many of our basic needs. On the other hand, those people charged with the responsibility of managing the forests and engaged in the removal and utilization of timber from them must take into consideration the total effect of their actions on the overall environment.

There are several generally recognized ways of increasing the timber supply in Florida: better utilization and protection of the existing supply; exertion of greater control over the stocking, structure, and species composition of existing timber stands through intermediate treatments; regeneration of nonstocked and poorly stocked stands; application of proved silvicultural practices by more private landowners; and finally, expansion of the area of commercial forest land by planting idle acres with trees. Although the Forest Survey statistics provide a measure of the potential gains which are theoretically possible through improved protection and utilization, the optimum allocation of limited funds and resources for increasing the timber supply is a difficult task. From the economic standpoint, the basic question is whether or not the expected returns from additional expenditures for better protection and utilization exceed the expected returns if the same funds and resources were used instead to accelerate timber growth. In some cases, the latter may be a more promising alternative. Before the selection and implementation of any major program or action, it should be examined from the standpoint of its cost and expected returns, its chances of success, its potential gain as compared with the alternatives, and its effect on the total environment.

REDUCE LOSS TO MORTALITY

In 1969, mortality of growing stock totaled almost 71 million cubic feet and reduced gross growth by nearly 12 percent. An additional but undetermined volume was lost to cull, retardation of growth, and reduction of quality in other trees damaged but not killed by fire, insects, disease, suppression, weather, and other agents. To the extent that losses could be reduced, the supply of timber in Florida could be increased through intensification of the protection efforts. Mortality certainly cannot be eliminated entirely simply because man has little control over many of the destructive agents which bring it about; therefore, the objectives must be limited to the achievement of some acceptable minimum.

Wildfire is one of the causes of mortality over which man has the greatest control. Although over 90 percent of Florida's forests and "wild lands" are under organized protection, fire remains one of the leading causes of death. This does not discredit the fine protection record in Florida in recent years. Since 1959, less than 1 percent of the protected areas has burned over by wildfire annually except for 1962 when almost 370,000 acres were burned (table V). Up until about 1956, it was not uncommon for several hundred thousand acres of Florida's forest to burn over during a year's time. Control costs are high and the full cooperation of the general public is essential to the prevention of unnecessary loss to fire. Few sights are more depressing than that of a forest blackened by a devastating fire.

Table V.—Forest area under fire protection, protected area burned, number of fires, and average size of fires, Florida, 1959-1969[1]

Year	Forest area protected		Protected area burned		Fires	Average size of fires
	Thousand acres	*Percent*	*Thousand acres*	*Percent*	*Number*	*Acres*
1959	18,086	83.52	48	0.27	3,930	12
1960	18,866	85.23	119	0.63	5,331	22
1961	18,608	85.06	98	0.53	6,372	15
1962	18,717	85.71	369	1.97	8,808	42
1963	19,540	89.64	97	0.50	7,217	13
1964	20,036	89.85	70	0.35	5,381	13
1965	20,527	98.46	105	0.51	5,823	18
1966	18,117	86.90	81	0.45	5,484	15
1967	18,450	88.52	176	0.95	7,631	23
1968	18,905	90.65	140	0.74	7,560	19
1969	19,319	93.27	66	0.34	5,029	13

[1]Source: U. S. Department of Agriculture, Forest Service, **Forest Fire Statistics, 1959-1969.**

Contingency plans for the widescale salvage of killed and damaged timber can certainly help to minimize losses when natural catastrophes occur. Although Florida's forests are seldom subjected to such weather phenomena as ice storms, damage from hurricanes is a continual threat. The devastation of the forests of lower Mississippi and Louisiana brought about by Hurricane Camille in 1969 stands as a classic example of this kind of threat.

Insect and disease outbreaks, along with suppression from overstocking, are other leading causes of mortality. These are usually more subtle in their attacks upon the forest than wildfire and hurricanes. Nevertheless, their toll shows up in the survey findings. Here, a great deal of control can be exerted through silvicultural practices which reduce the risks. For example, in regeneration efforts, it is important that the tree species be properly matched with the site and that the stand be maintained in a vigorous condition throughout the rotation.

IMPROVE TIMBER UTILIZATION

In 1969, the volume of logging residues and other removals not used for products, together with plant residues, totaled an estimated 90 million cubic feet. Here again, some minimum amount of waste must be tolerated; however, if only half of this wood fiber could be channeled into use, the annual output of timber products could be increased by 14 percent without any increase in timber removals. Although considerable progress has been made in wood utilization, further research and continued efforts become more important in this area as attention is focused on ways to minimize waste and reduce all forms of pollution throughout the production and manufacturing processes of all our products.

In addition to the unused volume in trees cut or destroyed, the volume left standing in rough and rotten trees is a type of residue in the broad sense. Because of high grading, or the removal of only the better trees at time of harvest, an inventory of almost 1.7 billion cubic feet has accumulated in rough and rotten trees. Such trees occupy one-sixth of the growing space in the commercial forests in Florida and are retarding the regeneration and development of desirable trees in many stands. Most of this volume can be used for pulpwood and other fiber products if it is removed along with the better trees at time of harvest. Once these trees are left as residuals, the opportunity for their utilization is greatly diminished because their low value will not fully compensate for the cost of removal. The most logical long-term solution to this problem is to minimize the accumulation of poor quality timber in the inventory through improved forest management and harvesting practices. In the meantime, new ways to remove, market, and utilize a greater proportion of the 1.7 billion cubic feet that is already in the inventory need to be explored. It is estimated that only 12 million cubic feet, or less than 4 percent of the total output of roundwood products, came from this source in 1969.

Another way to improve utilization is to be more selective in the use of the better quality timber for those products which require such input. Such practices can significantly enhance the value received from the timber harvested. Of course, the markets available in a particular area largely determine the kind of products for which the timber is used. For example, over one-half of the pine sawtimber harvested in Florida in 1969 was used for pulpwood. Some of this sawtimber came from company-owned lands where the forest management objective is to maximize the yield of wood fiber per acre for pulpwood. Nevertheless, this heavy use of sawtimber for a

fiber product seems somewhat inconsistent with the anticipated short supply of sawtimber in the years ahead. The finding suggests a need for the development of more diversified timber markets where more of the sawtimber could be channeled into lumber and other structural products. With the technological advances which have been made in equipment for handling timber products, it would seem that more concentration yards are needed where the timber can be sorted according to its potential value and use.

IMPROVE CONDITION OF EXISTING FORESTS

If the total area of commercial forest land in Florida is broken down into the proportions occupied by the various tree classes, stand sizes, and broad forest types, the Forest Survey findings provide a measure of the various conditions which suggest the need for some kind of silvicultural action (table VI). These findings indicate that about 5.7 million acres, or 35 percent of the commercial forests, are fairly well stocked with desirable trees and that current conditions suggest no action that would significantly increase prospective yields. Sawtimber occupies over one-third of the 5.7 million acres.

Another 3.1 million acres, or 19 percent of the commercial forests, are stocked with acceptable trees which can be carried through to rotation with reasonable yields if the better trees are favored through intermediate treatments. Stocking and conditions are less than desirable on these acres at this time, but a manageable stand does exist. On the 2.5 million acres of sawtimber and poletimber stands in this condition, the alternative to trying to improve these stands through intermediate treatment is harvest and regeneration, providing markets are available for poor quality trees.

REGENERATE NONSTOCKED AND POORLY STOCKED STANDS

On about 7.4 million acres, or 46 percent of the commercial forests, prospective yields are almost nil in terms of value until the stands are regenerated. In this condition, there is either an absence of stocking altogether or the area is occupied with rough trees, rotten trees, and other inhibiting vegetation. In fact, on about 4.0 million acres in this condition, site preparation to remove the inhibiting cover will have to precede regeneration. The regeneration of the remaining 3.4 million acres could be accomplished with little or no site preparation from the standpoint of existing cover.

Although the regeneration of these lands certainly offers the greatest potential of all the opportunities for increasing the supply of timber in Florida, it would require the greatest expenditure of money and effort. It is estimated that two-thirds of these lands are in the private, nonindustrial ownership class where there is great diversity of interest in the actions and investments that would be required. Where there is interest and willingness on the part of the owner, the best professional advice and

Table VI.—Commercial forest area by major type of action suggested by current spatial occupancy, by forest type, 1970

Type of action suggested to increase prospective yields	Commercial forest area		Current forest type			
			Pine	Oak-pine	Upland hardwood	Bottomland hardwood
	Percent	*Thousand acres*				
No treatment needed:						
Sawtimber	12.3	1,996.4	733.4	222.0	148.7	892.3
Poletimber	9.6	1,559.5	772.0	138.4	128.8	520.3
Sapling and seedling	13.4	2,173.8	1,711.4	172.0	106.8	183.6
Total	35.3	5,729.7	3,216.8	532.4	384.3	1,596.2
Stand improvement:						
Sawtimber	7.7	1,248.9	500.4	139.3	88.1	521.1
Poletimber	7.7	1,244.8	800.0	88.5	77.4	278.9
Sapling and seedling	3.8	622.8	431.1	64.3	53.1	74.3
Total	19.2	3,116.5	1,731.5	292.1	218.6	874.3
Regeneration:						
Without site preparation	21.2	3,441.1	1,985.9	362.2	706.5	386.5
With site preparation	24.3	3,944.3	1,272.0	482.4	991.8	1,198.1
Total	45.5	7,385.4	3,257.9	844.6	1,698.3	1,584.6
Total	100.0	16,231.6	8,206.2	1,669.1	2,301.2	4,055.1

silvicultural knowledge available should guide his actions. There might also be a need for incentive programs to reach other private owners, particularly if shortages are anticipated in the supply of timber.

In the meantime, some of the acres in this condition can be expected to regenerate naturally where seed sources are available and the establishment and development of seedlings is not inhibited.

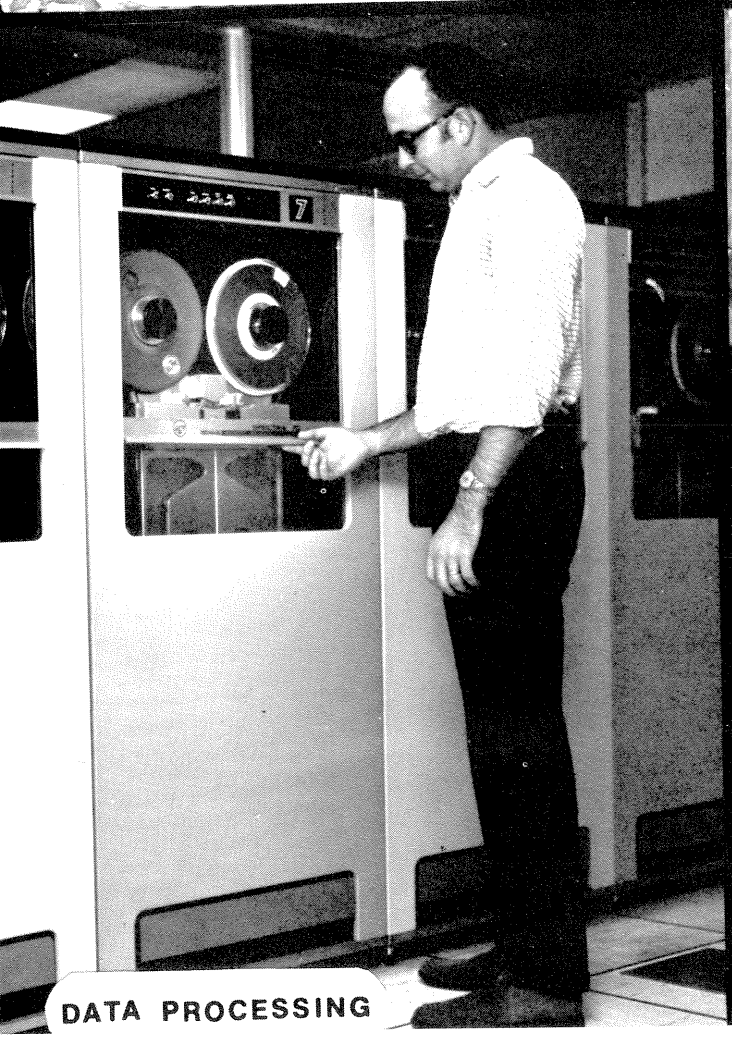
It is estimated that over 2.5 million acres of the forest lands in need of regeneration are either publicly owned or owned by forest industry. Management plans have already been set up for much of this area; therefore, most of these acres will gradually be brought into production. Because of the size of the task and time that will be required, priorities are needed for the better and more accessible sites.

EXPAND THE AREA OF COMMERCIAL FORESTS

Because the area of commercial forest land has been declining in Florida for several decades, one might conclude that there is little chance of reversing this trend and of increasing the supply of timber by expanding the forest base. The Forest Survey findings, however, show that there are 600,000 acres of idle farmland scattered across the State and about 2,500,000 acres of natural rangeland in South and Central Florida. This means that there are over 3 million acres of idle land which could conceivably be added to the forest base. Of course, some of this land will be improved for pasture, used for cropland or citrus production, or developed in urban expansion. On the remaining areas, forestry may very well offer the best opportunity available for putting these idle acres to use.


OFFICE PREPARATION


DATA COLLECTION


DATA PROCESSING


ANALYSIS AND REPORTING

Appendix

SURVEY PROCEDURE

The basic steps of the procedure used in the fourth Forest Survey of Florida were as follows:

1. In 33 of the 67 counties, initial estimates of forest and nonforest areas were based on the classification of 55,457 sample clusters systematically spaced on the latest aerial photographs available. A subsample of 4,713 of these 16-point clusters were ground checked, and linear regressions were fitted to the data to develop the relationships between the photo and ground classifications. This procedure provided a means for adjusting the initial estimates of area for change in land use since date of photography and for photo misclassification.

2. In 4 of the 67 counties, estimates of forest and nonforest areas were determined by direct aerial observation of 18,178 sample points from fixed-wing aircraft along flight lines 2 miles apart. An interval timer was used to determine the sample points.

3. In the remaining 30 counties, all located in South and Central Florida, estimates of forest and nonforest were based entirely on the ground classification of 6,802 sample clusters systematically distributed across all land uses.

4. Estimates of timber volume and forest classifications were based on measurements recorded at 4,704 ground sample locations systematically distributed within the commercial forest land. A 10-point cluster of plots systematically spaced on an acre were measured at each of these sample locations with 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.

5. Equations prepared from detailed measurements collected on trees tallied at 222 sample locations were used to compute the 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. The same subsample of plots used for the tree-volume study also served as a quality control of field measurements. Felled trees were measured at approximately 100 active cutting operations to provide utilization factors for product and species groups, and to supplement the standing tree-volume study.

6. Estimates of growth, removals, and mortality were determined from the remeasurement of 3,913 permanent sample plots which were established in the third survey. A 1969 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 local contacts, correspondence, and public records. In those counties where the sample missed a particular ownership class, temporary sample plots were added and measured to describe the forest conditions within the ownership class.

8. In South and Central Florida, approximately 2,232,100 acres of land classified as nonstocked forest land in the 1959 survey were reclassified as rangeland. In addition, approximately 441,400 acres of marginal forest land classified as commercial forest in the 1959 survey were reclassified as unproductive forest. These steps were taken in an attempt to provide a more realistic measure of the timber resource in these areas.

9. Throughout the State, an attempt was made to improve the breakdowns of land and water area provided by the Bureau of the Census. It is believed that this attempt strengthened the individual county statistics generated by the Forest Survey.

10. All field data were sent to Asheville for editing and were punched in cards and stored on magnetic tape for computer processing, sorting, and tabulation. Final estimates were based on statistical summaries of the data.

ACCURACY OF THE SURVEY

Statistical analysis of the data indicates a sampling error of ±0.51 percent for the estimate of total commercial forest area, 1.76 percent for total cubic volume, 1.76 percent for total cubic-volume growth, and 4.45 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. The order of this increase is suggested in the following tabulation, which shows the sampling error to which the estimates are liable, in terms of one standard error, or two chances out of three.

Sampling error[1]	Commercial forest area	Volume of growing stock		
		Inventory	Net growth	Removals
Percent	*Thousand acres*	*- - - Million cubic feet - - -*		
1	4,221.8	—	—	—
2	1,055.4	8,432.0	411.8	—
3	469.1	3,747.5	183.0	—
4	263.9	2,108.0	103.0	—
5	168.9	1,349.1	65.9	275.6
10	42.2	337.3	16.5	68.9
15	18.8	149.9	7.3	30.6
20	10.6	84.3	4.1	17.2
25	6.8	54.0	2.6	11.0

[1]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 exemple, the 6-inch class includes trees 5.00 through 6.99 inches d.b.h., inclusive.

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

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

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

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

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

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

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, comprises 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 forests in which tupelo, blackgum, sweetgum, oaks, or southern cypress, singly or in combination, comprises 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.)

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

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

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

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

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

Hard hardwoods.—Hard-textured hardwoods such as Florida maple, birch, hickory, dogwood, persimmon (forest grown), 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 16.7 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, poletimber, or sawtimber.

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

Land area.—The area of dry land and land temporarily or partly covered by water such as marshes, swamps, and river flood plains (omitting tidal flats below mean high tide); streams, sloughs, estuaries, and canals less than ⅛ of a statute mile in width; and lakes, reservoirs, and ponds less than 40 acres in area.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Pines.—Yellow pine species which include loblolly, longleaf, slash, pond, shortleaf, sand, and spruce pine.

Other softwoods. — Cypress, eastern redcedar, and white-cedar.

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 poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

Poletimber stands. — Stands at least 16.7 percent stocked with growing-stock trees of which half or more of 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 byproducts.

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 of 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[1]
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

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

Overstocked—Over 130 percent
Fully stocked—100-130 percent
Medium stocked—60-99 percent
Poorly stocked—16.7-59 percent
Nonstocked—Less than 16.7 percent

CONVERSION FACTORS

Cubic feet of wood per average cord (excluding bark)

D.b.h.	Pine	Other softwoods	Hardwood
6	61.0	68.2	59.9
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	90.5	79.8
18	83.4	92.3	80.8
20	84.6	93.9	81.5
22	86.2	94.8	82.1
24+	87.8	98.3	83.2
Average	71.8	81.0	74.0

Rough cords per M cubic feet (without bark) =

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

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

Index to Detailed Tables

Table 1—Area by land classes, Florida, 1970

Land class	Area
	Thousand acres
Forest land:	
Commercial	16,231.6
Productive-reserved	94.4
Unproductive	1,606.9
Total	17,932.9
Nonforest land:	
Cropland	3,692.2
Pasture and range	6,499.4
Other[1]	7,054.9
Total	17,246.5
All land[2]	35,179.4

[1]Includes swampland, industrial and urban areas, other nonforest land, and 548,500 acres classed as water by Forest Survey standards but defined by Bureau of Census as land.

[2]From U. S. Bureau of the Census, Land and Water Area of the United States, 1960.

Table 2.—Area of commercial forest land, by ownership classes, Florida, 1970

Ownership class	Area
	Thousand acres
National Forest	1,035.3
Other Federal:	
Bureau of Land Management	0.2
Indian	8.6
Miscellaneous Federal	609.0
Total other Federal	617.8
State	466.3
County and municipal	26.1
Forest industry[1]	5,216.5
Farmer-owned	2,915.8
Miscellaneous private:	
Individual	4,044.2
Corporate	1,909.6
Total miscellaneous private	5,953.8
All ownerships	16,231.6

[1]Not including 457,600 acres of farmer-owned and miscellaneous private lands leased to forest industry.

Table 3.—Area of commercial forest land, by stand-size and ownership classes, Florida, 1970

Stand-size class	All ownerships	National Forest	Other public	Forest industry	Farmer and misc. private
	Thousand acres				
Sawtimber	4,987.8	419.4	406.1	1,538.0	2,624.3
Poletimber	4,150.9	305.4	203.0	1,312.0	2,330.5
Sapling and seedling	4,529.2	244.0	243.5	1,944.3	2,097.4
Nonstocked	2,563.7	66.5	257.6	422.2	1,817.4
All classes	16,231.6	1,035.3	1,110.2	5,216.5	8,869.6

Table 4.—Area of commercial forest land, by stand-volume and ownership classes, Florida, 1970

Stand volume per acre[1]	All ownerships	National Forest	Other public	Forest industry	Farmer and misc. private
	Thousand acres				
Less than 1,500 bd. ft.	10,135.1	554.7	706.1	3,158.8	5,715.5
1,500 to 5,000 bd. ft.	4,224.8	333.1	286.7	1,374.4	2,230.6
More than 5,000 bd. ft.	1,871.7	147.5	117.4	683.3	923.5
All classes	16,231.6	1,035.3	1,110.2	5,216.5	8,869.6

[1]International 1/4-inch rule.

Table 5.—Area of commercial forest land, by stocking classes based on selected stand components, Florida, 1970

Stocking percentage	Stocking classified in terms of:					
	All live trees	Growing-stock trees			Rough and rotten trees	Inhibiting vegetation
		Total	Desirable	Acceptable		
	Thousand acres					
160	27.2	5.6	—	—	—	—
150-159	134.0	21.1	—	—	—	—
140-149	373.9	92.8	5.0	6.2	—	—
130-139	524.0	237.2	9.1	6.4	—	—
120-129	876.8	427.3	55.9	24.7	2.5	—
110-119	1,053.3	642.8	94.9	35.8	34.5	—
100-109	1,458.8	880.3	226.7	50.1	28.3	—
90-99	1,552.2	1,141.5	397.8	87.0	79.3	131.6
80-89	1,783.2	1,406.5	672.7	123.2	104.5	88.6
70-79	1,722.9	1,710.8	908.0	234.3	225.1	109.2
60-69	1,458.1	1,636.9	1,329.1	383.1	283.0	238.1
50-59	1,394.2	1,537.6	1,579.0	668.4	570.4	314.5
40-49	1,036.0	1,395.8	1,964.6	1,112.6	904.9	354.4
30-39	879.5	1,110.0	2,122.2	1,486.1	1,281.7	598.8
20-29	643.5	1,114.3	1,866.6	2,553.9	1,849.3	721.6
10-19	633.2	1,040.4	2,115.8	3,353.0	2,746.8	1,544.6
Less than 10	680.8	1,830.7	2,884.2	6,106.8	8,121.3	12,130.2
Total	16,231.6	16,231.6	16,231.6	16,231.6	16,231.6	16,231.6

Table 6.—Area of commercial forest land, by ownership and stocking classses,[1] with percent occupancy by selected stand components, Florida, 1970

Ownership and stocking class	Area	Stand components					
		Growing-stock trees			Rough and rotten trees	Inhibiting vegetation	Nonstocked
		Total	Desirable	Acceptable			
	M acres	*Percent of area*					
National Forest:							
Fully stocked stands	160.2	89.7	48.6	41.1	8.6	0.3	1.4
Medium stocked stands	411.6	72.4	45.0	27.4	10.5	4.3	12.8
Poorly stocked stands	463.5	34.6	21.8	12.8	11.7	19.0	34.7
All stands	1,035.3	59.5	35.8	23.7	10.7	9.8	20.0
Other public:							
Fully stocked stands	92.4	92.2	57.1	35.1	6.5	0.2	1.1
Medium stocked stands	310.7	75.4	48.7	26.7	11.6	3.7	9.3
Poorly stocked stands	707.1	25.1	14.9	10.2	33.9	10.2	30.8
All stands	1,110.2	46.1	28.7	17.4	24.8	7.4	21.7
Forest industry:							
Fully stocked stands	932.5	91.4	60.1	31.3	7.7	0.1	0.8
Medium stocked stands	2,290.1	73.9	51.6	22.3	11.9	3.5	10.7
Poorly stocked stands	1,993.9	34.7	24.5	10.2	18.0	14.6	32.7
All stands	5,216.5	63.0	43.3	19.7	13.3	6.9	16.8
Farmer & misc. private:							
Fully stocked stands	1,122.0	91.8	56.8	35.0	7.1	0.3	0.8
Medium stocked stands	2,883.3	72.7	46.1	26.6	14.6	3.1	9.6
Poorly stocked stands	4,864.3	25.9	16.6	9.3	21.0	14.5	38.6
All stands	8,869.6	50.9	32.2	18.7	16.9	8.7	23.5
All ownerships:							
Fully stocked stands	2,307.1	91.5	57.3	34.2	7.4	0.3	0.8
Medium stocked stands	5,895.7	73.3	48.1	25.2	13.1	3.4	10.2
Poorly stocked stands	8,028.8	28.2	18.4	9.8	21.3	14.3	36.2
All stands	16,231.6	54.5	35.3	19.2	16.1	8.2	21.2

[1]Based on degree of growing-stock stocking.

Table 7.—Area of commercial forest land, by site and ownership classes, Florida, 1970

Site class	All ownerships	National Forest	Other public	Forest industry	Farmer and misc. private
	Thousand acres				
165 cu. ft. or more	3.8	—	—	—	3.8
120 to 165 cu. ft.	143.7	3.3	2.3	33.5	104.6
85 to 120 cu.ft.	2,429.9	131.6	119.4	1,037.4	1,141.5
50 to 85 cu. ft.	9,486.1	550.8	527.1	3,294.1	5,114.1
Less than 50 cu. ft.	4,168.1	349.6	461.4	851.5	2,505.6
All classes	16,231.6	1,035.3	1,110.2	5,216.5	8,869.6

Table 8.—Area of commercial forest land, by forest types and ownership classes, Florida, 1970

Type	All ownerships	Public	Private
	Thousand acres		
Softwood types:			
Longleaf pine	1,531.6	399.6	1,132.0
Slash pine	5,424.9	528.8	4,896.1
Loblolly pine	344.4	4.5	339.9
Shortleaf pine	34.5	—	34.5
Redcedar	14.5	—	14.5
Sand pine	505.9	277.7	228.2
Pond pine	343.6	81.8	261.8
Spruce pine	6.8	—	6.8
Total	8,206.2	1,292.4	6,913.8
Hardwood types:			
Oak-pine	1,669.1	303.3	1,365.8
Oak-hickory	962.3	15.8	946.5
Southern scrub oak	1,338.9	220.8	1,118.1
Oak-gum-cypress	3,971.2	313.2	3,658.0
Elm-ash-cottonwood	83.9	—	83.9
Total	8,025.4	853.1	7,172.3
All types	16,231.6	2,145.5	14,086.1

Table 9.—Area of noncommercial forest land, by forest types, Florida, 1970

Type	All areas	Productive-reserved areas	Unproductive areas
	Thousand acres		
Longleaf-slash pine	221.7	18.7	203.0
Loblolly-shortleaf pine	—	—	—
Oak-pine	5.0	1.7	3.3
Oak-hickory	12.4	2.4	10.0
Oak-gum-cypress	1,462.2	71.6	1,390.6
Elm-ash-cottonwood	—	—	—
All types	1,701.3	94.4	1,606.9

Table 10.—Number of growing-stock trees on commercial forest land, by species and diameter classes, Florida, 1970

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Thousand trees										
Softwood:											
Longleaf pine	154,944	51,207	40,424	33,409	20,508	6,886	1,894	478	116	22	—
Slash pine	453,561	261,982	101,684	47,258	23,504	11,924	4,747	1,629	567	264	2
Loblolly pine	43,229	14,818	9,685	6,991	4,859	3,066	2,057	974	438	338	3
Shortleaf pine	3,642	1,755	782	472	309	163	66	39	47	9	—
Pond pine	25,031	10,798	6,299	3,520	2,370	1,221	470	255	64	32	2
Sand pine	38,675	23,274	9,695	3,589	1,316	565	170	55	—	11	—
Spruce pine	2,105	634	453	202	272	241	153	113	12	25	—
Baldcypress	44,002	15,555	10,786	6,523	4,931	2,980	1,417	1,057	320	396	37
Pondcypress	188,568	80,550	51,524	29,098	15,465	7,369	2,922	972	335	305	28
Atlantic white-cedar	5,925	2,155	1,147	1,182	649	412	181	144	35	20	—
Eastern redcedar	2,588	1,537	452	249	211	79	47	7	—	6	—
Total softwoods	962,270	464,265	232,931	132,493	74,394	34,906	14,124	5,723	1,934	1,428	72
Hardwood:											
Select white oaks[1]	1,881	273	350	330	300	312	152	86	51	27	—
Select red oaks[2]	538	193	179	82	35	27	—	9	—	11	2
Other white oaks	14,401	3,852	2,182	1,750	1,256	1,325	1,117	856	658	1,113	292
Other red oaks	75,972	30,827	17,931	10,303	6,119	4,349	2,562	1,655	943	1,132	151
Hickory	9,674	3,306	2,053	1,486	1,059	882	410	183	118	170	7
Hard maple	970	139	241	242	185	100	38	7	14	4	—
Soft maple	28,478	10,448	7,981	4,272	2,487	1,461	915	423	229	249	13
Beech	305	70	—	40	48	41	28	32	6	37	3
Sweetgum	41,939	18,044	9,867	6,174	3,530	2,212	1,005	574	275	248	10
Tupelo and blackgum	109,080	40,125	25,580	16,326	11,354	6,911	4,030	2,224	1,299	1,135	96
Ash	28,225	12,352	6,551	4,167	2,133	1,375	870	420	234	115	8
Cottonwood	64	—	—	21	13	13	—	7	6	4	—
Basswood	1,631	505	449	247	202	114	54	43	11	6	—
Yellow-poplar	2,886	623	840	525	464	139	186	67	27	15	—
Bay and magnolia	56,805	24,850	12,721	8,229	4,987	2,708	1,854	790	362	275	29
Elm	7,472	3,204	1,603	1,100	777	385	195	104	70	27	7
Black cherry	566	287	99	95	19	13	31	22	—	—	—
Sycamore	229	75	37	26	18	46	21	—	6	—	—
Other eastern hardwoods	6,360	3,707	1,124	721	368	248	109	59	17	7	—
Total hardwoods	387,476	152,880	89,788	56,136	35,354	22,661	13,577	7,561	4,326	4,575	618
All species	1,349,746	617,145	322,719	188,629	109,748	57,567	27,701	13,284	6,260	6,003	690

[1]Includes white and swamp chestnut oaks.
[2]Includes cherrybark and Shumard oaks.

Table 11.—Volume of timber on commercial forest land, by class of timber and by softwood and hardwood, Florida, 1970

Class of timber	All species	Softwood	Hardwood
	- - *Million cubic feet* - -		
Sawtimber trees:			
Saw-log portion	6,209.2	4,010.4	2,198.8
Upper-stem portion	721.0	396.7	324.3
Total	6,930.2	4,407.1	2,523.1
Poletimber trees	3,958.2	2,497.1	1,461.1
All growing-stock trees	10,888.4	6,904.2	3,984.2
Rough trees:			
Sawtimber-size trees	549.4	48.9	500.5
Poletimber-size trees	804.0	83.4	720.6
Total	1,353.4	132.3	1,221.1
Rotten trees:			
Sawtimber-size trees	263.7	44.0	219.7
Poletimber-size trees	44.9	8.6	36.3
Total	308.6	52.6	256.0
Salvable dead trees:			
Sawtimber-size trees	8.1	6.2	1.9
Poletimber-size trees	7.1	4.5	2.6
Total	15.2	10.7	4.5
Total, all timber	12,565.6	7,099.8	5,465.8

Table 12.—Volume of growing stock and sawtimber on commercial forest land, by ownership classes and by softwood and hardwood, Florida, 1970

Ownership class	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	- *Million cubic feet* -			- *Million board feet*[1] -		
National Forest	925.9	754.7	171.2	2,579.6	2,154.6	425.0
Other public	638.5	510.1	128.4	2,006.2	1,694.4	311.8
Forest industry	3,522.3	2,219.7	1,302.6	9,729.7	6,280.3	3,449.4
Farmer and misc. private	5,801.7	3,419.7	2,382.0	16,149.0	9,836.8	6,312.2
All ownerships	10,888.4	6,904.2	3,984.2	30,464.5	19,966.1	10,498.4

[1]International 1/4-inch rule.

Table 13.—Volume of growing stock on commercial forest land, by species and diameter classes, Florida, 1970

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Million cubic feet										
Softwood:											
Longleaf pine	1,395.9	134.9	262.9	395.1	357.6	162.5	57.2	19.0	5.3	1.4	—
Slash pine	2,643.3	577.4	588.8	525.1	401.7	290.1	149.0	67.8	27.9	15.3	0.2
Loblolly pine	483.1	31.8	56.2	75.2	85.2	74.6	68.8	43.5	25.0	22.7	0.1
Shortleaf pine	27.5	3.7	4.6	4.5	4.4	3.5	2.2	1.6	2.6	0.4	—
Pond pine	177.2	19.6	30.5	33.6	35.0	28.1	14.4	10.1	3.7	1.9	0.3
Sand pine	225.3	74.1	65.4	42.1	22.3	13.5	5.0	2.4	—	0.5	—
Spruce pine	32.9	1.6	2.8	2.4	5.3	6.9	6.0	5.6	0.7	1.6	—
Baldcypress	520.9	51.5	74.1	74.5	88.8	78.6	50.9	46.9	18.7	29.7	7.2
Pondcypress	1,324.5	212.7	286.7	283.8	235.1	157.5	78.6	34.6	14.8	17.6	3.1
Atlantic white-cedar	58.5	5.4	7.0	13.0	10.5	9.5	5.3	5.4	1.5	0.9	—
Eastern redcedar	15.1	3.2	2.2	2.3	3.0	1.8	1.8	0.3	—	0.5	—
Total softwoods	6,904.2	1,115.9	1,381.2	1,451.6	1,248.9	826.6	439.2	237.2	100.2	92.5	10.9
Hardwood:											
Select white oaks[1]	32.0	0.7	2.0	3.1	4.9	7.5	4.8	3.9	2.7	2.4	—
Select red oaks[2]	5.1	0.7	1.3	0.8	0.5	0.6	—	0.2	—	0.8	0.2
Other white oaks	302.4	8.7	10.7	15.4	17.0	26.9	29.8	30.2	29.8	83.4	50.5
Other red oaks	773.2	74.9	97.7	99.4	92.1	96.4	75.3	69.1	48.3	92.4	27.6
Hickory	112.9	7.6	10.1	14.2	16.8	20.8	13.5	8.4	6.4	13.9	1.2
Hard maple	12.2	0.4	1.1	2.4	2.9	2.7	1.1	0.4	0.8	0.4	—
Soft maple	275.8	30.7	47.3	45.2	40.0	34.9	28.2	17.6	11.6	18.5	1.8
Beech	10.4	0.2	—	0.4	0.8	0.9	1.0	1.4	0.2	5.0	0.5
Sweetgum	382.7	39.0	55.7	66.5	61.7	58.7	34.7	26.5	16.2	21.3	2.4
Tupelo and blackgum	1,149.6	107.7	145.6	171.3	188.8	166.1	124.0	91.1	65.1	78.4	11.5
Ash	265.4	30.0	37.0	43.1	40.2	38.2	30.3	20.8	13.6	10.9	1.3
Cottonwood	1.6	—	—	0.2	0.2	0.3	—	0.3	0.2	0.4	—
Basswood	18.5	1.3	3.0	2.6	3.6	2.9	1.9	2.0	0.7	0.5	—
Yellow-poplar	33.9	1.8	5.0	5.0	7.7	3.1	5.3	3.1	1.5	1.4	—
Bay and magnolia	489.5	63.1	73.1	83.5	78.8	61.9	54.4	32.1	17.6	20.6	4.4
Elm	69.7	7.6	9.8	10.8	12.9	9.5	6.2	5.0	4.0	2.5	1.4
Black cherry	4.2	0.5	0.4	0.8	0.3	0.3	1.0	0.9	—	—	—
Sycamore	3.6	0.3	0.2	0.4	0.3	1.4	0.6	—	0.4	—	—
Other eastern hardwoods	41.5	8.4	5.4	7.0	6.1	5.7	4.0	2.8	1.3	0.8	—
Total hardwoods	3,984.2	383.6	505.4	572.1	575.6	538.8	416.1	315.8	220.4	353.6	102.8
All species	10,888.4	1,499.5	1,886.6	2,023.7	1,824.5	1,365.4	855.3	553.0	320.6	446.1	113.7

[1]Includes white and swamp chestnut oaks.
[2]Includes cherrybark nad Shumard oaks.

Table 14.—Volume of sawtimber on commercial forest land, by species and diameter classes, Florida, 1970

Species	All classes	Diameter classes (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Million board feet								
Softwood:									
Longleaf pine	4,588.5	1,589.8	1,686.8	843.8	326.4	106.8	27.4	7.5	—
Slash pine	6,656.9	1,932.5	1,796.1	1,471.9	831.0	383.1	144.2	96.5	1.6
Loblolly pine	1,895.3	260.3	369.4	366.6	380.9	241.5	141.6	133.9	1.1
Shortleaf pine	87.7	14.6	18.1	17.1	12.0	8.1	15.1	2.7	—
Pond pine	555.2	111.1	143.9	136.4	79.8	54.4	18.0	10.1	1.5
Sand pine	360.7	162.0	94.6	62.0	24.8	14.1	—	3.2	—
Spruce pine	139.4	8.7	21.4	35.2	32.2	28.5	4.2	9.2	—
Baldcypress	1,903.9	265.4	401.8	398.3	278.4	257.6	102.3	159.3	40.8
Pondcypress	3,550.3	1,056.1	1,008.9	739.2	398.9	176.4	71.4	84.8	14.6
Atlantic white-cedar	187.5	44.5	39.6	41.1	24.2	24.5	7.6	6.0	—
Eastern redcedar	40.7	7.5	12.7	7.5	8.8	1.6	—	2.6	—
Total softwoods	19,966.1	5,452.5	5,593.3	4,119.1	2,397.4	1,296.6	531.8	515.8	59.6
Hardwood:									
Select white oaks[1]	116.6	—	17.6	31.2	23.8	19.9	12.0	12.1	—
Select red oaks[2]	10.7	—	1.8	2.4	—	1.5	—	3.8	1.2
Other white oaks	1,117.5	—	51.9	95.3	118.0	126.9	130.0	362.8	232.6
Other red oaks	2,185.0	—	340.7	392.5	331.3	331.2	224.5	434.6	130.2
Hickory	351.1	—	59.4	82.9	63.7	40.8	30.6	65.9	7.8
Hard maple	34.8	—	11.4	11.7	4.9	2.0	3.4	1.4	—
Soft maple	685.4	—	152.9	147.5	130.8	89.3	57.4	96.6	10.9
Beech	39.2	—	2.4	3.1	3.5	6.9	0.9	20.9	1.5
Sweetgum	972.3	—	218.7	252.7	169.2	135.7	78.6	105.4	12.0
Tupelo and blackgum	2,869.9	—	588.2	637.2	517.6	421.8	297.8	352.1	55.2
Ash	647.4	—	138.5	156.7	137.9	97.1	67.5	44.2	5.5
Cottonwood	6.4	—	0.5	1.8	—	1.8	0.6	1.7	—
Basswood	50.2	—	13.5	12.0	8.6	9.8	3.8	2.5	—
Yellow-poplar	99.5	—	27.9	12.8	27.4	16.3	8.3	6.8	—
Bay and magnolia	1,049.1	—	259.4	229.8	228.2	149.2	76.3	87.7	18.5
Elm	161.6	—	44.2	35.6	25.0	21.6	18.2	11.2	5.8
Black cherry	11.0	—	0.9	0.7	4.0	5.4	—	—	—
Sycamore	11.6	—	0.6	5.7	3.6	—	1.7	—	—
Other eastern hardwoods	79.1	—	21.4	22.1	15.9	11.9	5.4	2.4	—
Total hardwoods	10,498.4	—	1,951.9	2,133.7	1,813.4	1,489.1	1,017.0	1,612.1	481.2
All species	30,464.5	5,452.5	7,545.2	6,252.8	4,210.8	2,785.7	1,548.8	2,127.9	540.8

[1]Includes white and swamp chestnut oaks.
[2]Includes cherrybark and Shumard oaks.

Table 15.—Volume of sawtimber on commercial forest land, by species and quality classes, Florida, 1970

Species	All grades	Log or tree grade			
		1	2	3	4
	Million board feet				
Softwood:					
Yellow pines[1]	14,283.7	4,774.2	2,447.0	7,062.5	(2)
Cypress[3]	5,454.2	1,175.1	2,425.2	1,851.6	2.3
Other eastern softwoods[3]	228.2	15.6	67.7	144.9	—
Total	19,966.1	5,964.9	4,939.9	9,059.0	2.3
Hardwood:[4]					
Select white and red oaks	127.3	35.3	39.4	50.8	1.8
Other white and red oaks	3,302.5	922.7	920.0	1,379.7	80.1
Hickory	351.1	84.2	109.7	148.0	9.2
Hard maple	34.8	2.6	5.3	26.1	0.8
Sweetgum	972.3	246.2	303.6	409.1	13.4
Ash, walnut, and black cherry	658.4	199.4	179.5	266.9	12.6
Yellow-poplar	99.5	25.9	32.0	37.9	3.7
Other hardwoods	4,952.5	1,275.7	1,690.6	1,952.9	33.3
Total	10,498.4	2,792.0	3,280.1	4,271.4	154.9
All species	30,464.5	8,756.9	8,220.0	13,330.4	157.2

[1]Based on **Southern Pine Tree Grades for Yard and Structural Lumber,** Research Paper SE-40, published by the Southeastern Forest Experiment Station in 1968.

[2]Not applicable.

[3]Based on **Trial Log Grades for Eastern White Pine** prepared by the Northeastern Forest Experiment Station in 1960.

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

Table 16.—Net annual growth and removals of growing stock on commercial forest land, by species, Florida, 1969

Species	Net annual growth	Annual timber removals
	Million cubic feet	
Softwood:		
Yellow pines	370.7	259.7
Cypress	42.1	18.2
Other eastern softwoods	2.7	0.4
Total softwoods	415.5	278.3
Hardwood:		
Select white and red oaks	1.3	1.0
Other white and red oaks	37.9	25.0
Hickory	3.3	5.7
Hard maple	0.1	0.4
Sweetgum	12.6	8.9
Ash, walnut, and black cherry	7.0	2.9
Yellow-poplar	1.3	1.3
Tupelo and blackgum	24.6	13.2
Bay and magnolia	13.9	7.1
Other eastern hardwoods	14.3	4.1
Total hardwoods	116.3	69.6
All species	531.8	347.9

Table 17.—Net annual growth and removals of growing stock on commercial forest land, by ownership classes and by softwood and hardwood, Florida, 1969

Ownership class	Net annual growth			Annual timber removals		
	All species	Soft-wood	Hard-wood	All species	Soft-wood	Hard-wood
	Million cubic feet					
National Forest	45.3	41.2	4.1	9.5	9.4	0.1
Other public	29.3	25.5	3.8	16.6	13.5	3.1
Forest industry	179.2	145.7	33.5	135.1	114.0	21.1
Farmer and misc. private	278.0	203.1	74.9	186.7	141.4	45.3
All ownerships	531.8	415.5	116.3	347.9	278.3	69.6

Table 18.—Net annual growth and removals of sawtimber on commercial forest land, by species, Florida, 1969

Species	Net annual growth	Annual timber removals
	Million board feet	
Softwood:		
Yellow pines	1,155.6	863.3
Cypress	156.8	70.4
Other eastern softwoods	10.1	0.3
Total softwoods	1,322.5	934.0
Hardwood:		
Select white and red oaks	3.6	5.0
Other white and red oaks	117.7	79.3
Hickory	13.3	21.6
Hard maple	1.2	1.5
Sweetgum	41.2	32.9
Ash, walnut, and black cherry	22.7	8.8
Yellow-poplar	5.1	4.0
Tupelo and blackgum	74.7	39.3
Bay and magnolia	36.1	17.0
Other eastern hardwoods	49.4	10.3
Total hardwoods	365.0	219.7
All species	1,687.5	1,153.7

Table 19.—Net annual growth and removals of sawtimber on commercial forest land, by ownership classes and by softwood and hardwood, Florida, 1969

Ownership class	Net annual growth			Annual timber removals		
	All species	Soft-wood	Hard-wood	All species	Soft-wood	Hard-wood
	Million board feet					
National Forest	151.6	139.0	12.6	21.6	21.2	0.4
Other public	116.6	104.6	12.0	58.7	51.8	6.9
Forest industry	530.4	431.7	98.7	448.1	375.2	72.9
Farmer and misc. private	888.9	647.2	241.7	625.3	485.8	139.5
All ownerships	1,687.5	1,322.5	365.0	1,153.7	934.0	219.7

Table 20—Mortality of growing stock and sawtimber on commercial forest land, by species, Florida, 1969

Species	Growing stock	Sawtimber
	Million cu. ft.	*Million bd. ft.*
Softwood:		
Yellow pines	23.6	65.1
Cypress	5.9	18.6
Other eastern softwoods	0.2	0.9
Total softwoods	29.7	84.6
Hardwood:		
Select white and red oaks	0.3	1.5
Other white and red oaks	16.1	53.9
Hickory	0.3	0.9
Hard maple	—	—
Sweetgum	2.8	7.6
Ash, walnut, and black cherry	1.6	3.4
Yellow-poplar	0.7	1.7
Tupelo and blackgum	7.0	21.4
Bay and magnolia	5.7	10.1
Other eastern hardwoods	6.6	16.4
Total hardwoods	41.1	116.9
All species	70.8	201.5

Table 21.—Mortality of growing stock and sawtimber on commercial forest land, by ownership classes and by softwood and hardwood, Florida, 1969

Ownership class	Growing stock			Sawtimber		
	All species	Soft-wood	Hard-wood	All species	Soft-wood	Hard-wood
	Million cubic feet			*Million board feet*		
National Forest	3.9	2.3	1.6	12.6	6.9	5.7
Other public	3.2	1.6	1.6	8.1	3.7	4.4
Forest industry	16.6	6.8	9.8	47.0	17.3	29.7
Farmer and misc. private	47.1	19.0	28.1	133.8	56.7	77.1
All ownerships	70.8	29.7	41.1	201.5	84.6	116.9

Table 22.—Mortality of growing stock and sawtimber on commercial forest land, by causes and by softwood and hardwood, Florida, 1969

Cause of death	Growing stock			Sawtimber		
	All species	Soft-wood	Hard-wood	All species	Soft-wood	Hard-wood
	Million cubic feet			*Million board feet*		
Fire	11.5	7.8	3.7	26.0	18.2	7.8
Insects	4.9	4.8	0.1	18.9	18.3	0.6
Diseases	2.9	0.8	2.1	9.7	1.8	7.9
Other	19.5	10.1	9.4	53.1	26.9	26.2
Unknown	32.0	6.2	25.8	93.8	19.4	74.4
All causes	70.8	29.7	41.1	201.5	84.6	116.9

Table 23.—Output of timber products, by product, by source of material, and by softwood and hardwood, Florida, 1969

Product and species group	Standard units	Total output		Roundwood products		Plant byproducts	
		Number of units	Thousand cu. ft.	Number of units	Thousand cu. ft.	Number of units	Thousand cu. ft.
Saw logs:							
Softwood	M bd. ft.[1]	253,095	43,791	253,095	43,791	—	—
Hardwood	M bd. ft.[1]	59,527	9,363	59,527	9,363	—	—
Total	M bd. ft.[1]	312,622	53,154	312,622	53,154	—	—
Veneer logs and bolts:							
Softwood	M bd. ft.[1]	25,756	4,815	25,756	4,815	—	—
Hardwood	M bd. ft.[1]	62,353	10,842	62,353	10,842	—	—
Total	M bd. ft.[1]	88,109	15,657	88,109	15,657	—	—
Pulpwood:							
Softwood	Std. cords[2]	3,082,534	224,594	2,752,235	200,528	330,299	24,066
Hardwood	Std. cords[2]	363,507	24,682	268,440	18,227	95,067	6,455
Total	Std. cords[2]	3,446,041	249,276	3,020,675	218,755	425,366	30,521
Piling:							
Softwood	M linear ft.	19	12	19	12	—	—
Hardwood	M linear ft.	—	—	—	—	—	—
Total	M linear ft.	19	12	19	12	—	—
Poles:							
Softwood	M pieces	306	4,524	306	4,524	—	—
Hardwood	M pieces	—	—	—	—	—	—
Total	M pieces	306	4,524	306	4,524	—	—
Posts (round and split):							
Softwood	M pieces	871	479	791	435	80	44
Hardwood	M pieces	—	—	—	—	—	—
Total	M pieces	871	479	791	435	80	44
Other:[3]							
Softwood	M cu. ft.	814	814	814	814	—	—
Hardwood	M cu. ft.	1,012	1,012	829	829	183	183
Total	M cu. ft.	1,826	1,826	1,643	1,643	183	183
Total industrial products:							
Softwood		—	279,029	—	254,919	—	24,110
Hardwood		—	45,899	—	39,261	—	6,638
Total		—	324,928	—	294,180	—	30,748
Fuelwood:[4]							
Softwood	Std. cords	4,455	325	2,274	166	2,181	159
Hardwood	Std. cords	15,826	1,152	14,128	1,037	1,698	115
Total	Std. cords	20,281	1,477	16,402	1,203	3,879	274
All products:							
Softwood		—	279,354	—	255,085	—	24,269
Hardwood		—	47,051	—	40,298	—	6,753
Total		—	326,405	—	295,383	—	31,022

[1]International 1/4-inch rule.
[2]Rough-wood basis (includes chips converted to equivalent standard cords).
[3]Includes hewn ties, excelsior bolts, shingle bolts, turnery bolts, and chemical wood.
[4]Excludes approximately 6,433 thousand cubic feet of plant byproducts used for industrial fuel.

Table 24.—Output of roundwood products, by product, by source, and by softwood and hardwood, Florida, 1969

Product and species group	All sources	Growing-stock trees[1]			Rough and rotten trees[1]	Salvable dead trees[1]	Other sources[2]
		Total	Sawtimber	Poletimber			
	Thousand cubic feet						
Saw logs:							
Softwood	43,791	42,964	42,947	17	91	—	736
Hardwood	9,363	8,954	8,569	385	405	—	4
Total	53,154	51,918	51,516	402	496	—	740
Veneer logs and bolts:							
Softwood	4,815	4,586	4,586	—	—	—	229
Hardwood	10,842	10,006	9,575	431	805	—	31
Total	15,657	14,592	14,161	431	805	—	260
Pulpwood:							
Softwood	200,528	182,988	119,112	63,876	4,559	—	12,981
Hardwood	18,227	13,214	4,757	8,457	4,705	—	308
Total	218,755	196,202	123,869	72,333	9,264	—	13,289
Piling:							
Softwood	12	12	12	—	—	—	—
Hardwood	—	—	—	—	—	—	—
Total	12	12	12	—	—	—	—
Poles:							
Softwood	4,524	4,431	4,431	—	—	—	93
Hardwood	—	—	—	—	—	—	—
Total	4,524	4,431	4,431	—	—	—	93
Posts (round and split):							
Softwood	435	371	28	343	—	—	64
Hardwood	—	—	—	—	—	—	—
Total	435	371	28	343	—	—	64
Other:							
Softwood	814	788	709	79	—	—	26
Hardwood	829	352	10	342	322	—	155
Total	1,643	1,140	719	421	322	—	181
Total industrial products:							
Softwood	254,919	236,140	171,825	64,315	4,650	—	14,129
Hardwood	39,261	32,526	22,911	9,615	6,237	—	498
Total	294,180	268,666	194,736	73,930	10,887	—	14,627
Fuelwood:							
Softwood	166	92	—	92	—	50	24
Hardwood	1,037	196	—	196	746	—	95
Total	1,203	288	—	288	746	50	119
All products:							
Softwood	255,085	236,232	171,825	64,407	4,650	50	14,153
Hardwood	40,298	32,722	22,911	9,811	6,983	—	593
Total	295,383	268,954	194,736	74,218	11,633	50	14,746

[1]On commercial forest land.

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

Table 25.—Annual timber removals from growing stock on commercial forest land, by items and by softwood and hardwood, Florida, 1969

Item	All species	Softwood	Hardwood
	- Thousand cubic feet -		
Roundwood products:			
Saw logs	51,918	42,964	8,954
Veneer logs and bolts	14,592	4,586	10,006
Pulpwood	196,202	182,988	13,214
Piling	12	12	—
Poles	4,431	4,431	—
Posts	371	371	—
Other	1,140	788	352
Fuelwood	288	92	196
All products	268,954	236,232	32,722
Logging residues	25,090	14,207	10,883
Other removals	53,878	27,793	26,085
Total removals	347,922	278,232	69,690

Table 26.—Annual timber removals from live sawtimber on commercial forest land, by items and by softwood and hardwood, Florida, 1969

Item	All species	Softwood	Hardwood
	- Thousand board feet -		
Roundwood products:			
Saw logs	303,531	249,092	54,439
Veneer logs and bolts	79,832	24,498	55,334
Pulpwood	536,323	512,182	24,141
Piling	69	69	—
Poles	25,345	25,345	—
Posts	91	91	—
Other	4,206	4,143	63
Fuelwood	—	—	—
All products	949,397	815,420	133,977
Logging residues	57,139	33,036	24,103
Other removals	147,174	85,555	61,619
Total removals	1,153,710	934,011	219,699

Table 27.—Volume of unused residues at primary manufacturing plants, by industry and type of residue, and by softwood and hardwood, Florida, 1969

Species group and type of residues	All industries	Lumber	Veneer and plywood	Other
	- - - Thousand cubic feet - - -			
Softwood:				
Coarse[1]	2,570	1,710	537	323
Fine[2]	4,299	4,168	27	104
Total	6,869	5,878	564	427
Hardwood:				
Coarse[1]	1,605	508	975	122
Fine[2]	2,295	1,935	131	229
Total	3,900	2,443	1,106	351
All species:				
Coarse[1]	4,175	2,218	1,512	445
Fine[2]	6,594	6,103	158	333
Total	10,769	8,321	1,670	778

[1]Material, such as slabs, edgings, and veneer cores.

[2]Material, such as sawdust and shavings.

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, 1969 to 1999[1]

Species group	1969 (Inventory year)	Projections		
		1979 (Inventory year plus 10 years)	1989 (Inventory year plus 20 years)	1999 (Inventory year plus 30 years)
	GROWING STOCK (In thousand cubic feet)			
Softwood:				
Cut	278,300	392,200	475,900	537,000
Growth	415,500	480,900	520,200	536,700
Inventory[2]	6,904,200	7,991,100	8,633,900	8,831,200
Hardwood:				
Cut	69,600	98,500	119,600	136,300
Growth	116,300	127,000	133,300	135,400
Inventory[2]	3,984,200	4,337,200	4,540,200	4,596,700
Total:				
Cut	347,900	490,700	595,500	673,300
Growth	531,800	607,900	653,500	672,100
Inventory[2]	10,888,400	12,328,300	13,174,100	13,427,900
	SAWTIMBER (In thousand board feet)			
Softwood:				
Cut	934,000	1,192,000	1,443,000	1,616,000
Growth	1,322,500	1,446,000	1,557,000	1,590,000
Inventory[2]	19,966,100	23,215,000	24,977,000	25,352,000
Hardwood:				
Cut	219,700	194,000	243,000	282,000
Growth	365,000	312,000	308,000	295,000
Inventory[2]	10,498,400	11,921,000	12,814,000	13,173,000
Total:				
Cut	1,153,700	1,386,000	1,686,000	1,898,000
Growth	1,687,500	1,758,000	1,865,000	1,885,000
Inventory[2]	30,464,500	35,136,000	37,791,000	38,525,000

[1]Based on the assumption that cut starting at the 1969 level will be in balance with the growth by the year 2000, and that forestry progress will continue at the rate indicated by recent trends.

[2]Inventory as of January 1 of the following year.

Table 29.—Basal area per acre of growing stock and rough and rotten trees 5.0 inches d.b.h. and larger, by forest type and Survey Unit, Florida, 1970

Forest type	State	North-east	North-west	Cen-tral	South
	Square feet				
Longleaf-slash pine:					
Growing stock	28.3	31.9	28.0	21.9	18.7
Rough and rotten trees	1.3	1.3	1.1	1.9	1.6
All trees	29.6	33.2	29.1	23.8	20.3
Loblolly-shortleaf pine:					
Growing stock	27.3	27.7	30.2	22.3	9.4
Rough and rotten trees	2.8	2.3	3.6	2.6	—
All trees	30.1	30.0	33.8	24.9	9.4
Oak-pine:					
Growing stock	31.4	38.1	29.5	22.4	18.8
Rough and rotten trees	7.5	7.6	7.0	9.4	5.2
All trees	38.9	45.7	36.5	31.8	24.0
Oak-hickory:					
Growing stock	17.3	20.3	18.6	10.7	—
Rough and rotten trees	12.1	16.2	7.9	13.6	—
All trees	29.4	36.5	26.5	24.3	—
Oak-gum-cypress:					
Growing stock	59.2	57.7	62.6	61.6	44.2
Rough and rotten trees	18.9	16.4	25.3	17.0	14.9
All trees	78.1	74.1	87.9	78.6	59.1
Elm-ash-cottonwood:					
Growing stock	64.6	77.6	72.9	50.5	—
Rough and rotten trees	19.1	21.3	16.1	22.2	—
All trees	83.7	98.9	89.0	72.7	—
All types:					
Growing stock	34.8	36.3	33.5	35.8	28.8
Rough and rotten trees	8.1	7.3	7.8	10.6	7.1
All trees	42.9	43.6	41.3	46.4	35.9

Table 30.—Number of growing stock and rough and rotten trees 1.0-4.9 inches d.b.h. per acre, by forest type and Survey Unit, Florida, 1970

Forest type	State	North-east	North-west	Cen-tral	South
	Number of trees				
Longleaf-slash pine:					
Growing stock	223	266	228	117	129
Rough and rotten trees	55	57	71	25	16
All trees	278	323	299	142	145
Loblolly-shortleaf pine:					
Growing stock	196	231	224	84	50
Rough and rotten trees	102	90	159	36	—
All trees	298	321	383	120	50
Oak-pine:					
Growing stock	181	240	161	94	262
Rough and rotten trees	239	255	261	142	50
All trees	420	495	422	236	312
Oak-hickory:					
Growing stock	75	73	107	24	—
Rough and rotten trees	264	233	354	157	—
All trees	339	306	461	181	—
Oak-gum-cypress:					
Growing stock	241	269	201	251	214
Rough and rotten trees	280	317	338	216	179
All trees	521	586	539	467	393
Elm-ash-cottonwood:					
Growing stock	139	133	164	109	—
Rough and rotten trees	375	367	357	400	—
All trees	514	500	521	509	—
All types:					
Growing stock	199	235	193	149	166
Rough and rotten trees	166	159	201	135	84
All trees	365	394	394	284	250

Table 31.—Area of commercial forest land, by stand volume (board feet) and ownership classes, by physiographic classes, Florida, 1970

Ownership class and stand volume per acre[1] (Bd. ft.)	All classes	Physiographic class								
		Deep swamps	Broad stream margins	Narrow stream margins	Mountain tops and slopes	Flatwoods and dry pocosins	Bays and wet pocosins	Rolling uplands	Sandhills	Other misc. classes
					Thousand acres					
National Forest:										
Less than 1,500	554.7	—	—	9.0	—	200.7	86.6	12.1	233.8	12.5
1,500 to 5,000	333.1	12.7	2.5	30.8	—	171.2	44.0	6.3	47.4	18.2
More than 5,000	147.5	5.9	14.7	5.7	—	61.1	34.9	6.3	9.9	9.0
All classes	1,035.3	18.6	17.2	45.5	—	433.0	165.5	24.7	291.1	39.7
Other public:										
Less than 1,500	706.1	1.4	0.3	16.0	—	193.7	40.1	57.1	375.4	22.1
1,500 to 5,000	286.7	4.4	3.4	33.9	—	74.2	9.5	63.4	88.0	9.9
More than 5,000	117.4	5.4	10.8	40.5	—	23.8	11.1	5.5	—	20.3
All classes	1,110.2	11.2	14.5	90.4	—	291.7	60.7	126.0	463.4	52.3
Forest industry:										
Less than 1,500	3,158.8	21.9	9.0	112.4	—	1,774.5	432.4	369.1	261.4	178.1
1,500 to 5,000	1,374.4	85.0	43.3	208.8	—	525.7	107.7	107.3	30.5	266.1
More than 5,000	683.3	159.5	52.8	41.9	—	189.9	57.6	34.4	—	147.2
All classes	5,216.5	266.4	105.1	363.1	—	2,490.1	597.7	510.8	291.9	591.4
Farmer and misc. private:										
Less than 1,500	5,715.5	78.4	25.4	248.6	—	2,545.7	304.2	842.8	1,329.6	340.8
1,500 to 5,000	2,230.6	66.1	92.8	372.3	—	740.1	123.7	400.5	103.3	331.8
More than 5,000	923.5	143.0	69.9	179.4	—	190.6	33.8	107.6	5.7	193.5
All classes	8,869.6	287.5	188.1	800.3	—	3,476.4	461.7	1,350.9	1,438.6	866.1
All ownerships:										
Less than 1,500	10,135.1	101.7	34.7	386.0	—	4,714.6	863.3	1,281.1	2,200.2	553.5
1,500 to 5,000	4,224.8	168.2	142.0	645.8	—	1,511.2	284.9	577.5	269.2	626.0
More than 5,000	1,871.7	313.8	148.2	267.5	—	465.4	137.4	153.8	15.6	370.0
All classes	16,231.6	583.7	324.9	1,299.3	—	6,691.2	1,285.6	2,012.4	2,485.0	1 549.5

[1]Sawtimber volume, International 1/4-inch rule.

Table 32.—Area of commercial forest land, by stand volume (cubic feet) and ownership classes, by physiographic classes, Florida, 1970

Ownership class and stand volume per acre[1] (Cu. ft.)	All classes	Physiographic class								
		Deep swamps	Broad stream margins	Narrow stream margins	Mountain tops and slopes	Flatwoods and dry pocosins	Bays and wet pocosins	Rolling uplands	Sandhills	Other misc. classes
					Thousand acres					
National Forest:										
Less than 500	444.4	—	—	9.0	—	153.3	73.5	12.1	187.0	9.5
500 to 1,000	291.0	3.2	2.5	11.9	—	153.9	41.2	3.0	62.8	12.5
More than 1,000	299.9	15.4	14.7	24.6	—	125.8	50.8	9.6	41.3	17.7
All classes	1,035.3	18.6	17.2	45.5	—	433.0	165.5	24.7	291.1	39.7
Other public:										
Less than 500	715.8	1.4	0.3	9.8	—	199.7	36.5	59.6	389.1	19.4
500 to 1,000	184.1	—	3.4	9.0	—	42.1	13.1	45.8	65.8	4.9
More than 1,000	210.3	9.8	10.8	71.6	—	49.9	11.1	20.6	8.5	28.0
All classes	1,110.2	11.2	14.5	90.4	—	291.7	60.7	126.0	463.4	52.3
Forest industry:										
Less than 500	2,773.0	8.8	—	71.0	—	1,539.0	404.1	351.7	271.7	126.7
500 to 1,000	994.1	29.4	23.7	100.8	—	490.1	106.3	93.3	13.4	137.1
More than 1,000	1,449.4	228.2	81.4	191.3	—	461.0	87.3	65.8	6.8	327.6
All classes	5,216.5	266.4	105.1	363.1	—	2,490.1	597.7	510.8	291.9	591.4
Farmer and misc. private:										
Less than 500	5,051.7	46.2	29.9	164.8	—	2,327.4	245.5	711.7	1,304.1	222.1
500 to 1,000	1,769.5	43.4	28.2	231.9	—	653.6	122.9	376.4	103.2	209.9
More than 1,000	2,048.4	197.9	130.0	403.6	—	495.4	93.3	262.8	31.3	434.1
All classes	8,869.6	287.5	188.1	800.3	—	3,476.4	461.7	1,350.9	1,438.6	866.1
All ownerships:										
Less than 500	8,984.9	56.4	30.2	254.6	—	4,219.4	759.6	1,135.1	2,151.9	377.7
500 to 1,000	3,238.7	76.0	57.8	353.6	—	1,339.7	283.5	518.5	245.2	364.4
More than 1,000	4,008.0	451.3	236.9	691.1	—	1,132.1	242.5	358.8	87.9	807.4
All classes	16,231.6	583.7	324.9	1,299.3	—	6,691.2	1,285.6	2,012.4	2,485.0	1,549.5

[1]Growing-stock volume.

Table 33.—Average net volume and growth per acre on commercial forest land, by physiographic class, tree class, and species group, Florida, 1970

Physiographic class and tree class	Net volume per acre						Net growth per acre					
	Softwood		Hardwood		Total		Softwood		Hardwood		Total	
	Cubic feet	*Board feet*	*Cubic feet*	*Board feet*	*Cubic feet*	*Board feet*	*Cubic feet*	*Board feet*	*Cubic feet*	*Board feet*	*Cubic feet*	*Board feet*
Deep swamps:												
Growing stock	689.0	2,541	1,395.8	3,861	2,084.8	6,402	17.9	81	34.1	119	52.0	200
Rough and rotten trees	34.8	—	390.5	—	425.3	—	0.3	—	6.0	—	6.3	—
Total	723.8	2,541	1,786.3	3,861	2,510.1	6,402	18.2	81	40.1	119	58.3	200
Broad stream margins:												
Growing stock	286.3	1,227	1,382.4	4,275	1,668.7	5,502	9.7	49	33.9	131	43.6	180
Rough and rotten trees	11.4	—	405.6	—	417.0	—	0.1	—	6.2	—	6.3	—
Total	297.7	1,227	1,788.0	4,275	2,085.7	5,502	9.8	49	40.1	131	49.9	180
Narrow stream margins:												
Growing stock	443.7	1,570	707.3	1,735	1,151.0	3,305	21.6	93	20.1	66	41.7	159
Rough and rotten trees	7.4	—	214.1	—	221.5	—	0.1	—	3.7	—	3.8	—
Total	451.1	1,570	921.4	1,735	1,372.5	3,305	21.7	93	23.8	66	45.5	159
Mountain tops and slopes:												
Growing stock	—	—	—	—	—	—	—	—	—	—	—	—
Rough and rotten trees	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—
Flatwoods and dry pocosins:												
Growing stock	440.7	1,165	68.2	183	508.9	1,348	33.5	99	2.3	7	35.8	106
Rough and rotten trees	3.9	—	36.6	—	40.5	—	0.3	—	0.6	—	0.9	—
Total	444.6	1,165	104.8	183	549.4	1,348	33.8	99	2.9	7	36.7	106
Bays and wet pocosins:												
Growing stock	381.6	1,218	230.4	487	612.0	1,705	18.9	66	7.4	18	26.3	84
Rough and rotten trees	17.1	—	69.4	—	86.5	—	0.4	—	1.2	—	1.6	—
Total	398.7	1,218	299.8	487	698.5	1,705	19.3	66	8.6	18	27.9	84
Rolling uplands:												
Growing stock	349.9	1,074	210.7	528	560.6	1,602	26.8	87	7.5	22	34.3	109
Rough and rotten trees	2.9	—	63.2	—	66.1	—	0.2	—	1.0	—	1.2	—
Total	352.8	1,074	273.9	528	626.7	1,602	27.0	87	8.5	22	35.5	109
Sandhills:												
Growing stock	192.4	470	14.2	39	206.6	509	14.1	34	0.5	1	14.6	35
Rough and rotten trees	5.1	—	74.8	—	79.9	—	0.2	—	1.5	—	1.7	—
Total	197.5	470	89.0	39	286.5	509	14.3	34	2.0	1	16.3	35
Other misc. classes:												
Growing stock	801.5	2,223	389.0	1,048	1,190.5	3,271	24.6	88	11.8	34	36.4	122
Rough and rotten trees	55.6	—	122.2	—	177.8	—	0.5	—	2.1	—	2.6	—
Total	857.1	2,223	511.2	1,048	1,368.3	3,271	25.1	88	13.9	34	39.0	122
All classes:												
Growing stock	425.4	1,230	245.5	647	670.9	1,877	25.6	81	7.2	22	32.8	103
Rough and rotten trees	11.4	—	91.0	—	102.4	—	0.3	—	1.5	—	1.8	—
Total	436.8	1,230	336.5	647	773.3	1,877	25.9	81	8.7	22	34.6	103

Table 34.—Land area, by class, major forest type, and survey completion date, Florida, 1949, 1959, and 1970

Land use class	Survey completion date			Change 1959-1970
	1949[1]	1959[1]	1970	
	- - - Thousand acres - - -			
Forest land:				
Commercial forest land:				
Pine and oak-pine types	12,558.7	9,546.5	9,875.3	+ 328.8
Hardwood types	6,218.9	7,625.5	6,356.3	—1,269.2
Total	18,777.6	17,172.0	16,231.6	— 940.4
Noncommercial forest land:				
Productive-reserved	46.4	92.7	94.4	+ 1.7
Unproductive	1,990.9	1,785.0	1,606.9	— 178.1
Total	2,037.3	1,877.7	1,701.3	— 176.4
Nonforest land	13,782.3	15,323.2	16,698.0	+1,374.8
All land[2]	34,597.2	34,372.9	34,630.9	+ 258.0

[1]Area breakdowns by land use class are adjusted because of the reclassification of 2,,673,500 acres from commercial forest to natural rangeland and unproductive forest.
[2]Excludes all water areas.

Table 35.—Volume[1] of sawtimber, growing stock, and all live timber on commercial forest land, by species group, diameter class, and survey completion date, Florida, 1949, 1959, and 1970

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 million board feet, International ¼-inch rule)								
Softwood	1949	14,826.4	—	—	4,927.5	4,461.0	2,837.4	1,273.9	631.7	223.9	471.0
	1959	15,597.3	—	—	4,649.2	4,687.7	3,049.8	1,623.1	821.2	394.2	372.1
	1970	19,966.1	—	—	5,452.5	5,593.3	4,119.1	2,397.4	1,296.6	531.8	575.4
Hardwood	1949	9,439.0	—	—	—	1,756.2	1,928.0	1,508.9	1,288.6	936.1	2,021.2
	1959	9,262.0	—	—	—	1,777.0	1,966.5	1,623.3	1,261.6	902.4	1,731.2
	1970	10,498.4	—	—	—	1,951.9	2,133.7	1,813.4	1,489.1	1,017.0	2,093.3
			GROWING STOCK (In million cubic feet)								
Softwood	1949	5,065.2	655.4	1,060.3	1,308.7	994.3	568.5	233.2	115.4	42.6	86.8
	1959	5,460.1	796.7	1,173.5	1,239.0	1,047.5	612.4	297.7	151.1	73.9	68.3
	1970	6,904.2	1,115.9	1,381.2	1,451.6	1,248.9	826.6	439.2	237.2	100.2	103.4
Hardwood	1949	3,517.6	347.2	415.2	488.3	516.7	487.6	346.7	272.5	203.1	440.3
	1959	3,600.1	359.9	454.7	552.6	522.4	498.4	372.9	266.5	195.3	377.4
	1970	3,984.2	383.6	505.4	572.1	575.6	538.8	416.1	315.8	220.4	456.4
			ALL LIVE TIMBER (In million cubic feet)								
Softwood	1949	5,199.5	687.1	1,092.5	1,339.2	1,005.6	576.5	235.5	117.8	44.4	100.9
	1959	5,609.6	837.1	1,209.7	1,268.1	1,060.2	620.9	300.9	154.7	78.6	79.4
	1970	7,089.1	1,165.0	1,424.0	1,485.8	1,263.4	838.0	443.6	242.6	105.4	121.3
Hardwood	1949	4,816.8	598.5	629.8	674.1	681.1	608.1	425.4	335.0	257.6	607.2
	1959	4,940.3	620.6	692.2	762.4	689.4	621.7	457.3	330.4	245.7	520.6
	1970	5,461.3	659.1	768.2	790.7	757.8	674.1	512.6	390.6	278.1	630.1

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

Table 36.—Volume of all live timber, by species group and Survey Unit, Florida, 1949, 1959, and 1970

Species group and Survey Unit	1949	1959	Change 1949-1959	1970	Change 1959-1970
	Million cu. ft.	*Million cu. ft.*	*Percent*	*Million cu. ft.*	*Percent*
Softwood:					
Northeast	2,673.2	2,637.6	— 35.6	3,402.1	+ 764.5
Northwest	1,304.8	1,723.3	+418.5	2,207.2	+ 483.9
Central	955.0	906.1	— 48.9	1,130.9	+ 224.8
South	266.5	342.6	+ 76.1	348.9	+ 6.3
All units	5,199.5	5,609.6	+410.1	7,089.1	+1,479.5
Hardwood:					
Northeast	2,066.7	2,151.3	+ 84.6	2,307.1	+ 155.8
Northwest	1,719.8	1,799.7	+ 79.9	1,971.4	+ 171.7
Central	1,003.2	921.4	— 81.8	1,126.5	+ 205.1
South	27.1	67.9	+ 40.8	56.3	— 11.6
All units	4,816.8	4,940.3	+123.5	5,461.3	+ 521.0