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SOUTHERN FOREST EXPERIMENT STATION

New Orleans, La.



GUM NAVAL STORES PRODUCTION, PRODUCING ACREAGE, AND NUMBER
OF WORKING CUPS IN FOREST SURVEY UNIT #1, GEORGIA.

By

SOUTHERN FOREST SURVEY STAFF

I. F. Eldredge

Regional Director

* - This is an advance release of Forest Survey data that will later be published in complete reports. This information is subject to such correction or amplification as may be found necessary as computations proceed.

¹ - The first three releases of this series have been issued as Occasional Papers 31, 34 and 36 of the Southern Forest Experiment Station.

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According to analysis of the field data of the Forest Survey in the South, 6,976,000¹ acres of land in the thirty-five counties in south-east Georgia (Forest Survey Unit #1; see map on page 5) are covered with forest growth. This area excludes the Okefenokee Swamp and the coastal islands and marsh land, which were not surveyed. Of the forest area in this unit, 5,544,000 acres, or approximately 79 percent, are included in turpentine forests. This area includes, of course, the usual percentage of non-turpentine areas in swamps, bays, etc., such as are found in all turpentine orchards. Approximately 55 percent, or 3,032,000 acres of this turpentine forest area, is now being worked for naval stores. The remainder, 2,512,000, is for one reason or another, not being worked during the 1934-35 naval stores season.

The naval stores area is being worked by seven kinds of gum producers. These are defined below:

Operator. - A person who maintains a turpentine still and processes crude gum from his own or leased timber exclusively.

Operator and farmer. - An operator who combines farming with turpentine to the extent of at least half his time.

Operator and gum-buyer. - An operator who in addition to stilling gum from his own or leased timber, buys crude gum from producers, and, after processing, sells it in his own name.

Operator and custom-stiller. - An operator, who in addition to stilling gum from his own or leased timber, processes crude gum for producers who market the turpentine and rosin in their own names.

Operator, gum-buyer and custom-stiller. - An operator who is both a gum-buyer and a custom-stiller.

¹The area of the unit may be increased to a small extent by further computations.

Gum-producer-seller. - A person who does not maintain a still, but who works his own or leased timber for crude gum, which he sells to stillers.

Gum-producer-shipper. - A person without a still who works his own or leased timber for crude gum, which is custom-stilled and marketed in his own name.

AREA

Table 1 shows the working naval stores acreage for the 1934-35 season classified as owned and leased, and by types of operations producing crude gum.

Table 1. - Naval stores working acreage classified as owned and leased, and by types of operations producing crude gum - Survey Unit #1, Georgia, season 1934-35

Types of operations	Gross working acreage			Percent of total working acreage
	Owned	Leased	Total	
Number of acres				
Operator	467,000	632,000	1,099,000	36
Operator and farmer	18,000	6,000	24,000	1
Operator and gum-buyer	197,000	476,000	673,000	22
Operator and custom-stiller	55,000	100,000	155,000	5
Operator, gum-buyer and custom-stiller	83,000	182,000	265,000	9
Gum-producer-seller	500,000 ¹	85,000 ¹	585,000 ¹	19
Gum-producer-shipper	196,000 ¹	35,000 ¹	231,000 ¹	8
Total	1,516,000	1,516,000	3,032,000	
Percent of total working acreage	50	50		100

¹Estimated from information furnished by still operators.

CROPPAGE

Table 2 shows the present number of working crops classified as owned and leased and by types of operations.

Table 2. - Working naval stores crops classified as owned and leased and by types of operations - Survey Unit #1, Georgia, season 1934-35

Types of operations	Working crops			Percent of total work- ing crops
	Owned	Leased	Total	
Number of crops				
Operator	744.7	1,041.9	1,786.6	32
Operator and farmer	33.2	21.8	55.0	1
Operator and gum-buyer	365.4	1,005.5	1,370.9	25
Operator and custom-stiller	117.3	174.3	291.6	5
Operator, gum-buyer and custom-stiller	159.8	371.3	531.1	10
Gum-producer-seller	844.4 ¹	149.0 ¹	993.4 ¹	18
Gum-producer-shipper	434.7 ¹	76.7 ¹	511.4 ¹	9
Total	2,699.5	2,840.5	5,540.0	
Percent of total working crops	49	51		100

¹Estimated from information furnished by still operators.

PRODUCTION 1933-34

No figures on the number of naval stores operations or the naval stores croppage or production for the season 1933-34 were obtained directly on the line plot survey. These figures were secured by means of a supplemental study of the gum naval stores operations in the unit made by C. H. Coulter, who was loaned to the Survey by the Bureau of Chemistry and Soils and the Florida Forest Service. The gum naval stores production and croppage data shown in Table 3 are based on the figures furnished by the individual still operators. In many cases it was possible to confirm the production figures by sales records and by factors accounts. It has not been possible to check the 1933-34 croppage figures furnished by the operators.

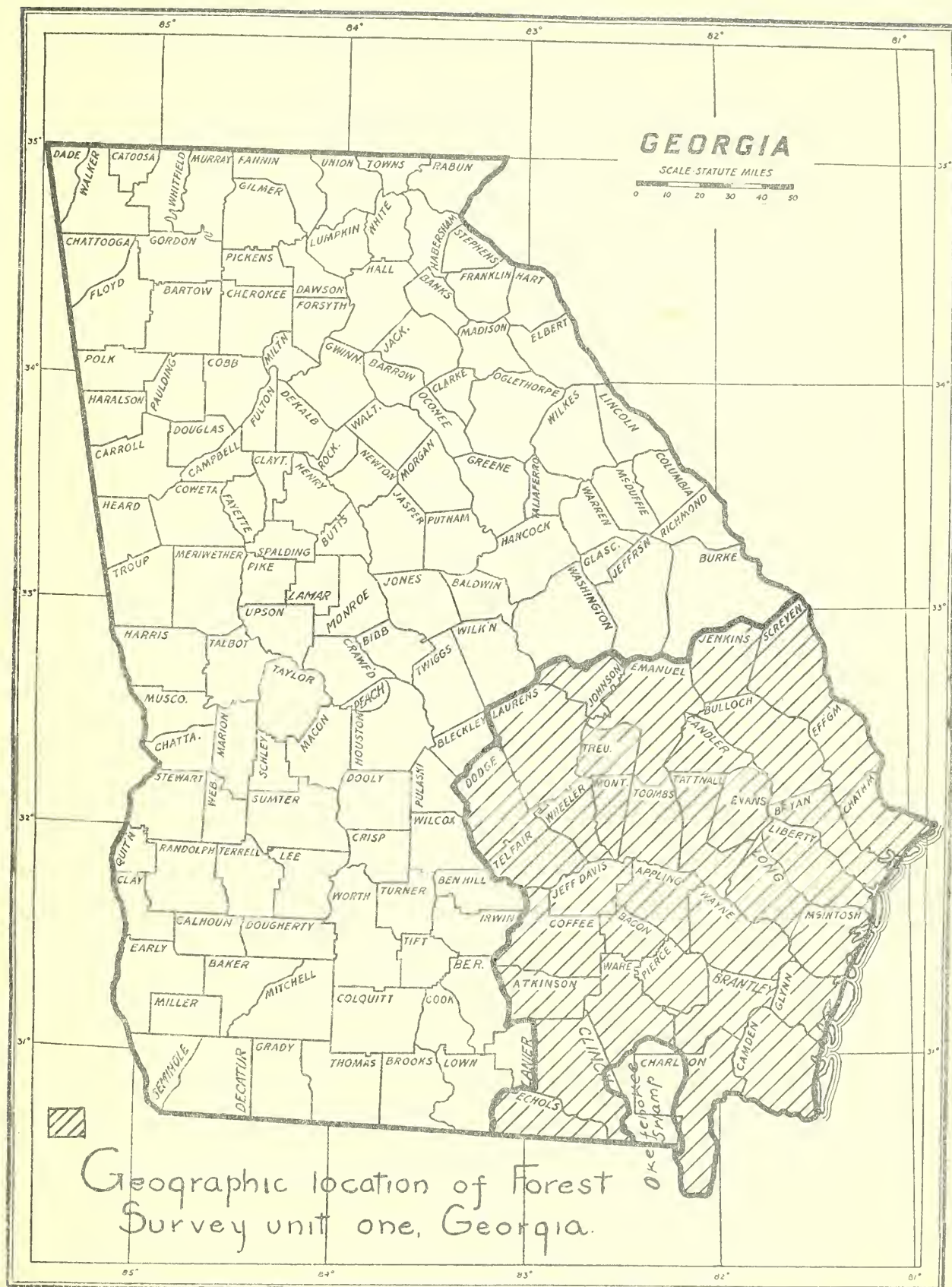
Table 3. - Naval stores production classified by the types of operations that produced the crude gum - Survey Unit #1, Georgia, season 1933-34

Types of operations	Number of operations ¹	Working crops	Production in naval stores units ²	Average production per crop in naval stores units
Operator	175	1,677.5	74,850	45
Operator and farmer	11	50.3	1,790	36
Operator and gum-buyer	158	1,255.7	56,560	45
Operator and custom-stiller	52	278.8	10,890	39
Operator, gum-buyer and custom-stiller	96	487.6	19,670	40
Gum-producer-seller	7,854 ³	1,062.4 ³	38,630 ³	36
Gum-producer-shipper	609 ³	547.0 ³	21,080 ³	39
Total	8,955	5,359.3	223,470	42

¹In addition to the 8,955 operations producing crude gum there were 13 operations that stilled gum produced by others but did not themselves work any timber.

²Totals rounded to nearest ten units for each class of operations.

³Estimated from information furnished by still operators.



A13.27

FOREST SURVEY RELEASE * NO. 5¹

November 17, 1934.

SOUTHERN FOREST EXPERIMENT STATION

New Orleans, La.



ADVANCE INFORMATION ON THE SUPPLY OF PULPWOOD
IN SURVEY UNIT #1
GEORGIA

By

SOUTHERN FOREST SURVEY STAFF

I. F. Eldredge

Regional Director

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ADVANCE INFORMATION ON THE SUPPLY OF PULPWOOD

IN SURVEY UNIT #1

GEORGIA

By

The Southern Forest Survey Staff

I. F. Eldredge

Regional Survey Director

The following information concerning the amount of pulpwood in Survey Unit #1, Georgia, is given in advance of the publication of a statistical report which will give not only the inventory of pulpwood, but in addition, full information concerning the supply, the growth, and the character of the timber suitable for lumber, naval stores, poles, piling and domestic uses. The data given in this advance release are preliminary, and are subject to correction and modification when final computations are completed. The figures of area used in this release are approximate only, and very likely will require correction as further information becomes available. It is believed, however, that the changes in estimates of pulpwood that may be necessitated by corrections in area figures will neither be extensive nor important.

The estimates given here are based on data gathered in the period from December 1933 to July 1934 by the Forest Survey, an activity of the Southern Forest Experiment Station of the Branch of Research, U. S. Forest Service. Measurement was made of the timber stand on the 9,066 quarter-acre forest-plots encountered in a total of 12,428 plots, both forest and non-forest. Sample plots were taken at intervals of 560 feet on parallel compass lines run 10 miles apart in an east and west direction across the 35 counties comprising the survey unit. The location of the unit may be seen on the map on page 10. The gross area surveyed, not including the Okefenokee Swamp and a strip along the coast which contains coastal islands and salt marshes, is approximately 9,643,400 acres. Table 1 shows the distribution of this area by class of land use.

Table 1. - Distribution of land area¹ by class of land use,
Survey Unit #1, Georgia

Land use classes	Area in acres	Percent of non- forest area	Percent of total area
Forest land	6,976,200		72.3
Nonforest land:			
Agricultural land:			
In cultivation:			
Old crop land	2,020,700	75.8	
New crop land	8,500	.3	
Out of cultivation:			
Idle	133,900	5.0	
Abandoned	122,400	4.6	
Pasture:			
Improved	19,200	.7	
Other areas:			
Marsh	168,500	6.3	
Waterways	64,600	2.4	
Towns and villages	49,200	1.9	
Roads, railroads, etc.	80,200	3.0	
Total nonforest land	2,667,200	100.0	27.7
Total forest and non- forest land	9,643,400		100.0

¹ Does not include the Okefenokee Swamp and a strip along the coast which contains coastal islands and salt marshes.

The Forest Area

As shown in table 1 the forest in Georgia Survey Unit #1 covers about 72 percent of the gross area. There are three groups of forest types of significance in pulpwood production in this unit. The first group consists of the turpentine pines, longleaf and slash, in their varying mixtures with each other and with other species. The nonturpentine pine group consists of varying mixtures of loblolly, shortleaf, pond, sand and spruce pines. Some hardwoods are found in both of these forest type groups. The third group is composed of hardwoods either pure or mixed to a very limited extent with pines. Table 2 shows the forest area classified by forest conditions and by these forest type groups. In round figures, the turpentine-pine forest types cover 72 percent, the nonturpentine-pine forest types 14 percent and the hardwood forest types 14 percent of the forested area. It will be noted that 30 percent of the forest is uncut second-growth of saw-log size, and 34 percent is uncut second-growth under saw-log size. The minimum tree diameter for pine trees of saw-log size is 9 inches, and for hardwoods 13 inches.

Table 2. - Forest area by forest conditions and forest type groups, Survey Unit #1, Georgia

Forest conditions	Forest type groups			Total	Percent of total forest area
	Longleaf and slash pine predominating	Loblolly and other nonturpentine pine predominating	Hardwood predominating		
-----Acres-----					
Old-growth uncut	104,700	81,500	228,600	414,800	5.9
Old-growth partly-cut	415,500	97,000	173,900	686,400	9.8
Second-growth saw-log size uncut	1,445,000	371,700	233,200	2,049,900	29.4
Second-growth saw-log size partly-cut	190,100	110,000	37,700	337,800	4.8
Second-growth under saw-log size uncut	1,914,500	209,300	279,300	2,403,100	34.5
Second-growth under saw-log size partly-cut	78,400	14,700	17,700	110,800	1.6
Clear-cut ¹	442,600	7,700	7,600	457,900	6.6
Reproduction	413,100	60,000	42,400	515,500	7.4
Total	5,003,900	951,900	1,020,400	6,976,200	
Percent of total forest area	71.7	13.7	14.6		100.0

¹The areas shown in the clear-cut condition include a relatively small area of fire-killed condition.

Volume Estimate

To understand the following tables of cordwood volume, a brief explanation of terms is necessary.

There are six species groups, of which the first five are considered suitable for pulpwood:

1. - Round turpentine-pines are longleaf and slash pine trees that have never been worked for naval stores, that is, no cups have been hung or faces made for the production of turpentine and rosin.
2. - Working and resting turpentine-pines are longleaf and slash pine trees that either are being worked for naval stores at the present time, or are in a temporary period of rest between working operations.
3. - Worked-out turpentine-pines are longleaf and slash pine trees on which as many cups or faces have been placed as the trees will stand; these trees have served their purpose in the production of naval stores, and are ready for the ax.
4. - The nonturpentine pines, loblolly, shortleaf, pond, sand and scrub pines, are not used in the production of naval stores. They, of course, have no cups or faces.
5. - The pulping hardwoods, which can be used in the manufacture of paper, include the gums, the maples, the bays, magnolia, cottonwood, poplar, etc.
6. - The nonpulping hardwoods include species that are not generally considered of value for the production of paper, such as oak, hickory, ash, cypress, hackberry and sycamore.

In estimating the volume of pulpwood only live timber of pulping species was considered. All sound trees five inches and over in diameter at breast height were taken, but no wood under 4 inches in diameter at the small end outside of bark was included in the estimate. No limb wood was included. A deduction was made for woods cull, that is, that portion of the tree that would be left in the woods on account of rot, crook, bad knots, or other defects. Volumes of the entire butt sections (approximately 10 feet) of working, resting, and worked-out turpentine-trees were omitted from the estimate. Later information may show that a substantial percentage of these butt sections can be used for pulpwood. In that event, the totals given here will be proportionately increased in later reports.

Table 3 gives by forest type groups and species groups the total amount of cordwood both pulping and nonpulping in stands in Georgia Unit #1. The cord used is the standard cord, 4 by 4 by 8 feet, measured with bark on.

Table 3. - Estimate of cordwood, by forest type groups and species groups, Survey Unit #1, Georgia

Species groups	Forest type groups			
	Longleaf and slash pine predominating	Loblolly and other nonturpentine pine predominating	Hardwood predominating	Total
Thousands of cords				
Round turpentine-pine (Longleaf and slash)	8,446	310	86	8,842
Working and resting turpentine-pine (Longleaf and slash)	9,585	147	35	9,767
Worked-out turpentine-pine (Longleaf and slash)	2,364	27	13	2,404
Nonturpentine pine (Loblolly, shortleaf, pond, sand and scrub)	1,888	6,615	187	8,690
Pulping hardwood (Gum, maple, bay, magnolia, etc.)	3,544	2,178	9,541	15,263
Nonpulping hardwood (Cypress, oak, hickory, ash, etc.)	2,701	1,255	5,448	9,404
Total	28,528	10,532	15,310	54,370

Table 3 indicates that there are 29,703,000 cords of pulpwood of the pine species, and 15,263,000 cords in the pulping hardwoods, or a total of 44,966,000 cords of pulpwood.

Survey Unit #1, Georgia, is in the heart of the naval-stores belt. It produces nearly 50 percent of this country's annual output of turpentine and rosin. The greater part of the pine forest is owned or leased by naval-stores operators. It is reasonable to assume that the naval-stores industry will continue to lay first

claim to the greater part of the longleaf and slash pine timber stands, and will use these stands for turpentine and rosin before they become available for pulpwood. Taking this into account, Table 4 has been prepared to show the volume of pulpwood available at the present time in species not used in naval-stores production and in trees that have already been fully exploited by naval-stores operators. The amount of pulpwood available in worked-out turpentine-pines increases each year. This is due to the fact that each year the turpentine industry abandons the working trees in its older operations, transferring activity to round timber. These worked-out trees are not utilized for saw timber or other products as rapidly as they are thrown out of naval-stores production.

Table 4. - Pulpwood estimate not including round, working or resting turpentine-pines. This estimate includes worked-out turpentine-pine, all nonturpentine-pine and pulping-hardwood species. Survey Unit #1, Georgia

Species groups	Forest type groups			
	Longleaf and slash pine predominating	Loblolly and other nonturpentine pine predominating	Hardwood predominating	Total
Thousands of cords				
Worked-out turpentine-pine (Longleaf and slash)	2,364	27	13	2,404
Nonturpentine pine (Loblolly, shortleaf, pond, sand and scrub)	<u>1,888</u>	<u>6,615</u>	<u>187</u>	<u>8,690</u>
Subtotal (all pine species)	4,252	6,642	200	11,094
Pulping hardwoods (Gum, maple, bay, magnolia, etc.)	3,544	2,178	9,541	15,263
Total	7,796	8,820	9,741	26,357

In table 5, the total estimate of cordwood, not including that in round and in working and resting turpentine-pines, is shown by tree diameter classes. The two-inch diameter classes used are designated in the table by the midpoint of each class; the 6-inch class includes trees from 5.0 to 6.9 inches, the 8-inch class from 7.0 to 8.9. It is to be noted that of the 26,357,000 cords of available pulpwood, 13,114,000 cords are in trees in the 6, 8, 10 and 12-inch classes. In these diameter classes, little competition is to be expected from the lumber industry.

Table 5 - Size classification of cordwood, both pulping and non-pulping, not including round, working and resting turpentine-pines, Survey Unit #1, Georgia

Species groups	Diameter classes	Forest type groups			
		Longleaf and slash pine predominating	Loblolly and other nonturpentine pine predominating	Hardwood predominating	Total
Thousands of cords					
Worked-out	6"- 8" ¹	268	2	1	271
turpentine-pine	10"-12"	1,237	14	5	1,256
(Longleaf	14"-18"	724	8	2	734
and slash)	20" & over	135	3	5	143
	Subtotal	2,364	27	13	2,404
Nonturpentine pine	6"- 8" ²	354	827	29	1,210
(Loblolly, short-	10"-12"	570	1,774	52	2,396
leaf, pond, sand	14"-18"	678	2,653	64	3,395
and scrub)	20" & over	286	1,361	42	1,689
	Subtotal	1,888	6,615	187	8,690
Pulping hardwood	6"- 8" ²	1,416	649	1,709	3,774
(Gum, maple,	10"-12"	1,146	642	2,419	4,207
bay, magnolia,	14"-18"	740	659	3,017	4,416
etc.)	20" & over	242	228	2,396	2,866
	Subtotal	3,544	2,178	9,541	15,263
Nonpulping					
hardwood	6"- 8" ²	1,115	262	869	2,246
(Cypress, oak,	10"-12"	1,029	334	1,277	2,640
hickory, ash,	14"-18"	418	403	1,443	2,264
etc.)	20" & over	139	256	1,859	2,254
	Subtotal	2,701	1,255	5,448	9,404
	Total	10,497	10,075	15,189	35,761

¹ Diameter measurements on worked-out pines were taken at 10 feet above the ground and represent the diameter of the part of the stem used above the discarded turpentine-butt section.

² Diameter measurements on all nonturpentine-pines and on all hardwoods were taken at 4½ feet above the ground since the whole merchantable stem is used.

Table 6 shows the cordwood volume on the composite acre by species groups and diameter classes. A composite acre is a theoretical acre arrived at by dividing the total number of cords of wood in each species group and diameter class by the total forest acreage.

Table 6 - Cordwood volume on the composite acre by species groups and diameter classes, Survey Unit #1, Georgia

Species groups	Diameter classes									
	6"-8"		10"-12"		14"-18"		20" & over		Total	
	Cords	% of total	Cords	% of total	Cords	% of total	Cords	% of total	Cords	% of total
Turpentine pine (Longleaf and slash)										
Round	.76	9.8	.32	4.1	.15	1.9	.04	.5	1.27	16.3
Working and resting	.30	3.9	.72	9.2	.33	4.3	.05	.6	1.40	18.0
Worked-out	.04	.5	.18	2.3	.10	1.3	.02	.3	.34	4.4
Nonturpentine pine (Loblolly, shortleaf, pond, sand and scrub)	.17	2.1	.35	4.5	.49	6.3	.24	3.1	1.25	16.0
Pulping hardwood (Gum, maple, bay, magnolia, etc.)	.54	6.9	.60	7.7	.63	8.1	.41	5.3	2.18	28.0
Nonpulping hardwood (Cypress, oak, hickory, ash, etc.)	.32	4.1	.38	4.9	.33	4.2	.32	4.1	1.35	17.3
Total	2.13	27.3	2.55	32.7	2.03	26.1	1.08	13.9	7.79	100.0

Growth

The calculation of the annual growth of the present timber stands in this unit has not been completed and the result of the Survey's findings in this respect will be shown in the statistical report for the Unit. This report will be published as soon as all field data have been assembled, computed and analyzed. It will be sent to those who express a desire to receive copies.

A word about the National Forest Survey

The Forest Survey in the South is a part of a national survey of the forest resources of the entire United States, authorized by Congress in 1928. The five-fold object of this nation-wide survey is: (1) to make an inventory of the present supply of pulpwood and other forest products, (2) to ascertain the rate at which this supply is being increased through growth, (3) to determine the rate at which this supply is being diminished through industrial and local use, windfall, fire and disease, (4) to study the probable future requirement for timber and other forest products, and (5) to correlate these findings with existing and anticipated economic conditions in order that policies for the effective use of land suitable for forest production can be formulated.

The land area to be surveyed in the South aggregates 321 million acres. The portion of this area now being covered is double-hachured on the map in Figure 2. For the forest inventory phase of the Survey the field work is being done by 27 crews, each of which is composed of three experienced timber cruisers. These men are cruising the timber and gathering the field data upon which forest inventory reports are based. Data needed in the preparation of Survey reports on forest growth, forest drain, and the economic relationship between the forest resources and community life are being gathered by special field crews. The data from all phases of Survey field work are summarized and presented in tabular form by an especially trained computing and stenographic group. The Survey force in the South at the present time aggregates 110 persons. This work is directed from the Southern Forest Experiment Station at New Orleans, La.

Funds are available to finish the field work and make a partial analysis of the data for the double-hachured area shown in Figure 2. The complete analysis of the data for this region, and the survey of the additional section single-hachured in Figure 2, are dependent on further appropriations by Congress. Plans have been prepared for a comprehensive survey and analysis of the whole area, and a trained personnel is available to undertake the work.

Figure 1.

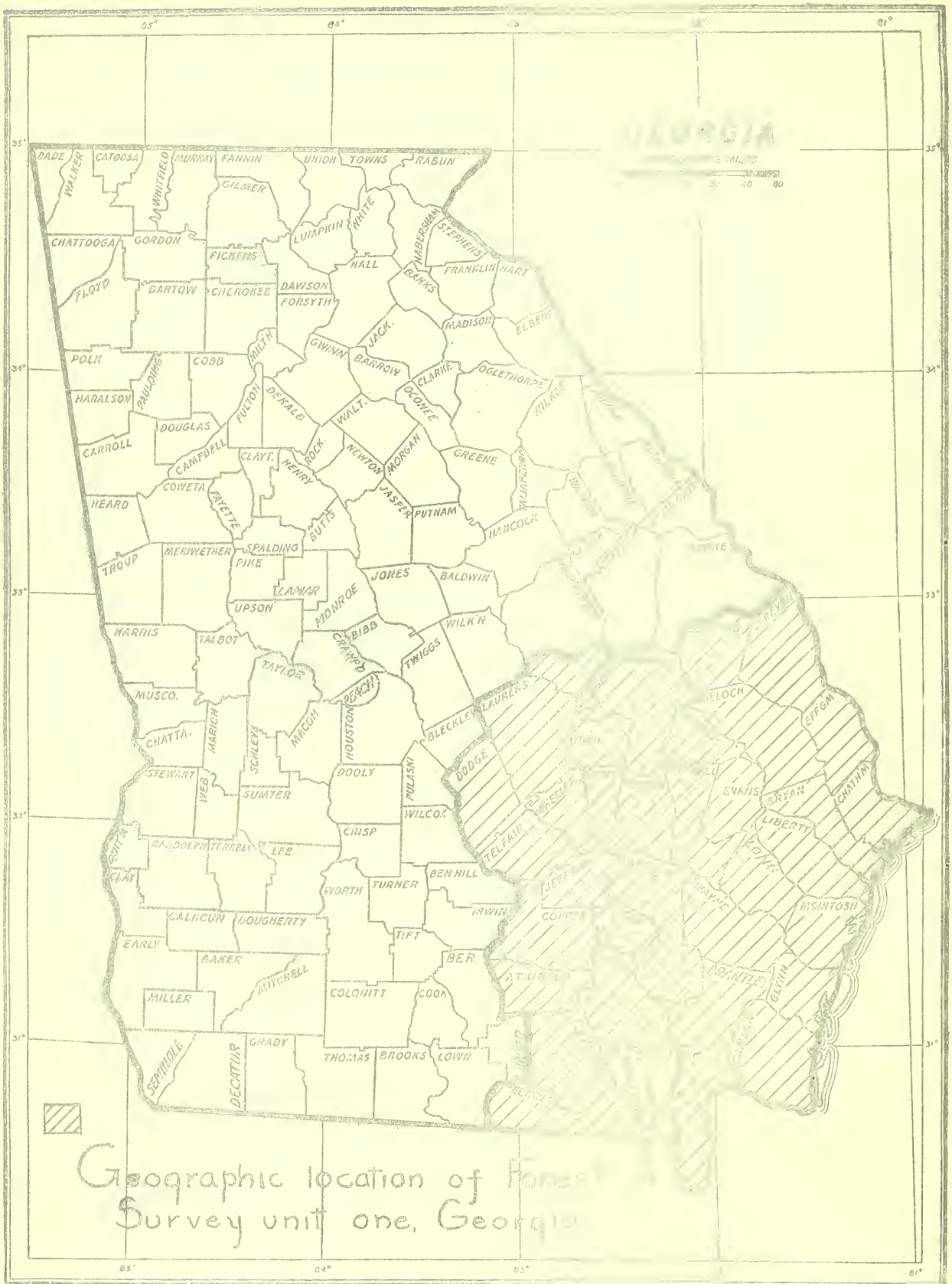
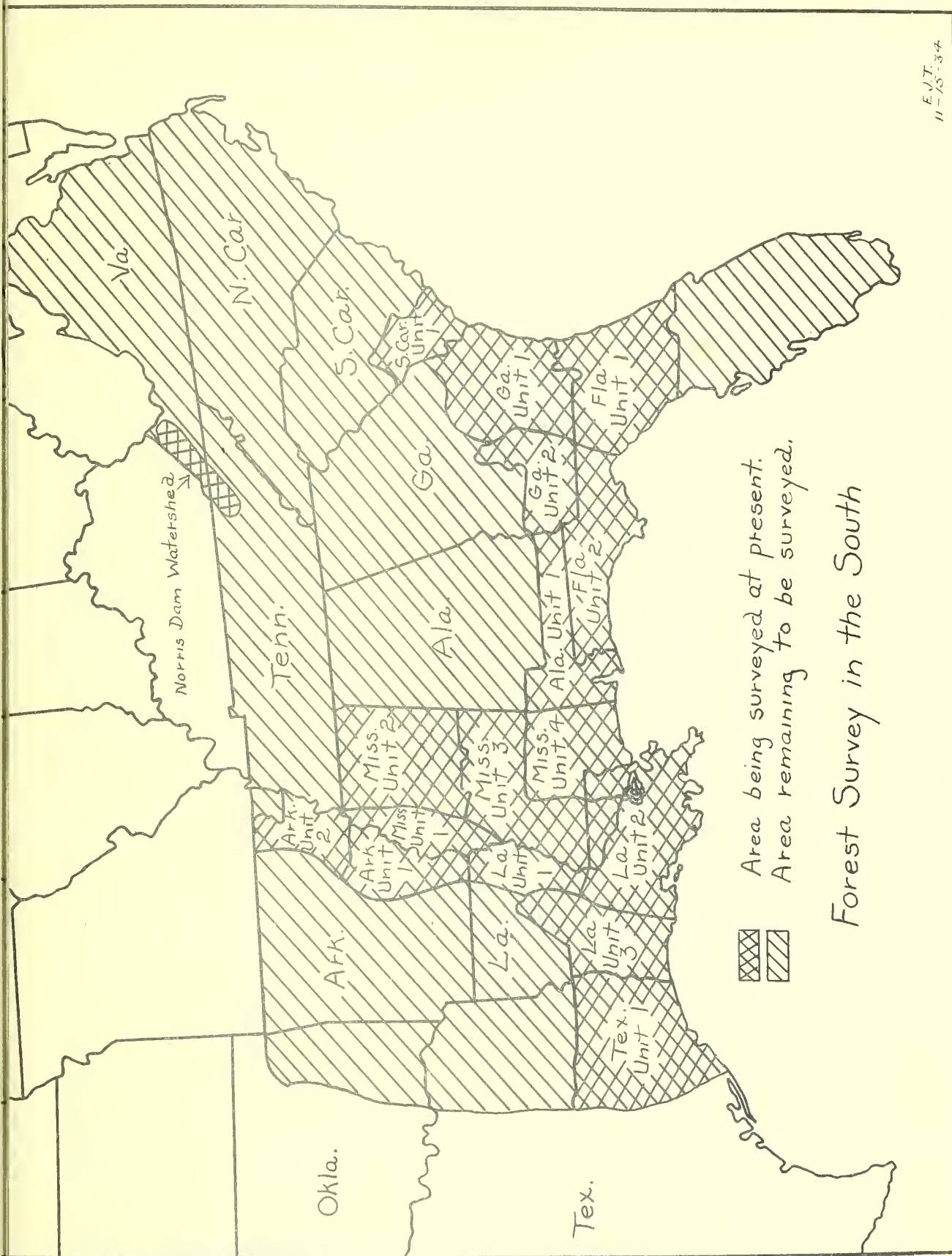


Figure 2.

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November 30, 1934.

SOUTHERN FOREST EXPERIMENT STATION

New Orleans, La.



PRELIMINARY REPORT ON THE FOREST SURVEY
OF THE
BOTTOM-LAND HARDWOOD UNIT IN MISSISSIPPI

By

SOUTHERN FOREST SURVEY STAFF

I. F. Eldredge

Regional Director

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I. F. Eldredge
Regional Director

A word about the National Forest Survey

In 1928, through the McSweeney-McNary Forest Research Act, Congress authorized a national survey of the timber resources of the United States. The object of this Federal Forest Survey is five-fold: (1) To make an inventory of the present supply of timber and other forest products, (2) to ascertain the rate of growth of the timber stands, (3) to determine the drain on the forests through industrial and local timber use, windfall, fire, flood and disease, (4) to determine the present requirement and the probable future trend in the requirement for timber and other forest products, (5) to correlate these findings with existing and anticipated economic conditions, in order that policies can be formulated for the effective use of land suitable for forest production.

The nation-wide Forest Survey is an activity of the Branch of Research of the United States Forest Service. Within each region, the survey is conducted as a part of the work of the regional forest experiment station. The survey is now under way in the Pacific Northwest, California, the Northern Rocky Mountain region, the Lake States, and the South. Work will be undertaken progressively in other parts of the country until all the timber lands of the United States are covered.

Within the southern region survey work is undertaken in territorial units of 4 to 12 million acres. The boundaries of the units within each State conform, insofar as possible, with the boundaries of the major timber types, such as the long-leaf pine type. For each unit a detailed report covering all phases of survey work will eventually be prepared. Meanwhile, upon completion of the office analysis of separate phases of the work, special preliminary reports will be issued. This publication is the first preliminary report for the Bottom-land Hardwood Unit of west Mississippi, and includes the principal statistics of the inventory, growth and drain phases of the survey. While the information here presented is thought to be substantially correct all data are subject to such modification as later and more detailed analysis may make necessary.

The field work of the Forest Survey in this unit was done by three-man crews, each of which consisted of an expert timber cruiser and two assistants. These crews gridironed the entire unit without regard to land ownership or occupancy. Sample plots were taken at intervals of 660 feet on parallel compass lines run in an east and west direction ten miles apart. The timber stand was sampled by counting the number of trees by diameter classes and species groups on the 2,301 quarter-acre forest-plots. Growth rates of individual tree species, and other special information, were obtained on randomly selected sample trees located on the sample plots.

Analysis has shown that for geographical units of 4 million acres or more this gridiron method of random sampling gives statistical results that are within the limits of dependability set up for the Forest Survey.

Description of the Bottom-land Hardwood Unit in Mississippi

Classification of land area by class of land use

This survey unit embraces an area of 4,420,400 acres of bottom land, which includes all of the flood plain of the Mississippi River lying in the State of Mississippi north of Vicksburg. The geographic location of the unit is shown in Figure 1. Characteristically the area is a relatively low-lying, featureless expanse sloping gently southward. In general its soils are very fertile and produce heavily when given proper drainage.

As shown in Table 1, approximately 50% of the area is now being farmed. Agriculture is an old and more or less stabilized industry in the unit, cotton farming being of major importance. A certain amount of land is cleared and put into cultivation each year. Accordingly, land clearing constitutes a definite drain upon the present timber resources. On the other hand, approximately 1.0 percent of the land area in the unit is abandoned for agriculture, probably on account of faulty drainage. Since natural reproduction on old fields is easily secured, much of this area will become forest land presently. In addition, approximately 1.7 percent of the land area is in the idle agricultural land class. A considerable part of this will presumably be abandoned and ultimately pass into second-growth timber land. Unless economic conditions change perceptibly, therefore, the present area of forest land is not likely to be materially reduced as a result of land clearing.

Wood-using industries rank second in importance to agriculture in this unit. The forest occupies 39% of the total area. In the southern portion of the unit the forest industries predominate. Lumber companies and timber operators are important owners of timber land because they hold the principal supplies of merchantable timber. In the aggregate, however, plantation owners hold a greater acreage of the timber land than the lumber companies and timber operators. Much of the timber land held by plantation owners is imperfectly drained and probably will not be used for agriculture until prices of agricultural products increase perceptibly.

FIGURE 1

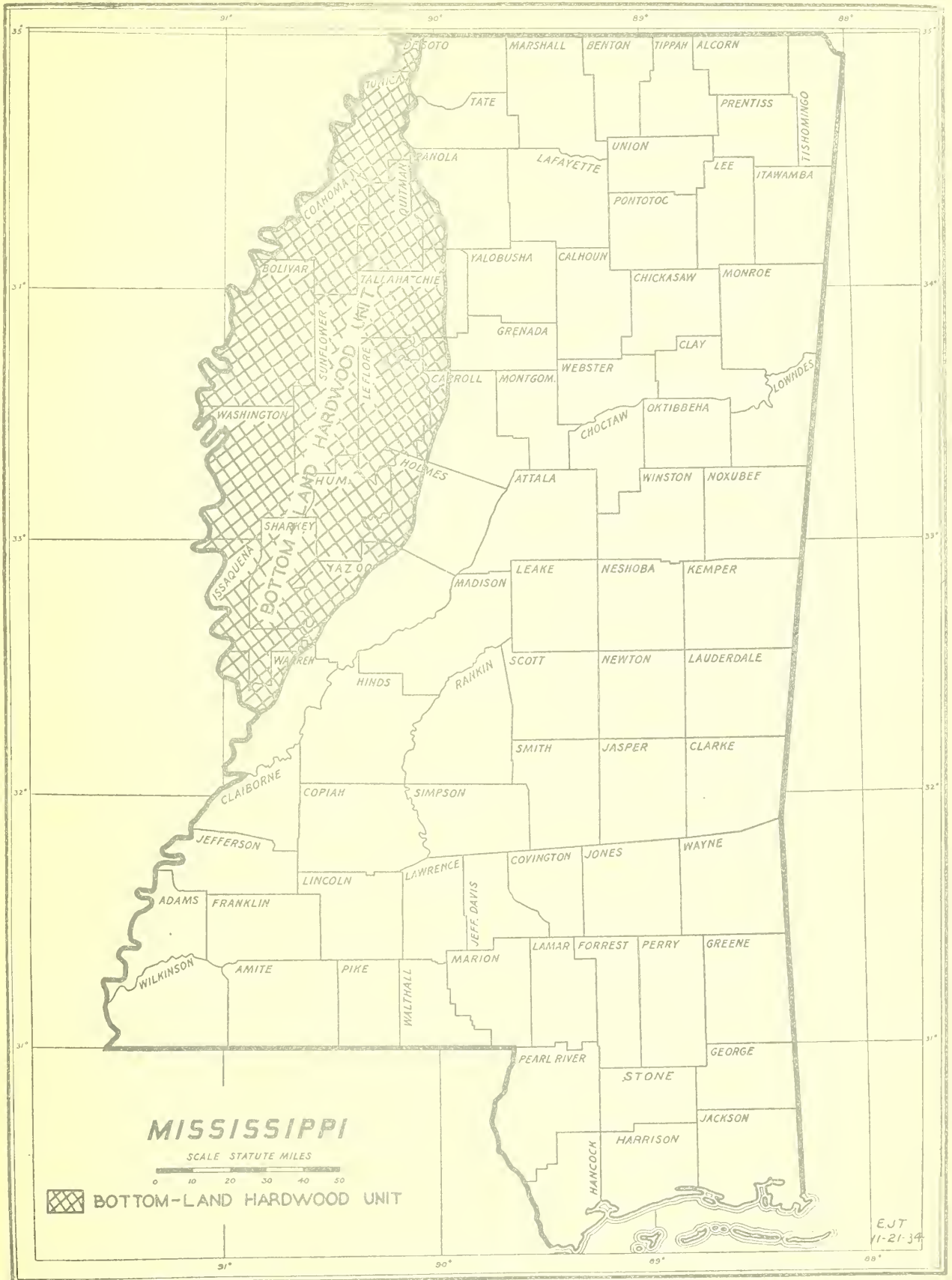


FIGURE 1 a.

THE BOTTOMLAND HARDWOOD UNIT IN MISSISSIPPI

TENN.
MISS.

LEGEND

- STATE HIGHWAYS
- ===== U. S. HIGHWAYS
- +++++ RAILROADS
- BOUNDARY OF UNIT

SCALE :- 1" = 21 MILES

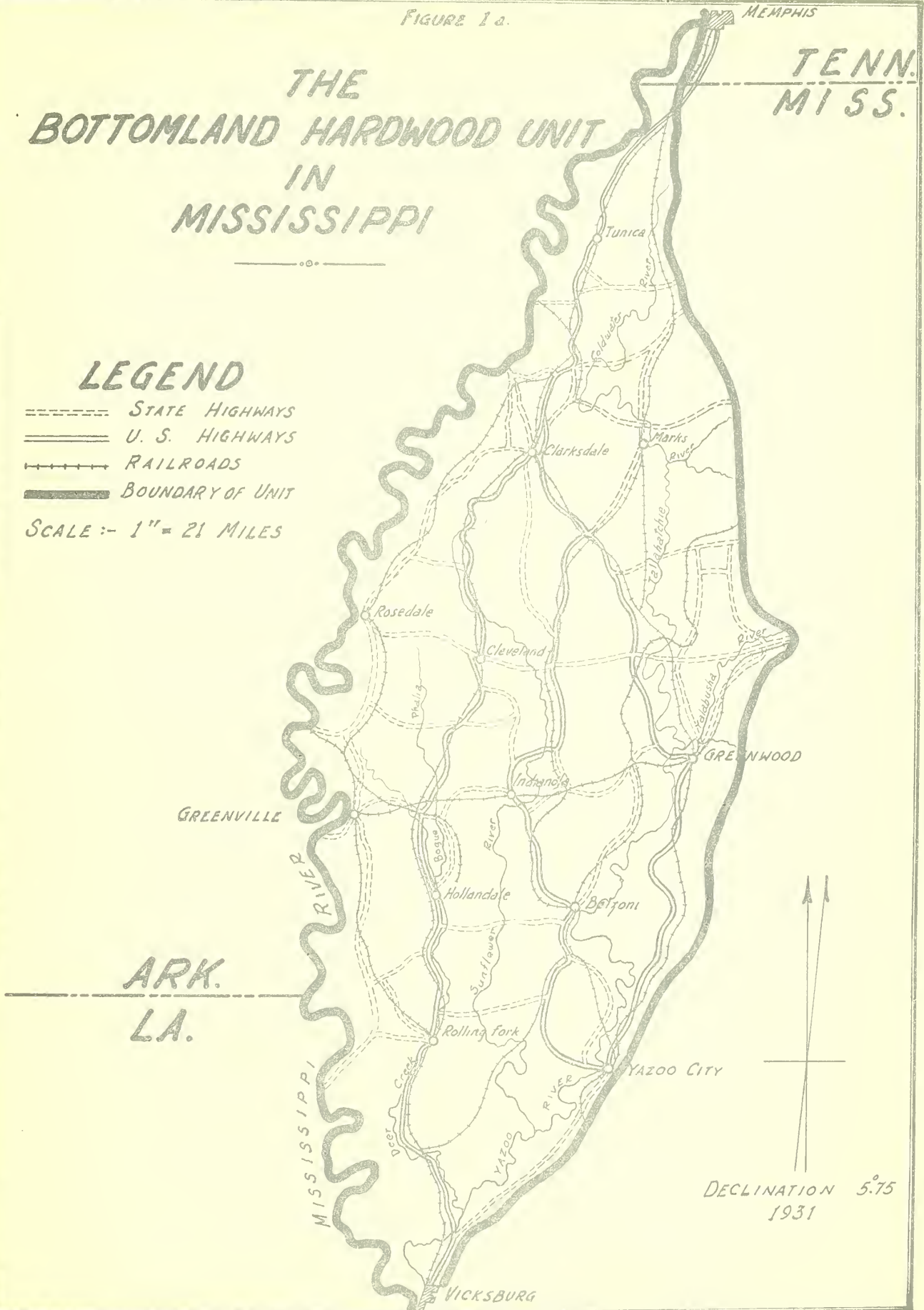




Table 1. - Distribution of land area by class of land use, in the Bottom-land Hardwood Unit in Mississippi

Land use classes	Area in acres	Percent of total area
Forest:	1,736,900	39.3
Nonforest:		
Agricultural:		
In cultivation:		
Old crop land ¹	2,192,100	49.6
New crop land ²	127,600	2.9
Out of cultivation:		
Idle ³	74,700	1.7
Abandoned ⁴	46,100	1.0
Pasture:		
Improved ⁵	27,900	.6
Woodland ⁶	29,400	.7
Other areas:		
Levees, roads, railroads, towns, waterways	185,700	4.2
Total nonforest	2,683,500	60.7
Total forest and nonforest	4,420,400	100.0

¹ Land cultivated at least 5 years and on which a farm crop was raised within 2 years prior to date of survey.

² Land recently converted from forest to crop land. Stumps or standing dead trees are present. Dead hardwood trees and stumps usually decay and disappear within 5 years.

³ Cultivated land that has not produced a farm crop for two years or more, but which has not reached the abandoned class.

⁴ Land once cultivated but showing distinct evidence of having been out of cultivation for at least five years; no attempt is being made to keep it as pasture.

⁵ Cleared land under fence used for grazing. A real attempt has been made to produce and maintain a sod.

⁶ More or less wooded areas under fence used primarily for grazing. Usually no attempt has been made to improve the sod.

Description of the Forest Area

For descriptive purposes the forest area has been classified into (a) topographic situations, primarily on the basis of drainage, (b) forest conditions on the basis of stand age and logging history, and (c) forest types on the basis of association of tree species. The descriptive terms used in these classification systems are defined as follows:

Definitions of topographic situations

Swamp - Forested areas that are usually under water a large part of each year.

Batture¹ - Land lying between the levee and the river, and thereby subject to overflow; also, similar land located along sections of river banks where no levees exist.

Bottoms¹ - All land not described as batture or swamp.

Definitions of forest conditions

Old-growth - Stands which have the superficial characteristics of the original mature forests of the region and forest type. There has been no cutting, except perhaps an occasional tree for some special product.

Old-growth culled - Old-growth stands from which an appreciable quantity of high-grade timber has been removed. These stands contain, however, a sufficient volume of material of saw-log size and quality to justify another operation.

Old-growth cut-over - Old-growth stands from which practically all trees of merchantable size and quality have been removed, leaving too small a volume per acre to justify another logging operation in the immediate future.

Second-growth - Stands of young timber one inch and over in diameter at 4½ feet above the ground, which have come in after cutting, hurricane, fire or previous cultivation. These stands may contain a few residual trees from the former old-growth stands, but the present forest is predominantly second-growth. Trees in these stands range in size from those recently established to those that are now merchantable. The stands may be uncut, or, if only an occasional tree has been removed, lightly cut.

Second-growth cut-over - Second-growth stands that have been given a harvesting cut, leaving an insufficient number of trees of merchantable size and quality to justify immediate further cutting.

¹Although the following tables show only the forest area in batture and bottoms, agricultural land is also found in the bottoms and to a very limited extent on the batture.

Fire- and flood-killed¹ - Forest areas on which practically all of the trees have been killed by fire or flood.

The forest area classified by forest conditions and topographic situations is shown in Table 2.

Table 2. - Forest area by forest conditions and topographic situations

Forest conditions	Topographic situations			Total	Percent of total forest Area
	Swamp	Batture	Bottoms		
-----Area in acres-----					
Old-growth	4,500	30,200	58,100	92,800	5.3
Old-growth culled	19,600	2,300	77,000	98,900	5.7
Old-growth cut-over	45,300	15,100	333,700	394,100	22.7
Second-growth	65,700	176,600	630,300	872,600	50.2
Second-growth cut-over	17,400	30,200	193,200	240,800	13.9
Subtotal	152,500	254,400	1,292,300	1,699,200	97.8
Fire- and flood-killed ¹	8,300	5,300	24,100	37,700	2.2
Total	160,800	259,700	1,316,400	1,736,900	
Percent of total forest area	9.2	15.0	75.8		100.0

¹Since the fire-killed and flood-killed conditions combined occupy only 2.2 percent of the total forest area, the accuracy of area estimates of either condition alone is insufficient to warrant its use.

Definitions of forest types

Cypress-hardwood - Two distinct phases of this type can readily be identified, (a) the cypress and/or tupelo-gum phase found in the swamps, and (b) the cypress-mixed hardwood phase usually found on clayey flats. For this preliminary report the two phases of the cypress-hardwood type have been combined, because the cypress-mixed hardwood phase occurs infrequently in the unit.

- (a) Cypress and/or tupelo-gum phase - Cypress in wet swamps, occurring either in pure stands or in mixture with tupelo gum and other hardwood species. Cypress makes up 40 percent or more of the merchantable volume of the stand, or 40 percent or more of the number of dominant and codominant trees. Red maple, planer tree, water locust, and in some instances willow, are common associates of the cypress. Many of the cypress stands have been heavily cut over and very little old-growth cypress remains in the Unit.
- (b) The cypress-mixed hardwood phase - Found on areas that are only occasionally inundated and are not true swamps. Cypress makes up 25 to 40 percent of the merchantable volume of the stand, or 40 percent of the number of dominant and codominant trees. Overcup oak, green ash, red gum, Nuttall's oak and other hardwoods are common associates of cypress. This phase of the type has often developed as a result of changes in drainage conditions.

Cottonwood-willow - A river-margin type. In this Unit it is chiefly found along the banks of the Mississippi, Yazoo and Sunflower Rivers. Although the cottonwood and willow may be associated, they are commonly found in pure stands of one species or the other. Willow is often found on low flats along the river's edge; cottonwood on the higher, sandier portions of the river bank. The rapid growth of cottonwood and willow, and the proximity to cheap water transportation, make this type commercially important. The lumber cut of several mills along the Mississippi River depends largely on the cottonwood and willow logs obtained from the batture and from river islands.

Overcup oak-water hickory - Found on the poorly drained, clay flats and at the edges of swamps. From a standpoint of merchantable value and growth this type is the poorest in the unit. The overcup oak and water hickory together make up at least 60 percent of the stand volume, or in young stands at least 60 percent of the number of dominant and codominant trees. American elm, cedar elm, persimmon, Nuttall's oak and green ash are common associates.

Mixed hardwood - Stands in which, as a rule, no single tree species or small group of tree species makes up more than 30 percent of the stand, by volume or by number of dominant and codominant trees. In the old-growth mixed-hardwood stands, the chief species are red gum, various red, white and water oaks, elms, ash and pecan. The cut-over stands may contain the same species, but with a greater representation of oak, elm, ash, and in addition, hackberry. Red gum is sometimes found in pure, or practically pure, stands on abandoned fields.¹ Extensive areas of pure, virgin red gum occur occasionally, but they are rare.

¹ The accuracy of the area estimate of the pure red gum type was found to be too low to warrant its segregation as a distinct type. For this reason, it has been combined with the mixed hardwood type.

The forest area classified by forest conditions and forest types is shown in Table 3.

Table 3. - Forest area by forest conditions and forest types

Forest conditions	Forest types				Total	Percent of total forest area
	Cypress-hardwood	Cottonwood-willow	Overcup oak-water hickory	Mixed hardwood		
-----Area in acres-----						
Old-growth	6,000	----	25,700	61,100	92,800	5.3
Old-growth culled	21,900	----	40,000	37,000	98,900	5.7
Old-growth cut-over	51,300	----	82,300	260,500	394,100	22.7
Second-growth	47,600	138,100	66,400	620,500	872,600	50.2
Second-growth cut-over	10,600	18,900	3,800	207,500	240,800	13.9
Subtotal	137,400	157,000	218,200	1,186,600	1,699,200	97.8
Fire- and flood-killed	3,000	2,300	4,500	27,900	37,700	2.2
Total	140,400	159,300	222,700	1,214,500	1,736,900	
Percent of total forest area	8.1	9.2	12.8	69.9		100.0

Volume Estimate

Merchantable timber area

In general, the stands of timber of saw-log size in the bottom-land hardwood unit of Mississippi have been cut over at least once for lumber or other forest products. These cut-over stands are characterized by the presence of trees that were considered unmerchantable at the time of the previous logging. The remnant trees are associated with such young growth as has developed since the logging. Owing to changes in the lumber market and other economic circumstances, some of these residual trees are now merchantable, but many of them are of such low grade or are so defective that they presumably will never have value for lumber or other forest products requiring high quality timber.

From the immediate industrial standpoint, it is important to determine the area of accessible forest land bearing stands of timber of sufficient value to warrant immediate logging. In general, the bottom-land hardwood timber stands are accessible. In this report, any area supporting 2,500 board feet of timber per acre has been considered merchantable. It must be clearly understood, however, that this volume per acre includes, in addition to the high-grade material (see page 11), the volume of timber that is suitable only for ties, timbers, staves, and rough-structural and small-dimension lumber. Prior to the present depression period, sawmill operators had been truck-logging areas having no more than 1,000 to 1,500 board feet of high-grade timber per acre. On the average, stands of 2,500 board feet per acre of all grades of material produce about 1,000 board feet of high-grade timber. Accordingly, stands bearing 2,500 board feet per acre are considered merchantable. In forest types where species of low commercial value are predominant, notably the overcup oak-water hickory type, stands averaging more than 2,500 board feet per acre will often produce less than 1,000 board feet of high-grade material. Interpretation of tables involving area and volume of stands bearing 2,500 board feet per acre will have to be tempered accordingly.

The forest area supporting 2,500 or more board feet per acre is shown in Table 4, classified by forest conditions and forest types.

Table 4. - Forest area having 2,500 or more board feet¹ per acre classified by forest conditions and forest types- Bottom-land Hardwood Unit in Mississippi

Forest conditions	Forest types				Total	Percent of forest area having 2,500 or more board feet per acre
	Cypress-hardwood	Cotton-wood - willow	Overcup oak - water hickory	Mixed hardwood		
-----Area in acres-----						
Old-growth	4,500	----	22,700	54,300	81,500	11.8
Old-growth culled	21,100	----	34,000	31,000	86,100	12.5
Old-growth cut-over	27,200	----	43,800	81,500	152,500	22.1
Second-growth	21,900	37,000	27,100	210,600	296,600	42.9
Second -growth cut-over	5,300	4,500	1,500	62,700	74,000	10.7
Total	80,000	41,500	129,100	440,100	690,700	
Percent of forest area having 2500 or more board feet per acre	11.6	6.0	18.7	63.7		100.0

¹By Scribner log rule. This volume includes sawlogs, ties, timbers, stave material, and rough - structural and small - dimension lumber.

Saw-timber in merchantable trees

Before considering the timber volume information given in the following tables, a clear statement is necessary defining terms and presenting conceptions of southern-hardwood forest-utilization-practice. Some of the board-foot volume-estimates are given in both the Scribner and the Doyle log rules. The former is recognized by the United States Forest Service and the latter is the only log rule commonly used by lumbermen in the South.

These volumes do not make any allowance for breakage during the logging operation. The volume in any given tree was measured to the height that included the maximum number of merchantable logs of standard lengths, namely, 8, 10, 12, 14 and 16 feet. To be merchantable, a log had to be at least 8 feet long and 10 inches in diameter inside bark at the small end; it had to be relatively straight and free from numerous large knots; and at least 50 percent of its volume had to be suitable for lumber, ties, timbers, stave bolts, or rough-structural or small-dimension material. Although 10 inches was the irreducible minimum top diameter, no fixed top diameter was used; the merchantable length extended only as high as the individual tree stem would produce merchantable logs. At this merchantable limit the stem diameter was frequently 12 and 14 inches, and sometimes larger.

The term "gross volume" refers to the full board-foot content of merchantable trees from stump to top of last log, and includes both woods and mill cull. In general, a tree was considered merchantable if it was 13.0 inches or over in diameter outside of bark at a point $4\frac{1}{2}$ feet above the ground and if 50 percent of its volume met the quality and size specifications for merchantability given in the preceding paragraph. In the case of large specimens of such valuable timber species as red gum, cypress, white and red oaks, and ash, trees having a smaller percentage of merchantable volume were considered to be merchantable. This minimum percentage varied with individual trees, but was seldom less than 30 percent.

Excepting cypress and large red gum, dead trees are not included in the merchantable volume estimates. Since dead heartwood of cypress is highly resistant to decay and is commonly used by sawmill operators, the volume of all dead cypress trees of merchantable size is included. The exceedingly high value of sound, dead heartwood of large, old-growth red gum justifies its inclusion also.

Table 5 shows by forest conditions the gross volume for the unit and for the area supporting 2,500 or more board feet per acre.

Table 5. - Gross board-foot volume of merchantable trees, classified by forest conditions,¹ Bottom-land Hardwood Unit in Mississippi

Forest conditions	All forest area		Forest area having 2,500 or more board feet per acre	
	Scribner log rule	Doyle log rule	Scribner log rule	Doyle log rule
-----Thousand feet board measure-----				
Old-growth	800,000	751,130	784,530	738,070
Old-growth culled	660,900	585,400	631,760	558,290
Old-growth cut-over	1,048,800	926,060	790,950	711,950
Second-growth	2,092,900	1,781,330	1,585,300	1,373,140
Second-growth cut-over	485,900	407,380	325,960	280,950
Total	5,088,500	4,451,300	4,118,500	3,662,400

¹A negligible volume of live timber was found in the fire-killed and flood-killed conditions. This volume is not included in the volume figures for the Unit, given in Tables 5, 6, 8, 9, and 10.

The volume of merchantable trees was classified into high-grade and low-grade material. According to Forest Survey definitions, high-grade timber includes the volume of any log that, in the opinion of the cruiser, would produce at least 35 percent of its volume in number 1 common lumber or better. A log of this quality produces, on an average, 50-60 percent of its volume in number 1 common lumber or better. Low-grade timber includes the volume of any log that meets the minimum specifications for merchantability, but which will not produce 35 percent of its volume in number 1 common lumber or better. This low-grade timber is principally suited² for ties, timbers, stave bolts, and rough-structural and small-dimension lumber.

²Of the quantity of low-grade timber approximately 20 percent is suitable for cooperage bolts and small-dimension lumber. To be suitable for these two uses, timber can be of a smaller size than that required to produce ties, timbers, and rough-structural lumber, but it must have the quality of high-grade timber.

Table 6. - Board-foot volume of merchantable trees, classified by species groups, Bottom-land Hardwood Unit in Mississippi

Species groups	Total forest area				Forest area having 2500 or more board feet per acre		
	Gross volume 1/		Net volume - Scribner log rule		Gross volume 1/		
	Scribner log rule	Doyle log rule	High-grade timber 2/	Low-grade timber 3/	Scribner log rule	Doyle log rule	
Thousand feet board measure			As a percent of gross volume	Thousand feet board measure			
White oak	57,820	50,060	23,380	40	33,460	31,890	28,560
Red oak	43,030	37,020	13,000	30	28,760	23,040	20,440
Water oak	637,700	575,990	232,600	36	362,710	484,510	446,330
Overcup oak	798,920	731,580	270,900	34	497,350	683,180	632,870
Red gum	588,530	537,120	271,370	46	289,340	527,770	485,910
Hickory	29,860	24,250	7,530	25	21,460	15,730	13,170
Cottonwood - willow	545,910	469,820	286,800	53	244,430	482,260	420,790
Ash	163,080	133,280	81,760	50	72,090	116,570	94,720
White elm - hackberry	455,130	377,930	131,590	29	305,420	302,060	256,080
Cypress	443,030	392,070	398,980	90 4/	5/	409,170	366,160
Tupelo gum - black gum	285,440	202,810	126,980	44	141,470	232,090	167,490
Cedar elm - water hickory	683,620	601,600	286,320	42	368,360	518,820	463,870
Others	336,530	302,160	164,980	49	154,670	277,410	255,080
Specials	19,900	15,610	6/	6/	6/	14,000	10,930
Total	5,088,500	4,451,300	2,296,190	45	2,519,520	4,118,500	3,662,400

1/ Includes volume of sound and defective wood.

2/ Net log scale at mill deck. This is the gross volume of high-grade timber less both woods cull and mill cull.

3/ Net log scale in woods. This is the gross volume of low-grade timber less woods cull only.

4/ Cull accounts for 10 percent of the gross volume of cypress.

5/ All cypress volume was considered to be high-grade.

6/ Specials are not graded into log grades.

Woods cull is that part of the stem that would under usual logging practice be left in the woods on account of defect. Mill cull is the volume of material lost in sawing defect from logs in the sawmill. Table 6 shows, by species groups, the gross volume in merchantable trees, including woods and mill cull; the net volume of high-grade timber, after deducting both woods and mill cull; and the net volume of low-grade material, after deducting woods cull.

Table 7 shows, by major species groups, the woods and mill cull percentages that can properly be applied to the gross volume of merchantable trees to get net volumes. These percentages are based on a study of the cull found in merchantable trees only, and are in no way influenced by the volume in cull trees. Of the cull volume found in merchantable trees approximately 50 percent was directly or indirectly caused by fire. The indirect fire loss is largely the cull volume caused by rot that entered the tree through fire scars.

As the rot continues to spread it gradually reduces the volume of sound material in a given tree until the tree eventually becomes a rotten cull - i. e., contains more than 50 percent of its volume in decayed wood.¹ The gross volume of rotten cull trees of saw-log size in this unit is significant; if all the rotten cull trees in the unit had been entirely sound they would have contained 1,193,000,000 board feet of merchantable material.

In addition to rotten cull trees there is in the unit a considerable number of sound cull trees - those that are culled on account of extreme limbiness, crookedness, or forking of the central stem. The volume in sound cull trees was not determined, and had no influence on the percentages shown in Table 7.

¹A particularly large, high quality tree having somewhat more than 50 percent of its volume in decayed wood sometimes was classified as merchantable. The defective material seldom exceeded 70 percent.

Table 7. - Average woods-cull¹ and mill-cull²
percentages for merchantable trees

Species groups	Woods cull - percent of gross volume (Scribner log rule)		Mill cull - percent of log scale at mill deck. (Scribner log rule)
	Original timber ³	Residual and second- growth timber ⁴	All forest conditions
	----- Percent -----		
White oak	.5	.9	2
Red oak	.9	1.8	4
Water oak	2.6	5.1	5
Overcup oak	1.3	2.4	5 ⁵
Red gum	1.9	3.4	6
Hickory	1.3	2.6	2
Cottonwood - willow	-	.5	4
Ash	2.5	3.0	5
White elm - hackberry	.8	1.7	7
Cypress	1.0	7	8
Tupelo gum -			
black gum	1.4	4.8	5
Cedar elm -			
water hickory	1.0	2.1	5
Others and specials	2.6	3.7	3

¹ Woods-cull percentages were determined from an analysis of the woods-cull deductions made by cruisers for the merchantable sample trees on survey sample plots. In no instances were these percentages based on the cull volume in cull sample trees.

² Mill-cull percentages were obtained by the Forest Products Laboratory, U. S. Forest Service, Madison, Wisc., in a series of mill-scale studies made at eight sawmills situated in the bottom-land hardwood region of Louisiana, Arkansas and Mississippi.

³ Original timber includes old-growth and old-growth culled forest conditions.

⁴ Residual and second-growth timber includes old-growth cut-over, second-growth and second-growth cut-over forest conditions.

⁵ This percentage would be somewhat higher were it not for the considerable quantity of "sound wormy" overcup oak lumber that is accepted in the hardwood industry.

⁶ Percentage of mill cull in red gum: old-growth conditions 5%, second-growth conditions 2%.

⁷ Percentage of woodscull in cypress: old-growth cut-over condition 5.7%, second-growth and second-growth cut-over conditions .4%.

Pulpwood

In addition to the volume of saw-timber, the Mississippi Bottom-land Hardwood Unit has an important supply of pulpwood. Species suitable for pulp are red gum, cottonwood, willow, cypress, tupelo and black gum, red and silver maple. Where timber size and quality will permit, lumber manufacture is assumed to be the most profitable use of the hardwood pulping species. Accordingly, the pulpwood estimate of 1,830,000 cords includes only the volume in sound trees 5.0 inches or over in diameter and below the minimum lumber size, i.e., 13.0 inches in diameter, at a point $4\frac{1}{2}$ feet above the ground. A sound tree is one in which 50% or more of the gross volume is sound. It includes that part of each stem up to 4 inches in diameter at the top, which in the judgment of the cruiser could be converted into pulpwood. It does not include the unutilized tops of trees that would be felled for lumber.

Number of sound trees and volume for the average acre

Table 8 shows, by diameters of trees, the number of trees and volume of timber on the average acre of land in each forest condition. The cubic-foot volume includes the gross volume to a 4 inch top in sound trees 5.0 inches or over in diameter and below saw-timber size. The board-foot volume includes the gross volume in merchantable trees of saw-log size, i.e., 13.0 inches or over in diameter.

Table 9 gives similar information for stands having a gross volume per acre of 2,500 or more board feet. These two tables show that there is no present dearth of trees of small size.

Table 9. - Number of trees and gross volume of timber on the average acre of forest land having 2,500 or more board feet per acre, by forest conditions and diameters of trees, Bottom-land Hardwood Unit in Mississippi

Forest conditions		Tree diameters in inches at breast height																		Totals for average acre			
																				No. of trees 1/	Volume cu. ft.	Volume bd. ft. 2/	
		2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44 up
Old-growth	No. of trees 1/	37.0	15.2	15.9	5.7	5.9	5.3	3.85	3.74	2.44	2.70	2.07	1.93	1.44	1.22	1.11	1.48	.63	.44	.56	.22	.11	.48
	Vol. cu. ft.	-	-	36.6	33.6	64.9	97.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Vol. bd. ft. 2/	-	-	-	-	-	-	241	355	327	526	540	672	700	683	724	1258	659	572	806	328	246	989
Old-growth culled	No. of trees 1/	25.3	12.6	10.9	5.1	5.8	5.2	5.58	4.18	4.67	3.72	3.37	3.02	1.61	1.02	.84	.60	.35	.56	.35	.25	.07	.32
	Vol. cu. ft.	-	-	25.1	30.1	63.8	95.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Vol. bd. ft. 2/	-	-	-	-	-	-	306	341	526	618	754	821	587	520	509	420	279	469	323	248	64	493
Old-growth cut-over	No. of trees 1/	49.9	12.3	8.5	5.4	4.4	3.8	4.44	3.52	3.35	2.45	2.24	1.86	.79	1.01	.44	.42	.30	.24	.10	.16	-	.20
	Vol. cu. ft.	-	-	19.6	31.9	48.4	69.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Vol. bd. ft. 2/	-	-	-	-	-	-	276	326	445	462	566	613	313	500	249	265	265	233	114	165	-	395
Second-growth	No. of trees 1/	92.0	31.6	17.4	10.5	8.8	8.3	6.94	6.02	4.52	3.09	2.24	1.66	.70	.42	.25	.30	.15	.07	.07	.06	.05	.10
	Vol. cu. ft.	-	-	40.0	61.8	96.6	151.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Vol. bd. ft. 2/	-	-	-	-	-	-	453	599	666	658	661	638	342	228	171	260	145	74	82	86	75	207
Second-growth cut-over	No. of trees 1/	67.3	30.2	15.1	8.1	7.6	5.7	5.51	5.35	4.16	3.63	1.55	1.51	.41	.49	.24	.24	.12	.04	.04	-	-	.04
	Vol. cu. ft.	-	-	34.7	47.8	83.6	104.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Vol. bd. ft. 2/	-	-	-	-	-	-	367	544	608	795	474	564	183	285	168	169	104	50	50	-	-	39

1/ Merchantable or sound trees only. Cull trees are not included.

2/ By Scribner log rule. This volume includes sawlogs, ties, timbers, stave material, and rough-structural and small-dimension lumber.

Forest Growth and Drain

Forest growth estimate

The basic data for the growth calculations were gathered on 2,412 sample trees randomly selected on the forest plots established in the Unit. The following measurements were taken on each of these trees: diameter at 4½ feet above the ground, merchantable height, and radial growth during the preceding ten-year period. The probable average yearly timber growth in the Unit has been calculated for the ten-year period from 1932 to 1942. In these calculations the annual timber cut is assumed to be equal to the annual growth. Appropriate deductions have been made for the timber volume lost as a result of wind-fall, fire, disease and other natural causes. Table 10 shows the annual board-foot volume growth.

Table 10. - Annual board-foot volume growth¹ for the period 1932-42, assuming that a cut equal to the annual growth is made each year, Bottom-land Hardwood Unit in Mississippi

Forest conditions	Annual gross volume growth			Annual net volume growth - for unit		
	For unit	Per acre	Percent of the 1932 gross volume	High-grade ² timber	Low-grade ³ timber	Total
	M. ft. b. m.	ft. b. m.	Percent	-----M .ft. b. m.-----		
Old-growth	12,000	129	1.5 ⁴	6,480	5,040	11,520
Old-growth culled	15,610	158	2.4	8,740	6,090	14,830
Old-growth cut-over	32,090	81	3.1	13,160	17,010	30,170
Second- growth	116,030	133	5.5	48,730	61,500	110,230
Second- growth cut-over	24,980	104	5.1	9,740	14,240	23,980
Totals and weighted averages	200,710	118	3.9	86,850	103,880	190,730

¹ By Scribner log-rule.

² Gross woods volume of high-grade timber less woods cull and mill cull.

³ Gross woods volume of low-grade timber less woods cull but including mill cull.

⁴ Bottom-land hardwood forests are characteristically all-aged. That the current annual growth rate in this condition is as high as 1.5% is largely due to the rapid growth of the young trees found in stands in the old-growth condition.

Forest drain estimate

Until the recent organization of the Lumber Code Authority no complete figures on lumber manufacture in this Unit were available. Even now, information on the cut of timber for hewed railroad ties, cooperage, poles, posts, piling, and fuel wood is not currently recorded by any statistical organization. Accordingly, the final report of the Forest Survey on timber drain cannot be prepared until the recently formed organizations for securing statistics on forest utilization have had time to assemble sufficient data to warrant authoritative statements concerning the quantity of wood actually used. There is, however, a present need for an approximate forest drain estimate that can be compared with present growth to ascertain whether or not the timber stands of the Unit are being depleted.

Table 11 gives an estimate of the material that will be cut from this Unit during the calendar year 1934. It is based upon the cut reported to the Lumber Code Authority for the first 4 months of the year. In estimating this annual cut, reasonable allowance has been made for the normal, seasonal fluctuation in timber production.

Table 11. - Estimate of saw-timber cut¹
for calendar year 1934

Use for which timber is cut	High-grade timber	Low-grade timber	Total
-----Thousand feet board measure-----			
Lumber ²	52,260	32,780	85,040
Cooperage stock	2,300 *	9,700 *	12,000 *
Pulpwood	900 *	7,200 *	8,100 *
Fuel wood ³	12,260 *	68,620 *	80,880 *
Miscellaneous ⁴	1,700 *	6,100 *	7,800 *
Total	69,420	124,400	193,820

¹ By Scribner log rule.

² Includes commercial veneer.

³ Also includes the volume of timber cut but not otherwise utilized when forest land is cleared for agriculture.

⁴ Includes poles, piling, posts, hewed and round ties, hewed and split pieces used in logging and local construction work.

* Although this material is not actually used as saw-timber, it has the quality of high-grade or low-grade timber as defined on page 11.

Comparison of the volume of forest growth and forest drain

Comparison of the annual net board-foot timber growth of the Unit with the total annual drain shows that the growth of high-grade and low-grade material combined is only 3,090,000 board feet less than the drain. The annual growth of low-grade material is considerably less than the yearly cut of this grade of timber. On the other hand, the annual growth of high-grade material exceeds the yearly cut of high-grade timber by 17,430,000 board feet. Growth appears to be more than replacing the volume of high-grade timber removed at the present rate of cutting. However, approximately 85 percent of the growth of high-grade material is taking place in the forest conditions where the stand volume per acre is commonly too low to support a commercial operation at the present time. In contrast, a large part, probably 75 percent, of the present cut is being concentrated in the old-growth stands. From this it is apparent that the high-grade material now being grown will not be as easily and as cheaply harvested as the present supply of high-grade timber in old-growth and old-growth culled stands.

During 1934 the sawmills of the Unit have been operating at about 37 percent of their capacity. With improvement in the present lumber market, operators of these mills will probably desire to increase their production and thus liquidate their investment in standing timber. Any considerable increase in the cut of high-grade timber will overtax the capacity of the Unit to supply such material on a continuous basis. According to conservative estimates 300,000 man-days of labor are needed in the logging and manufacture of the 1934 commercial cut in the Mississippi Bottomland Hardwood Unit. If forests are cut no faster than they grow, there is reasonable assurance that this amount of labor can be continuously employed in logging and manufacturing in the Unit.

Summary

Of the 4,420,400 acres in the Bottom-land Hardwood Survey Unit in Mississippi, 1,736,900 acres, or approximately 40 percent, is forest land. Eleven percent of the forest area bears uncut or lightly-culled old-growth timber stands. The remainder of the forest area is either cut-over timber land or supports a second-growth forest which may or may not be of merchantable size. On a very small percentage of the forest area all of the timber has been killed by fire or flood.

The net timber volume in the Unit, expressed in the Scribner log rule, is $2\frac{1}{4}$ billion board feet of high-grade¹, and $2\frac{1}{2}$ billion board feet of low-grade² material. A part of the volume of high-grade timber is found in occasional trees scattered on areas already cut over. From the point of view of practicable logging, it is not now feasible to harvest all of this high-grade material.

Assuming an annual timber cut that is equal to the annual growth, the Bottom-land Hardwood Unit in Mississippi has a net annual growth of 190,730,000 board feet. The best available data on the volume of timber cut from the forests in the Unit fix the current annual drain at 193,820,000 board feet of material of saw-timber size. Thus the growth of high-grade and low-grade material combined is slightly less than the forest drain. Forty-six percent of the net timber growth of the Unit, or 86,850,000 board feet, is in high-grade material. This growth exceeds the drain of high-grade timber by 17,430,000 board feet. It must be remembered, however, that the growth of high-grade material is taking place on trees distributed widely throughout the unit; on the other hand, the drain of high-grade timber is chiefly confined to those restricted areas supporting heavy stands of old-growth timber or merchantable stands of second-growth.

¹Net log scale at mill deck. This is the gross volume of high-grade timber less both woods cull and mill cull.

²Net log scale in the woods. This is the gross volume of low-grade timber less woods cull.

January 7, 1935.

SOUTHERN FOREST EXPERIMENT STATION

E. L. Demmon, Director

New Orleans, La.



REPORT OF THE FOREST SURVEY
ON
THE LAND CLASSES IN THE NORRIS DAM WATERSHED
IN
TENNESSE AND VIRGINIA

By

SOUTHERN FOREST SURVEY STAFF

I. F. Eldredge

Regional Survey Director

* - This is an advance release of Forest Survey data that will later be published in complete reports. This information is subject to such correction or amplification as may be found necessary as computations proceed.

¹ - The first three releases of this series have been issued as Occasional Papers 31, 34 and 36 of the Southern Forest Experiment Station.

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REPORT OF THE FOREST SURVEY
ON
THE LAND CLASSES IN THE NORRIS DAM WATERSHED
IN
TENNESSEE AND VIRGINIA

By

Southern Forest Survey Staff

This report classifies the land area of the Norris Dam Watershed Survey Unit in eastern Tennessee and southwestern Virginia. Land classes recognized by the Survey are based on kind of use, degree of slope, character of erosion damage, forest type, and forest site quality. The Norris Dam Watershed Survey Unit covers the Clinch-Powell River basin above the Norris Dam and includes all land which will drain into the Norris Dam Reservoir.¹

This information is given in advance of the publication of a statistical report which will contain full information on forest stands of the unit. The data given in this advance release are preliminary and subject to correction and modification when final computations are complete and when more accurate figures are available for the area of the Norris Dam Reservoir. It is believed however, that any corrections or changes necessitated will change the area figures here given by only a very small percentage.

The data on which this report is based were gathered during the period between February 1934 and August 1934 by the Forest Survey, an activity of the Southern Forest Experiment Station of the Branch of Research, U. S. Forest Service. These data were obtained by a line plot survey in which parallel compass lines at intervals of 5 miles were run across the unit at right angles to the general direction of the drainage. Quarter-acre plots were taken every 660 feet along these lines.

The topography of the area varies from mountainous, with steep or often precipitous slopes and narrow valleys, to rolling hills with gentle to moderate slopes and wide valleys. Where the slopes and depth of soil permit, the land has been cleared and put into cultivation or pasture. In general, the forest occupies the steeper and more rocky slopes. Areas of forest land are well distributed over the unit and make up almost half of the entire land area.

¹The total area of the unit is taken from War Department Bulletin No.308. The figure given is 2,949 square miles. The preliminary estimate of the area to be occupied by the Norris Dam Reservoir, as given by the Tennessee Valley Authority, is 35,000 acres. Figures given in this report exclude the area of the reservoir.

Table 1. - Distribution of land area¹ by class of land use, in the Norris Dam Watershed Unit in Tennessee and Virginia

Land use classes ¹	Area in acres	Percent of total area
Forest:	885,800	47.8
Nonforest:		
Agricultural:		
In cultivation:		
Old crop land ²	416,500	22.5
New crop land ³	24,100	1.3
Out of cultivation:		
Idle ⁴	36,100	2.0
Abandoned ⁵	20,800	1.1
Pasture ⁶	419,000	22.6
Total Agricultural	916,500	49.5
Other areas:		
Roads, railroads, towns, waterways	50,100	2.7
Total forest and nonforest	1,852,400	100.0

¹ Area that, according to estimates, will be occupied by the Norris Dam pool is not included in this table.

² Land cultivated more than 3 years and on which a farm crop was raised within 2 years prior to date of survey. Orchards are included in this class.

³ Land converted from forest to crop land within the past three years as indicated by stumps or deadened trees on the land.

⁴ Cultivated land that has not been used for two years or more, but which has not reached the abandoned class.

⁵ Land once cultivated but showing distinct evidence of having been abandoned for agricultural purposes; no attempt is being made to keep it as pasture. Forest growth is not yet established.

⁶ Cleared land under fence used for grazing.

Table 2. - Area of agricultural land classified by land use and topographical classes

Land use class	Topographical class					Percent of total agricultural land
	Slope 0-15%	Slope 16-30%	Slope 31-60%	Slope over 60%	Total all classes	
-----Area in acres -----						
Agricultural land:						
In cultivation:						
Old crop land	162,200	168,000	76,300	10,000	416,500	45.5
New crop land	3,300	6,700	13,300	800	24,100	2.6
Out of cultivation:						
Idle	5,800	13,700	14,500	2,100	36,100	3.9
Abandoned	2,100	8,700	8,700	1,300	20,800	2.3
Pasture	91,200	153,900	152,300	21,600	419,000	45.7
Total	264,600	351,000	265,100	35,800	916,500	100.0
Percent of total agricultural land	28.8	38.3	29.0	3.9	100.0	

Character and Prevalence of Soil Erosion

The erosion encountered on survey plots was classified according to the classes described below. When more than one class of erosion was present the most advanced stage was recorded. :

Sheet erosion - Where the soil is washing off from a generally smooth surface and where the cutting into the soil is very shallow (less than one foot).

Shoestring erosion - Where erosion has progressed to such a point that the surface is cut into, and a system of small, shallow, branching gullies not over 2 feet deep is formed.

Gullies - Where erosion is well-advanced and the surface is deeply cut into V-shaped gullies from 2 to 10 feet deep.

Extensive gullies - Where the soil has washed to such an extent that the cuts are more than 10 feet deep.

Erosion arrested - Where erosion has been stopped by natural growth of grass, vines, shrubs, or trees, or by artificial means such as dams, terracing, etc.

The acreage of agricultural land falling in each class as described from the plot records is shown in table 3.

Table 3 .- Area of agricultural land classified by degree of erosion and agricultural land class

Class of agricultural land					Percent of total agricul- tural land
Degree of erosion	Crop land in cultivation	Idle and abandoned crop land	Pasture	Total	
..... Area in acres					
Sheet erosion	83,500	7,100	64,700	155,300	16.9
Shoestring erosion	16,200	2,500	15,300	34,000	3.7
Gullies	5,000	5,800	13,700	24,500	2.7
Extensive gullies	1,200	400	1,700	3,300	.3
Total active erosion	105,900	15,800	95,400	217,100	23.6
Erosion arrested	1,600	800	6,600	9,000	1.0
No erosion present	333,100	40,300	317,000	690,400	75.4
Total	440,600	56,900	419,900	916,500	100.0

Description of Forest Area

For descriptive purposes the forest area has been classified into: (a) forest conditions on the basis of stand age and cutting history, (b) forest types on the basis of association of tree species. The descriptive terms used in these classification systems are defined as follows:

Definition of forest conditions:

Old-growth - Stands which have the superficial characteristics of the original mature forests of the region and forest type. There has been no cutting, except perhaps an occasional tree for some special product.

Old-growth partly-cut - Old-growth stands from which an appreciable quantity of high-grade timber has been removed. These stands still contain, however, a sufficient volume of material of saw-log size and quality to provide a cutting of 1,000 board feet per acre or more.

Second-growth saw-log size - Stands of pine or hardwoods which have developed following logging, clearing, or destruction by fire, and have at least 600 board feet per acre in trees of merchantable size. Less than 10% of the trees of saw-timber size have been cut. These stands often contain residual trees from the former old-growth stands.

Second-growth saw-log size partly-cut² - Second growth stands of pine or hardwoods from which over 10% of the trees of saw-log size have been cut and which still have a volume of at least 400 board feet per acre in trees of merchantable size.

Second-growth under-saw-log size³ - Stands of young pine or hardwood one inch and over in diameter at 4½ feet above the ground, in which the volume of timber in trees of saw-timber size or larger is less than 600 board feet per acre and the remainder of the stand is below saw-timber size. Less than 10% of the trees under saw-log size have been cut.

Second-growth under-saw-log size, partly-cut - The same as second-growth under saw-log size except that more than 10 percent of the trees have been cut.

Reproduction - Stands of young trees not over 1 inch in diameter at 4½ feet above the ground which have become established on old fields, or on areas denuded of their former stand by clear cutting, fire or other agency.

Clear-cut and fire-killed - Forest areas on which practically all of the trees have been killed or removed by fire or cutting and no reproduction has taken place.

Noncommodity and rocky out-crops - These are forest areas that will not grow commercial timber because of rock out crops or soil conditions.

Definition of forest types.

Hardwoods - Pure or mixed stands of hardwood species and stands of mixed pine and hardwood where less than 25% of the merchantable volume or less than 25% of the dominant and codominant trees are pine, and stands of cedar and hardwoods in which hardwoods predominate in merchantable volume or number of dominant and codominant trees.

² Stands of cedar having at least 200 linear feet per acre of post or saw-log material in the boles of trees 5.0 inches or over in diameter are classified as "second-growth under-saw-log size partly-cut" regardless of their cutting history.

³ Stands of young cedar one inch and over in diameter are included with second-growth under-saw-log size regardless of the amount of cutting if they have less than 200 linear feet per acre of post or saw-log material in the boles of trees 5.0 inches or over in diameter.

Pine-hardwoods - Where pine and hardwoods occur in the same stand, the type is classified as pine-hardwoods if pine makes up 25 to 75 percent of the merchantable volume or 25 to 75 percent of the number of dominant and codominant trees.

Pine - Stands in which pine makes up more than 75 percent of the volume or more than 75 percent of the dominant and codominant trees.

Cedar - Stands in which cedar predominates, that is, makes up 50 percent or more of the merchantable volume or 50 percent or more of the dominant and codominant trees.

Table 4. - Forest area by forest conditions and forest types

Forest Conditions	Forest types					Percent of total forest area
	Hardwood	Pine - hardwood	Pine	Cedar	Total	
----- Area in acres -----						
Old-growth	21,200	800	400	-	22,400	2.5
Old-growth partly-cut	156,900	5,400	6,200	-	168,500	19.0
Second-growth saw-log size	170,100	15,400	8,300	-	193,800	21.9
Second-growth saw-log size partly-cut	87,100	7,800	4,600	15,400	114,900	13.0
Second-growth under- saw-log size	249,300	15,400	14,500	14,900	294,100	33.2
Second-growth under- saw-log size partly-cut	23,200	400	1,300	-	24,900	2.8
Reproduction	49,800	2,500	3,300	9,100	64,700	7.3
Clear-cut and fire-killed	400	-	-	400	800	.1
Noncommodity	1,700	-	-	-	1,700	.2
Total	759,700	47,700	38,600	39,800	885,800	100.0
Percent of total forest area	85.7	5.4	4.4	4.5	100.0	

Site Quality for Hardwoods

Three broad site classes for areas in the hardwood and pine-hardwood types are recognized. These site classes are determined from curves of total height over age for the Southern Upland Hardwoods. A brief description of each site follows:

Site 1, Good site - This site quality is found chiefly in coves and stream bottoms and on moist benches and lower slopes. The soil is usually a deep, friable, dark brown loam. The timber stands are dense when not reduced by cutting or fire and when mature are composed principally of trees averaging 3 or more logs per tree.

Site 2, Fair site - This is an intermediate site where soil and moisture conditions are not as favorable to tree growth as on site one, but where good commercial timber can be produced on a longer rotation. Mature stands consist of trees averaging less than 3 logs each but more than 1½ logs each for the hardwood species.

Site 3, Poor site - The poorest sites usually occupy the dry, upper slopes and ridges. Here the soil is shallow and lacks fertility. Occasional rock outcrops and cliffs occur, and the soil is frequently very rocky. This site is more likely to be found on south and west slopes than on north and east exposures. The hardwoods on this site are usually short-bodied and when mature seldom average as much as 1½ logs each.

Table 5. - Forest area in the combined hardwood and pine-hardwood type classified by forest conditions and site quality

Forest conditions	Site quality		
	Site 1	Site 2	Site 3
----- Area in acres -----			
Old-growth	7,900	12,400	1,700
Old-growth partly-cut	31,500	120,000	10,800
Second-growth saw-log size	45,200	130,800	9,500
Second-growth saw-log size partly-cut	10,000	78,300	6,600
Second-growth under-saw-log size	28,200	221,500	15,000
Second-growth under-saw-log size partly-cut	2,100	19,900	1,600
Reproduction	400	49,000	2,900
Clear-cut and fire-killed	-	400	-
Noncommodity	-	400	1,300
Totals	125,300	632,700	49,400
Percent of total hardwood and pine - hardwood area	15.5	78.4	6.1

Site Quality of Areas in the Pine Type

In the pine type, the quality of the site from the point of view of its capacity for tree growth is measured in terms of the average height attained by dominant or co-dominant trees at 50 years of age. Shortleaf pine was used as the site index.

Table 6. - Area of the pine type classified by
shortleaf pine site index

Shortleaf pine site index in feet	Area in acres	Percent of total pine area
40	1,700	4.4
50	5,800	15.0
60	6,600	17.1
70	17,000	44.1
80	5,800	15.0
90	1,700	4.4
Total area pine type	38,600	100.0

January 12, 1935.

SOUTHERN FOREST EXPERIMENT STATION

E. L. Demmon, Director

New Orleans, La.



THE SUPPLY AND STATUS OF NAVAL-STORES TIMBER
IN SURVEY UNIT #1
FLORIDA

By

SOUTHERN FOREST SURVEY STAFF

I. F. Eldredge

Regional Survey Director

* - This is an advance release of Forest Survey data that will be included in complete reports to be published later. This information is subject to correction or amplification as computations proceed.

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THE SUPPLY AND STATUS OF NAVAL-STORES TIMBER

IN SURVEY UNIT #1

FLORIDA

By

SOUTHERN FOREST SURVEY STAFF

I. F. Eldredge

Regional Survey Director

This release presents briefly the most significant naval stores data gathered by the Forest Survey in Unit No. 1 Florida. The land classification and turpentine-crop data, and all data concerning the number, size, and species of trees were computed from basic information taken on 11,956 quarter-acre sample plots. These plots were uniformly taken over the entire unit regardless of ownership by a line-plot survey system in which the plots were taken every 660 feet on parallel compass lines run east and west across the state ten miles apart. The line-plot work was done in the period December 1933 - October 1934.

The data concerning the division of turpentine crops and acreage between owned and leased, and the number, size and character of naval stores operations were gathered independently of the line plot work by a still-to-still canvass of approximately 100 percent of the operations. This canvass was made in the period May to July, 1934.

Land-use classes

This unit, comprising a gross area of approximately 9,778,000 acres located in the northeastern part of Florida is shown in Figure 1. The net area, exclusive of 263,000 acres within the boundaries of the Ocala National Forest, is 9,515,000 acres. The following table shows the classification of this area by kind of land use.

Table 1. - Distribution of land area by class of land use, Survey Unit #1¹, Florida

Land use classes	Area in acres	Percent of total area
Forest	7,378,900	77.5
Nonforest:		
Agricultural:		
In cultivation:		
Old crop land ²	939,800	9.9
New crop land ³	11,000	.1
Out of cultivation:		
Idle ⁴	315,400	3.3
Abandoned ⁵	128,500	1.4
Pasture:		
Improved ⁶	48,100	.5
Total agricultural	1,442,800	15.2
Other areas:		
Prairie and grass land	65,400	.7
Marsh	411,600	4.3
Waterways	44,200	.5
Towns and villages	83,600	.9
Roads, railroads, etc.	89,100	.9
Total other areas	693,900	7.3
Total forest and nonforest	9,515,600	100.0

¹Does not include Ocala National Forest, the gross area of which is 263,000 acres.

²Land cultivated at least 5 years and on which a farm crop was raised within 2 years prior to the date of survey.

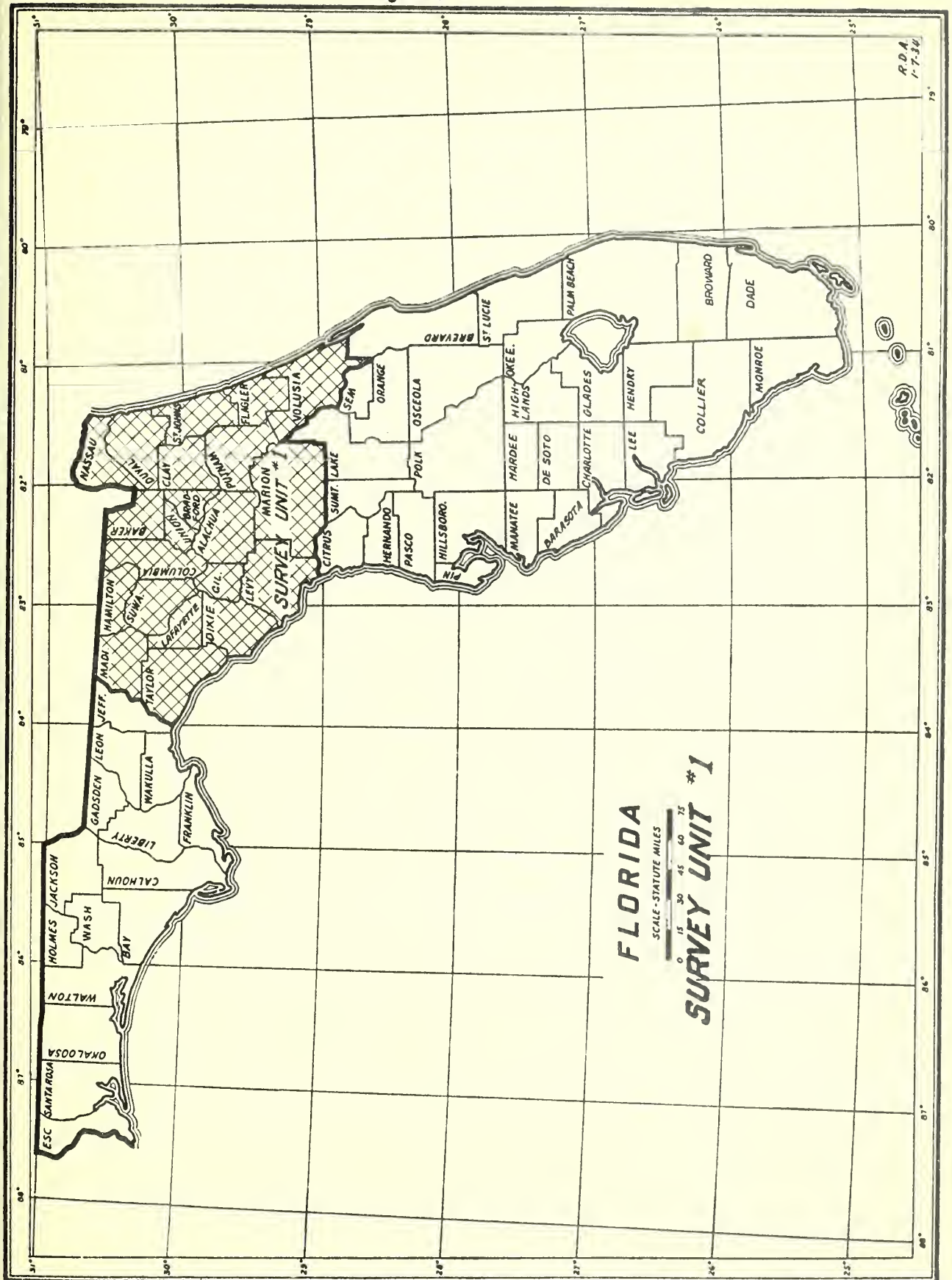
³Land recently converted from forest to crop land. Stumps or standing dead trees are usually present. Dead hardwood trees and stumps usually decay and disappear within 5 years.

⁴Cultivated land that has not produced farm crop for two years or more, but which has not reached the abandoned class.

⁵Land once cultivated but showing distinct evidence of having been abandoned for agricultural crop production; no attempt is being made to keep it as pasture.

⁶Cleared land under fence used primarily for grazing. A real attempt has been made to produce and maintain a sod.

Figure 1



Area classified by forest types and turpentine history

In Table 2 the 7,378,900 acres of forest land is allocated to the main forest type groups found in the unit. The table also shows the acreage occupied by trees in the various stages of turpentine working. Definitions of these stages follow:

Round crops - Areas bearing longleaf and slash pine trees upon which no cups have as yet been hung.

Working crops - Areas bearing trees that are now being worked for naval stores.

Idle crops - Areas bearing trees once worked for naval stores but on which operations were discontinued before the turpentine faces on the worked trees reached a height of five feet. These faces may possibly be worked again.

Worked-out crops - Areas bearing trees once worked for naval stores but on which operations were discontinued after the turpentine faces had reached a height of more than five feet. Worked-out crops include both crops in which the trees are resting prior to further working on back faces, and crops in which the trees are completely exhausted for naval stores operation.

Non-turpentine areas - Areas occupied for the most part by non-turpentine species in which there are too few turpentine trees to justify working, or areas of naval stores type which are either cut-over and not restocked or the stands are too immature for consideration.

From Table 2 it appears that naval stores timber is found on almost 70 percent of the forest area in Florida Unit No. 1. A certain percentage of the longleaf and slash pine naval-stores timber is found in the hardwood and non-turpentine pine types.

Table 2. - Forest area by forest type groups and turpentine crop history, Survey Unit #1¹, Florida, season 1934-35

Turpentine crop history	Forest type groups			Total	Percent of total forest area
	Longleaf and slash pine predominating	Loblolly and other nonturpentine pine predominating	Hardwood predominating		
----- Acres -----					
Round	1,754,300	44,100	142,700	1,941,100	26.3
Working	1,282,800	33,100	65,400	1,381,300	18.7
Idle	282,300	9,500	17,300	309,100	4.2
Worked-out and resting	1,453,800	34,700	70,200	1,558,700	21.1
Nonturpentine area	174,200	463,600	1,469,700	2,107,500	28.6
Subtotal	4,947,400	585,000	1,765,300	7,297,700	98.9
Noncommodity ²				81,200	1.1
Total ¹				7,378,900	100.0
Percent of total forest area	67.1	7.9	23.9		

¹ Does not include the area of the Ocala National Forest.

² Forest areas that do not bear commercial timber species; therefore not included in the three major type groups.

Classification of working turpentine area

The total forest area being worked for turpentine is 1,381,300 acres. This area is organized into turpentine crops that are being operated by a large number of naval stores operators. These operations have been divided into seven classes as follows:

Operator - A person who maintains a turpentine still and processes crude gum from his own or leased timber exclusively.

Operator and farmer - An operator who combines farming with turpentining to the extent of at least half his time.

Operator and gum-buyer - An operator who in addition to stilling gum from his own or leased timber, buys crude gum from producers, and, after processing, sells it in his own name.

Operator and custom-stiller - An operator, who in addition to stilling gum from his own or leased timber, processes crude gum for producers who market the turpentine and rosin in their own names.

Operator, gum-buyer, and custom-stiller - An operator who is both a gum-buyer and a custom-stiller.

Gum-producer-seller - A person who does not maintain a still, but who works his own or leased timber for crude gum, which he sells to stillers.

Gum-producer-shipper - A person without a still who works his own or leased timber for crude gum, which is custom-stilled and marketed in his own name.

Table 3 shows the owned and the leased acreage being worked by each class of gum-producer. More than three-fourths of the working naval-stores area is leased.

Table 3. - Turpentine working acreage classified as owned and leased, and by types of operations producing crude gum, Survey Unit #1¹, Florida, season 1934-35

Types of operations	Gross working acreage			Percent of total working acreage
	Owned	Leased	Total	
----- Acres -----				
Operator	293,400	976,500	1,269,900	91.9
Operator and farmer	5,200	10,100	15,300	1.1
Operator and gum-buyer	1,000	2,300	3,300	.2
Operator and custom-stiller	14,200	32,400	46,600	3.4
Operator, gum-buyer, and custom-stiller	4,300	4,300	8,600	.6
Gum-producer-seller	3,900 ²	800 ²	4,700 ²	.4
Gum-producer-shipper	6,900 ²	26,000 ²	32,900 ²	2.4
Total	328,900	1,052,400	1,381,300	100.0
Percent of total working acreage	23.8	76.2	100.0	

¹Does not include the area of the Ocala National Forest.

²Estimated from information furnished by still operators.

Turpentine trees

In Table 4 the longleaf and slash pine trees, regardless of the forest type or turpentine crop in which they are found, are classified according to two-inch diameter classes. The trees are also classified by the extent, if any, to which they have been worked for turpentine. Definitions of these classes follow:

Round trees - Longleaf and slash pine trees that have never been worked for naval stores.

Working trees - Longleaf and slash pine trees that are being worked for naval stores.

Idle trees - Trees that have been worked for naval stores, but for one reason or another are not now being worked, and whose naval-stores productivity has not been exhausted.

Worked-out trees - Trees that have been worked until their usefulness as naval-stores producers has been exhausted.

Table 4. - Number of longleaf and slash pine trees by tree turpentine history and diameter classes, Survey Unit #1¹, Florida, season 1934-35

Tree diameter 4½ feet above ground²	Tree turpentine history				Total	Percent of total
	Round	Working	Idle	Worked-out.		
Inches	-----Thousands of trees³-----					
3.0- 4.9	89,597	-	-	-	89,597	33.1
5.0- 6.9	63,036	neg.	978	79	64,093	23.7
7.0- 8.9	41,352	5,266	5,519	2,381	54,518	20.2
9.0-10.9	15,214	7,033	5,487	3,295	31,029	11.5
11.0-12.9	5,992	5,866	4,005	2,413	18,276	6.7
13.0-14.9	2,703	2,170	1,671	1,451	7,995	2.9
15.0-16.9	1,000	763	568	599	2,930	1.1
17.0-18.9	457	174	205	268	1,104	.4
19.0 and larger	460	129	196	227	1,012	.4
Total	219,811	21,401	18,629	10,713	270,554	100.0
Percent of total	81.2	7.9	6.9	4.0	100.0	

¹ Does not include Ocala National Forest.

² For turpented trees this diameter is calculated from diameters measured at 10 feet above ground.

³ To obtain the full number of trees add "000".

Table 5. - Working turpentine cups classified by year of working and diameter of working trees, Survey Unit #1 ^{1/} Florida, season 1934-35

Tree diameter ^{1/2} feet above ground ^{2/}	Year of working						Total					
	1st year	2nd year	3rd year	4th year	5th year	6th year and up						
Inches	Number of cupe	Number of cups	Number of cups	Number of cups	Number of cups	Number of cupe	Number of cups	Percent	Percent	Percent	Number of cups	Percent
Under 7.0 ^{3/}	-	-	-	-	-	-	-	-	-	-	-	-
7.0 - 8.9	1,107	709	694	757	883	1,120	883	25.4	21.5	27.8	5,270	23.5
9.0 - 10.9	1,583	1,246	962	1,135	1,164	1,309	1,164	33.5	32.2	32.5	7,399	33.0
11.0 - 12.9	1,205	1,318	694	1,009	893	974	893	25.7	28.7	24.2	6,093	27.2
13.0 - 14.9	476	454	239	379	331	442	331	9.6	10.8	11.0	2,321	10.4
15.0 - 16.9	214	180	63	142	107	155	107	3.1	4.0	3.8	861	3.8
17.0 - 18.9	76	44	22	51	56	25	56	1.6	1.5	.6	274	1.2
19.0 and larger	51	35	22	47	38	6	38	1.1	1.3	.1	199	.9
Total	4,712	3,986	2,696	3,520	3,472	4,031	3,472	100.0	100.0	100.0	22,417	
Percent	21.0	17.8	12.0	15.7	15.5	18.0						100.0

^{1/} Does not include Ocala National Forest.

^{2/} Corrected to remove the influence of turpentine on tree diameter; calculated from diameters measured at 10 feet above ground.

^{3/} The number of cups on trees under 7.0 inches in diameter is negligible.

TO OBTAIN FULL NUMBER OF CUPS ADD 000

The total number of trees now being worked in the unit is 21,401,000. On these trees there are 22,417,000 cups or an average of 1.05 cups per tree. Table No. 5 classifies these working cups by the diameter of the trees on which they hang and the stage of working of the faces above them.

It is common practise for naval stores operators to lease a considerable part of the timber they work for turpentine. The extent to which this practise is followed differs in different parts of the naval stores belt. The following table shows that in Survey Unit #1, Florida over 77 percent of the cups being worked in the season 1934-35 were in leased timber.

Table 6. - Working turpentine cups classified as owned and leased, and by types of operations producing crude gum, Survey Unit #1¹, Florida, season 1934-35

Types of operations	Working cups			Percent of total working cups
	Owned	Leased	Total	
-----Thousands of cups ² -----				
Operator	4,568	16,126	20,694	92.3
Operator and farmer	94	180	274	1.2
Operator and gum-buyer	25	55	80	.4
Operator and custom-stiller	152	444	596	2.7
Operator, gum-buyer and custom-stiller	65	67	132	.6
Gum-producer-seller	63 ³	11 ³	74 ³	.3
Gum-producer-shipper	119 ³	448 ³	567 ³	2.5
Total	5,086	17,331	22,417	
Percent of total working cups	22.7	77.3		100.0

¹Does not include Ocala National Forest.

²To convert to full number of cups add "000".

³Estimated from information furnished by still operators.

The 4,712,000 first-year cups indicated in Table No. 5 are shown in Table No. 7 classified according to those hung on front-cupped trees and those on back-cupped trees.

Almost two-thirds of the season's virgin cups were hung on trees being worked for the first time. Slightly less than one-fourth were hung on trees under 9 inches in diameter.

Table 7. - First-year turpentine cups on front-cupped and back-cupped trees, Survey Unit #1¹, Florida, Season 1934-35

Tree diameter 4½ feet above ground ²	On front-cupped trees		On back-cupped trees		Total	
Inches	Number ³	Percent	Number ³	Percent	Number ³	Percent
Under 7.0 ⁴	-	-	-	-	-	-
7.0- 8.9	855	28.7	252	14.6	1,107	23.5
9.0-10.9	995	33.3	588	34.0	1,583	33.6
11.0-12.9	698	23.4	507	29.3	1,205	25.6
13.0-14.9	278	9.3	198	11.5	476	10.1
15.0-16.9	107	3.6	107	6.2	214	4.5
17.0-18.9	24	.8	52	3.0	76	1.6
19.0 and larger	26	.9	25	1.4	51	1.1
Total	2,983	100.0	1,729	100.0	4,712	
Percent of total	63.3		36.7		100.0	

¹Does not include Ocala National Forest.

²Corrected to remove the influence of turpentine on tree diameter; calculated from diameters measured at 10 feet above ground.

³To convert to full number of cups add "000".

⁴The number of cups on trees under 7.0 inches in diameter is negligible.

Gum naval-stores production 1933-34

No data on the number of naval-stores operations or on the naval-stores croppage and production figures for the season 1933-34 were obtained directly on the line-plot survey. The gum naval-stores croppage and production figures given in Table 8 were obtained from a canvass of practically all of the operators in the unit. In many cases it was possible to confirm the production data by sales records and factors' accounts. It has not been possible to check the 1933-34 croppage figures furnished by the operators. Accordingly, the data on average production per crop in naval-stores units for 1933-34 cannot be verified by the Survey. They are presented here for what they may be worth. To many persons they will appear unusually high. This large number of units per crop may possibly be explained by the availability of cheap labor and the favorable weather conditions which made possible the chipping of an abnormally large number of streaks during the 1933-34 season.

Table 8. - Naval-stores croppage and production classified by the types of operations that produced the crude gum, Survey Unit #1¹, Florida, season 1933-34

Types of operations	Number of operations	Thousands of working cups ²	Production in naval-stores units ³	Average production per crop in naval-stores units ⁴
Operator	160	17,936	76,620	42.7
Operator and farmer	5	318	1,180	37.1
Operator and gum-buyer	1	50	190	38.0
Operator and custom-stiller	7	434	1,750	40.3
Operator, gum-buyer and custom-stiller	2	123	510	41.5
Gum-producer-seller	20 ⁵	60 ⁵	220 ⁵	36.7
Gum-producer-shipper	8 ⁵	371 ⁵	1,500 ⁵	40.4
Total	203	19,292	81,970	42.5

¹ Does not include Ocala National Forest.

² To convert to full number of cups add "000".

³ Totals rounded to nearest ten units for each class of operation.

⁴ A naval-stores unit is made up of a fifty-gallon barrel of turpentine and 3-1/3 500-pound (gross) barrels of rosin.

⁵ Estimated from information furnished by still operators.



A word about the nation-wide Forest Survey

The Southern Forest Survey has been under way since January 1931. It is a part of the organization established by the United States Forest Service for the purpose of making a survey of the timber resources of the United States. The five-fold object of this nation-wide survey is: (1) to make an inventory of the present supply of timber and other forest products, (2) to ascertain the rate at which this supply is being increased through growth, (3) to determine the rate at which this supply is being diminished through industrial and local use, windfall, fire, and disease, (4) to determine the present requirement and the probable future trend in the requirement for timber and other forest products, and (5) to correlate these findings with existing and anticipated economic conditions in order that policies can be formulated for the effective use of land suitable for forest production.

The Survey work in the South is carried on in geographic units of four to ten million acres. Unit boundaries are so established within a given state that the timber stand conditions, as well as factors governing the social, economic, and industrial activities are as uniform as possible throughout the unit. The land area within a unit is gridironed without regard to ownership or occupancy. Quarter-acre sample plots are laid out at intervals of 660 feet on parallel compass lines ten miles apart. On each sample plot the trees are counted and measured, and are classified by diameter classes and species groups. Growth rates of individual tree species, cull percentages, merchantable lengths, and other special data are obtained on randomly selected sample trees located on the sample plots. Forest growth and forest utilization specialists are assigned to forest growth and utilization studies in each of the survey units. In the naval stores region of the South Atlantic and Gulf Coast States, a special study of the gum naval stores industry has been made to determine, for each survey unit, the annual production of gum turpentine and gum rosin, the number of producers, and other related data not heretofore available. In addition, pertinent economic information concerning local woodusing industries is gathered in each survey unit.

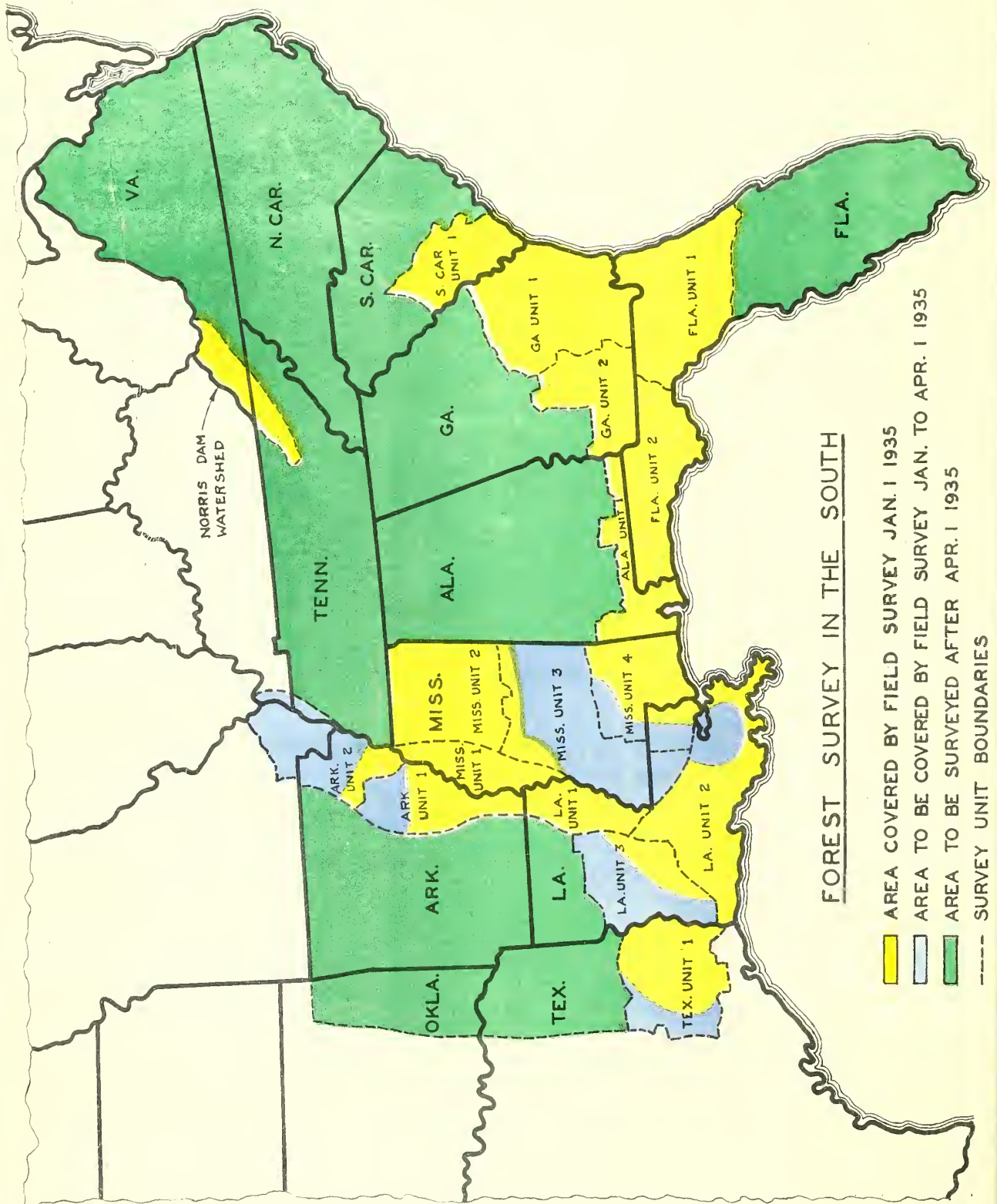
A group of nineteen statistical experts and skilled computers is summarizing and analyzing the tremendous mass of field data gathered in each survey unit by the field crews. In this computation work modern electric sorting and tabulating machines and many other timesaving devices are being effectively used. In the analysis of the field data that have already been gathered by the Survey, it is estimated that more than half a million tabulating machine cards will be used.

As soon as analysis of the survey data is completed for any unit, a comprehensive statistical report will be prepared. This report will give essential information on the volume, growth, and present drain of the timber resource, and in the naval-stores belt will furnish data on naval-stores croppage and production.

On the following map is shown the status of the field work of the Survey on January 1, 1935.

The Forest Survey in the South is an activity of the Southern Forest Experiment Station of the United States Forest Service. Further information concerning the Survey can be obtained by writing to the Director, Southern Forest Experiment Station, 600 Stern Building, 348 Baronne Street, New Orleans, La.

Figure 1



FOREST SURVEY IN THE SOUTH

- AREA COVERED BY FIELD SURVEY JAN. 1 1935
- AREA TO BE COVERED BY FIELD SURVEY JAN. TO APR. 1 1935
- AREA TO BE SURVEYED AFTER APR. 1 1935
- SURVEY UNIT BOUNDARIES

FOREST SURVEY RELEASE* No. 9

January 30, 1935.

SOUTHERN FOREST EXPERIMENT STATION

E. L. Demmon, Director

New Orleans, La.



ADVANCE INFORMATION ON THE SUPPLY OF PULPWOOD
IN SURVEY UNIT #1
FLORIDA

By

SOUTHERN FOREST SURVEY STAFF

I. F. Eldredge

Regional Survey Director

* - This is an advance release of Forest Survey data that will be included in complete reports to be published later. This information is subject to correction or amplification as computations proceed.

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ADVANCE INFORMATION ON THE SUPPLY OF PULPWOOD

IN SURVEY UNIT #1

FLORIDA

By

SOUTHERN FOREST SURVEY STAFF

I. F. Eldredge

Regional Survey Director

This report presents information concerning the quantity of pulpwood in Survey Unit #1, Florida. The geographic location of this unit which includes twenty-one counties in the northeastern part of the state is shown in Figure 1. The total land area of this unit is 9,515,600 acres, excluding 263,000 acres within the boundary of the Ocala National Forest¹. The data given in this release are preliminary and are subject to correction and modification when final computations are completed. It is believed, however, that the changes in estimates of pulpwood will neither be extensive nor important. The information is given in advance of the publication of a comprehensive report for the unit covering the quantity, character and growth of the timber supply expressed in terms of lumber, naval stores, poles, etc. as well as pulpwood.

The estimates of land area and pulpwood volume given in this report are based on data gathered during the period from December 1933 to October 1934 by the Forest Survey, a part of the U. S. Forest Service and an activity of the Southern Forest Experiment Station. These data are based on the measurement of the timber or record of condition on 11,956 quarter-acre sample plots established in a systematic line plot gridironing of the entire unit. The field work in this unit was done by a group of six specially trained parties of timber estimators.

Land Area

The area of land in the several land-use classes is shown in Table 1. Approximately 77 percent of the total land area of the unit is classified as forest land. Fifteen percent of the area is agricultural and the remainder falls into one of the other nonforest classes.

¹The pulpwood estimate for this area has not been computed; it will be included in the comprehensive report for the unit to be published later.

Table 1. - Distribution of land area by class of
land use, Survey Unit #1¹, Florida

Land use classes	Area in acres	Percent of total area
Forest	7,378,900	77.5
Nonforest:		
Agricultural:		
In cultivation:		
Old crop land ²	939,800	9.9
New crop land ³	11,000	.1
Out of cultivation:		
Idle ⁴	315,400	3.3
Abandoned ⁵	128,500	1.4
Pasture:		
Improved ⁶	48,100	.5
Total agricultural	1,442,800	15.2
Other areas:		
Prairie and grass land	65,400	.7
Marsh	411,600	4.3
Waterways	44,200	.5
Towns and villages	83,600	.9
Roads, railroads, etc.	89,100	.9
Total other areas	693,900	7.3
Total forest and nonforest	9,515,600	100.0

¹Does not include Ocala National Forest, the gross area of which is 263,000 acres.

²Land cultivated at least 5 years and on which a farm crop was raised within 2 years prior to the date of survey.

³Land recently converted from forest to crop land. Stumps or standing dead trees are usually present. Dead hardwood trees and stumps usually decay and disappear within 5 years.

⁴Cultivated land that has not produced a farm crop for two years or more, but which has not reached the abandoned class.

⁵Land once cultivated but showing distinct evidence of having been abandoned for agricultural crop production; no attempt is being made to keep it as pasture.

⁶Cleared land under fence used primarily for grazing. A real attempt has been made to produce and maintain a sod.

Forest Area

From the point of view of pulpwood production there are three significant groups of forest types in the unit. The first group consists of the turpentine pines, longleaf and slash, in their varying mixtures with each other and with other species. The second group is made up of types having varying mixtures of the nonturpentine pines, including loblolly, shortleaf, pond, sand, and spruce pines. Some hardwoods may be found in both of these forest type groups. The third group is composed of hardwoods, either pure or mixed to a very limited extent with pines. Table 2 shows the forest area classified by forest conditions and by these forest type groups. In round figures, the turpentine-pine forest types cover 67 percent, the nonturpentine-pine forest types 8 percent, and the hardwood forest types 24 percent of the forest area. Approximately 20 percent of the forest area bears uncut stands of second-growth timber of saw-log size. In the pines 9 inches d.b.h. and in hardwoods 13 inches are here considered the minimum diameters for saw-log size.

Table 2. - Forest area by forest conditions and forest type groups, Survey Unit #1¹, Florida

Forest Conditions	Forest type groups			Total	Percent of total forest area
	Longleaf and slash pine predominating	Loblolly and other nonturpentine pine predominating	Hardwood predominating		
----- Acres -----					
Old-growth uncut	174,200	77,300	385,600	637,100	8.6
Old-growth partly-cut	429,700	49,600	391,100	870,400	11.8
Second-growth saw-log size uncut	1,183,400	191,600	138,000	1,513,000	20.5
Second-growth saw-log size partly-cut	91,400	39,400	15,800	146,600	2.0
Second growth under saw-log size uncut	1,816,600	146,600	675,700	2,638,900	35.8
Second-growth under saw-log size partly-cut	33,000	2,400	15,800	51,200	.7
Clear-cut ²	1,001,400	33,200	32,200	1,066,800	14.4
Reproduction	217,700	44,900	111,100	373,700	5.1
Subtotal	4,947,400	585,000	1,765,300	7,297,700	98.9
Noncommodity ³				81,200	1.1
Total				7,378,900	100.0
Percent of total forest area	67.1	7.9	23.9		

¹ Does not include the area of the Ocala National Forest.

² The area shown in the clear-cut condition includes a relatively small area in the fire-killed condition.

³ Forest areas that do not bear commercial timber species; therefore not included in the three major type groups.

Volume Estimate

In the following tables, cordwood volumes are classified by pulping and nonpulping species groups. The pulping species group is subdivided into pine and hardwood, and the pine subgroup in turn is reclassified as turpentine and non-turpentine-pines. The turpentine-pines are further subdivided into round, working and idle, and worked-out groups.

These species groups are defined as follows:

1. - Round turpentine-pines - Longleaf and slash pine trees that have never been worked for naval stores, that is, no cups have been hung or faces made for the production of turpentine and rosin.
2. - Working and idle turpentine-pines - Longleaf and slash pine trees that are either being worked for naval stores at the present time; or are in a temporary period of rest between working operations.
3. - Worked-out turpentine-pines - Longleaf and slash pine trees on which as many faces have been placed as the trees will stand; these trees have served their purpose in the production of naval stores and are ready for the axe.
4. - The nonturpentine-pines - Loblolly, shortleaf, pond, sand, and scrub pines. They are not used in the production of naval stores, and of course, have no cups or faces.
5. - Pulping hardwoods - Hardwood species that can be used in the manufacture of paper. They include the gums, the maples, the bays, magnolia, cottonwood, poplar, etc.
6. - Nonpulping hardwoods - Hardwood species that are not generally considered of value for the production of paper, such as oak, hickory, ash, cypress, hackberry and sycamore.

In estimating the volume of pulpwood, only live timber of pulping species was considered. All sound trees five inches and over in diameter at breast height were taken, but no wood under four inches in diameter outside of bark was included in the estimate. No limbwood was included. An approximate deduction was made for woods cull, that is, that portion of the trees that would be left in the woods on account of rot, firescar, crook, bad knots, or other defects. Volumes of the entire butt sections (approximately 10 feet) of working, resting, and worked-out turpentine trees were omitted from the estimate. Later information may show that a substantial percentage of these butt sections can be used for pulpwood. In that event, the totals given here will be proportionately increased in later reports.

Table 3 gives by forest type groups and species groups the total amount of cordwood, both pulping and nonpulping in stands in Florida Unit #1. The cord used is the standard cord, 4 by 4 by 8 feet, measured with bark on.

Table 3. - Estimate of cordwood, by pulping and nonpulping species groups, and by forest type groups, Survey Unit #1', Florida

Tree species groups	Forest type groups			Total
	Longleaf and slash pine predominating	Loblolly and other nonturpentine pine predominating	Hardwood predominating	

..... Thousands ² of cords

Pulping species:

Pine:

Turpentine pine
(longleaf and slash)

Round	11,202	178	311	11,691
Working and idle	5,206	71	106	5,383
Worked-out	1,746	29	38	1,813

Nonturpentine pine
(loblolly, shortleaf,
pond, sand, and
scrub)

639	3,582	228	4,449
-----	-------	-----	-------

Total pine	18,793	3,860	683	23,336
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Hardwood

(gum, maple, bay,
magnolia, etc.)

982	682	6,599	8,263
-----	-----	-------	-------

Total cordwood in pulping species	19,775	4,542	7,282	31,599
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Nonpulping species:

Hardwood

(cypress, oak,
hickory, ash, etc.)

2,991	657	9,816	13,464
-------	-----	-------	--------

Total cordwood	22,766	5,199	17,098	45,063
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¹ Does not include Ocala National Forest.

² To convert to full number of cords add "000".

Survey Unit #1, Florida, is in the heart of the naval-stores belt. In it is produced nearly 20 percent of this country's annual output of turpentine and rosin. A large part of the pine forest is owned or leased by naval-stores operators. It is reasonable to assume that the naval-stores industry will continue to control a considerable part of the longleaf and slash pine timber stands, and will use these stands for turpentine and rosin before they are relinquished for any subsequent utilization. Taking this into account, Table 4 has been prepared to show the volume of pulpwood in species not used in naval-stores production and in trees that have already been fully exploited by naval-stores operators. The amount of pulpwood in the worked-out turpentine pines increases each year. This is due to the fact that each year the turpentine industry abandons the working trees in its older operations, transferring its activity to round timber. These worked-out trees are not utilized for saw-timber or other products as rapidly as they are thrown out of naval-stores production.

The volume estimates given in this release are based upon a conversion into cords of standing timber suitable for pulpwood. No attempt is made here to estimate the proportion of the amount of standing timber that will presently be available for use as pulpwood. This estimate would be governed by such factors as the prior claims of established industries, the accessibility of the timber stands and the percentage of stands that must be reserved to assure reproduction and to provide growing stock for continued operation.

Table 4. - Estimate of pulpwood, not including round, working, or idle turpentine pine, clasified by tree species groups and by forest type groups, Survey Unit #1¹, Florida

Tree species groups	Forest type groups			Total
	Longleaf and slash pine predominating	Loblolly and other nonturpentine pine predominating	Hardwood predominating	
----- Thousands ² of cords -----				
Pine				
Turpentine pine (longleaf and slash)				
Worked-out	1,746	29	38	1,813
Nonturpentine pine (loblolly, shortleaf, pond, sand, and scrub)	639	3,582	228	4,449
Total pine	2,385	3,611	266	6,262
Hardwood (gum, maple, bay, magnolia, etc.)	982	682	6,599	8,263
Total pulpwood (not including round, or idle turpentine pine)	3,367	4,293	6,865	14,525

¹ Does not include Ocala National Forest.

² To convert to full number of cords add "000".

In Table 5, the total estimate of cordwood, not including that in round and in working and idle turpentine pines, is shown by tree diameter classes. It is significant that of the 14,525,000 cords of pulpwood in species groups exclusive of round, working and idle turpentine trees 7,066,000 cords are in trees in the 6, 8, 10, and 12 inch classes. Trees in these diameter classes are usually not in demand by the lumber industry.

Table 5. - Estimate of cordwood, not including round, working or idle turpentine pine, classified by forest type groups, and by species groups and diameters of trees, Survey Unit #1¹, Florida

Tree species groups	Tree diameters ²	Forest type groups			Total
		Longleaf and slash pine predominating	Loblolly and other nonturpentine pine predominating	Hardwood predominating	
Inches -----Thousands ³ of cords -----					
Turpentine pine	6" - 8"	217	3	7	227
(longleaf and slash)	10" - 12"	866	15	20	901
Worked-out	14" - 18"	505	11	11	527
	20" & over	158	.	.	158
Total worked-out turpentine pine		1,746	29	38	1,813
Nonturpentine pine	6" - 8"	139	598	48	785
(loblolly, shortleaf,	10" - 12"	245	1,001	69	1,315
pond, sand and scrub)	14" - 18"	198	1,146	68	1,412
	20" & over	57	837	43	937
Total nonturpentine pine		639	3,582	228	4,449
Pulping hardwood	6" - 8"	455	180	1,114	1,749
(gum, maple, bay,	10" - 12"	291	185	1,613	2,089
magnolia, etc.)	14" - 18"	173	219	2,216	2,608
	20" & over	63	98	1,656	1,817
Total pulping hardwood		982	682	6,599	8,263
Nonpulping hardwood	6" - 8"	1,173	132	2,256	3,561
(cypress, oak, hickory,	10" - 12"	1,039	178	2,701	3,918
ash, etc.)	14" - 18"	587	203	2,516	3,306
	20" & over	192	144	2,343	2,679
Total nonpulping hardwood		2,991	657	9,816	13,464
Total cordwood					
(not including round, working or resting turpentine pine)		6,358	4,950	16,681	27,989

¹ Does not include Ocala National Forest.

² Diameter measurements on all nonturpentine pines and all hardwoods were taken at 4½ feet above the ground. Diameter measurements on worked-out pines were taken at 10 feet above the ground, and represent the the bottom diameter of the part of the stem above the turpentine-butt section. The two-inch diameter classes used are designated by the midpoint of each class; accordingly the 6-inch class includes trees from 5.0-6.9 inches, and the 8-inch class from 7.0 to 8.9 inches.

³ To convert to full number of cords add "000".

Table 6 shows for the average acre the cordwood volume classified by species groups and diameter classes. In this instance the volume of the average acre is theoretical one arrived at by dividing the total number of cords of wood in each species group and diameter class by the forest acreage bearing commercial timber species.

Table 6. - Estimate of cordwood on the average acre of forest land¹, classified by species groups and diameters of trees, Survey unit #1², Florida

Tree species groups	Tree diameters ³ in inches									
	6" - 8"		10" - 12"		14" - 18"		20" and over		Total	
	Cords	% of total	Cords	% of total	Cords	% of total	Cords	% of total	Cords	% of total
Turpentine pine (longleaf and slash)										
Round	.74	12.0	.52	8.4	.26	4.2	.08	1.3	1.60	25.9
Working and idle	.14	2.3	.43	7.0	.15	2.4	.02	.3	.74	12.0
Worked-out	.03	.5	.13	2.1	.07	1.2	.02	.3	.25	4.1
Nonturpentine pine (loblolly, shortleaf pond, sand and scrub).	.11	1.8	.18	2.9	.19	3.1	.13	2.1	.61	9.9
Total pine pulpwood	1.02	16.6	1.26	20.4	.67	10.9	.25	4.0	3.20	51.9
Pulping hardwood (gum, maple, bay, magnolia, etc.)	.24	3.9	.28	4.5	.36	5.8	.25	4.1	1.13	18.3
Total pulpwood	1.26	20.5	1.54	24.9	1.03	16.7	.50	8.1	4.33	70.2
Nonpulping hardwood (cypress, oak, hick- ory, ash, etc.)	.49	7.9	.53	8.6	.45	7.3	.37	6.0	1.84	29.8
Total	1.75	28.4	2.07	33.5	1.48	24.0	.87	14.1	6.17	100.0

¹ Only the 7,297,700 acres bearing commercial timber species were considered.

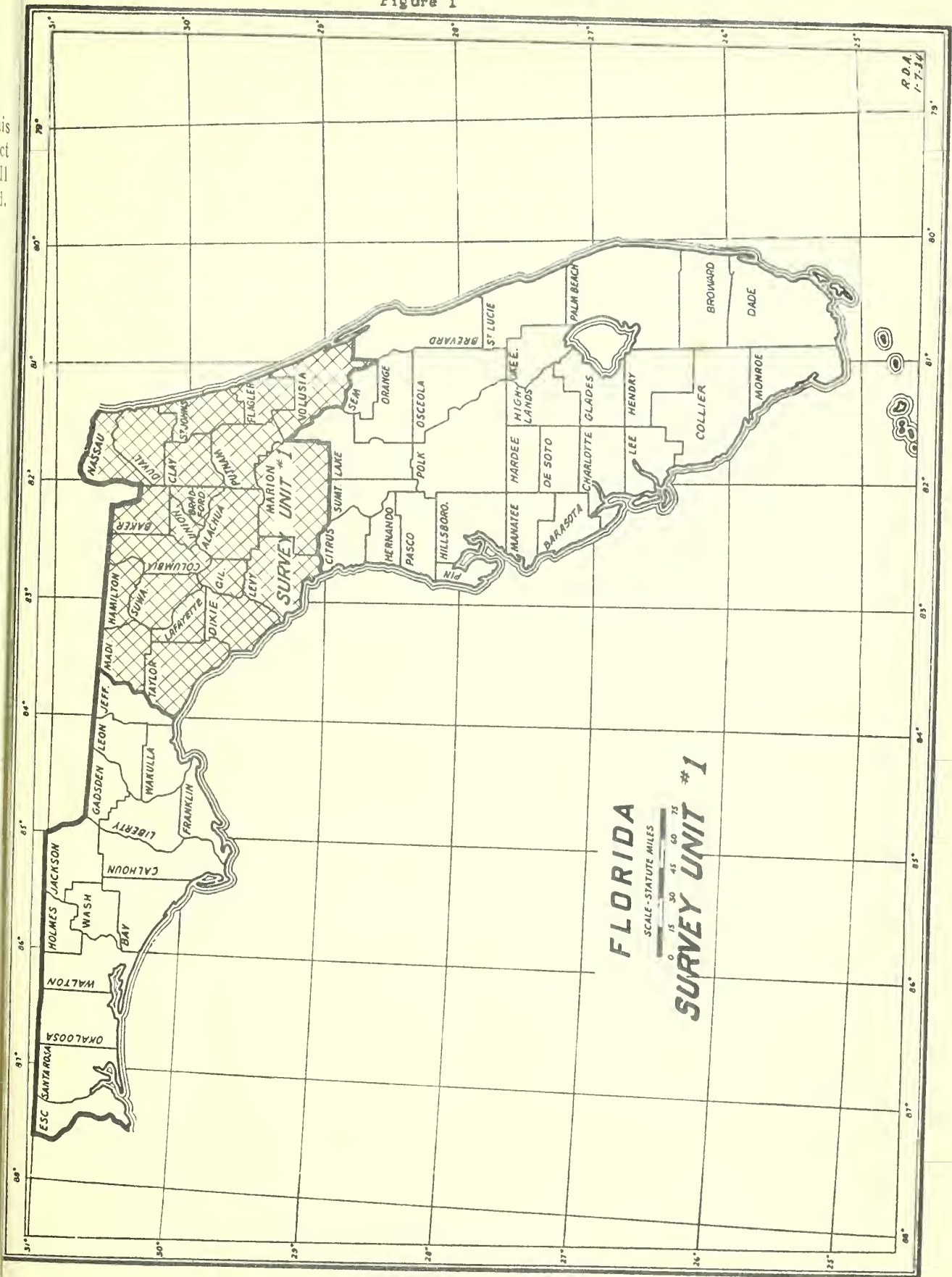
² Does not include Ocala National Forest.

³ Diameter measurements on round turpentine-pines and on all nonturpentine-pines and hardwoods were taken at 4½ feet above the ground. Diameter measurements on working, idle and worked-out turpentine-pines were taken at 10 feet above the ground, and represent the bottom diameter of the part of the stem above the turpentine-butt section. The two-inch diameter classes used are designated by the mid-point of each class; accordingly the 6-inch class includes trees from 5.0-6.9 inches, and the 8-inch class from 7.0-8.9 inches.

Growth

The calculation of the annual growth of the present timber stands in this unit has not been completed, and the result of the Survey's findings in this respect will be shown in a later more comprehensive report for the unit. This report will be published as soon as all field data have been assembled, computed and analyzed. It will be sent to those who express a desire to receive copies.

Figure 1



A word about the nation-wide Forest Survey

The Southern Forest Survey has been under way since January 1931. It is a part of the organization established by the United States Forest Service for the purpose of making a survey of the timber resources of the United States. The five-fold object of this nation-wide survey is: (1) to make an inventory of the present supply of timber and other forest products, (2) to ascertain the rate at which this supply is being increased through growth, (3) to determine the rate at which this supply is being diminished through industrial and local use, windfall, fire, and disease, (4) to determine the present requirement and the probable future trend in the requirement for timber and other forest products, and (5) to correlate these findings with existing and anticipated economic conditions in order that policies can be formulated for the effective use of land suitable for forest production.

The Survey work in the South is carried on in geographic units of four to ten million acres. Unit boundaries are so established within a given state that the timber stand conditions, as well as factors governing the social, economic, and industrial activities are as uniform as possible throughout the unit. The land area within a unit is gridironed without regard to ownership or occupancy. Quarter-acre sample plots are laid out at intervals of 660 feet on parallel compass lines ten miles apart. On each sample plot the trees are counted and measured, and are classified by diameter classes and species groups. Growth rates of individual tree species, cull percentages, merchantable lengths, and other special data are obtained on randomly selected sample trees located on the sample plots. Forest growth and forest utilization specialists are assigned to forest growth and utilization studies in each of the survey units. In the naval stores region of the South Atlantic and Gulf Coast States, a special study of the gum naval stores industry has been made to determine, for each survey unit, the annual production of gum turpentine and gum rosin, the number of producers, and other related data not heretofore available. In addition, pertinent economic information concerning local woodusing industries is gathered in each survey unit.

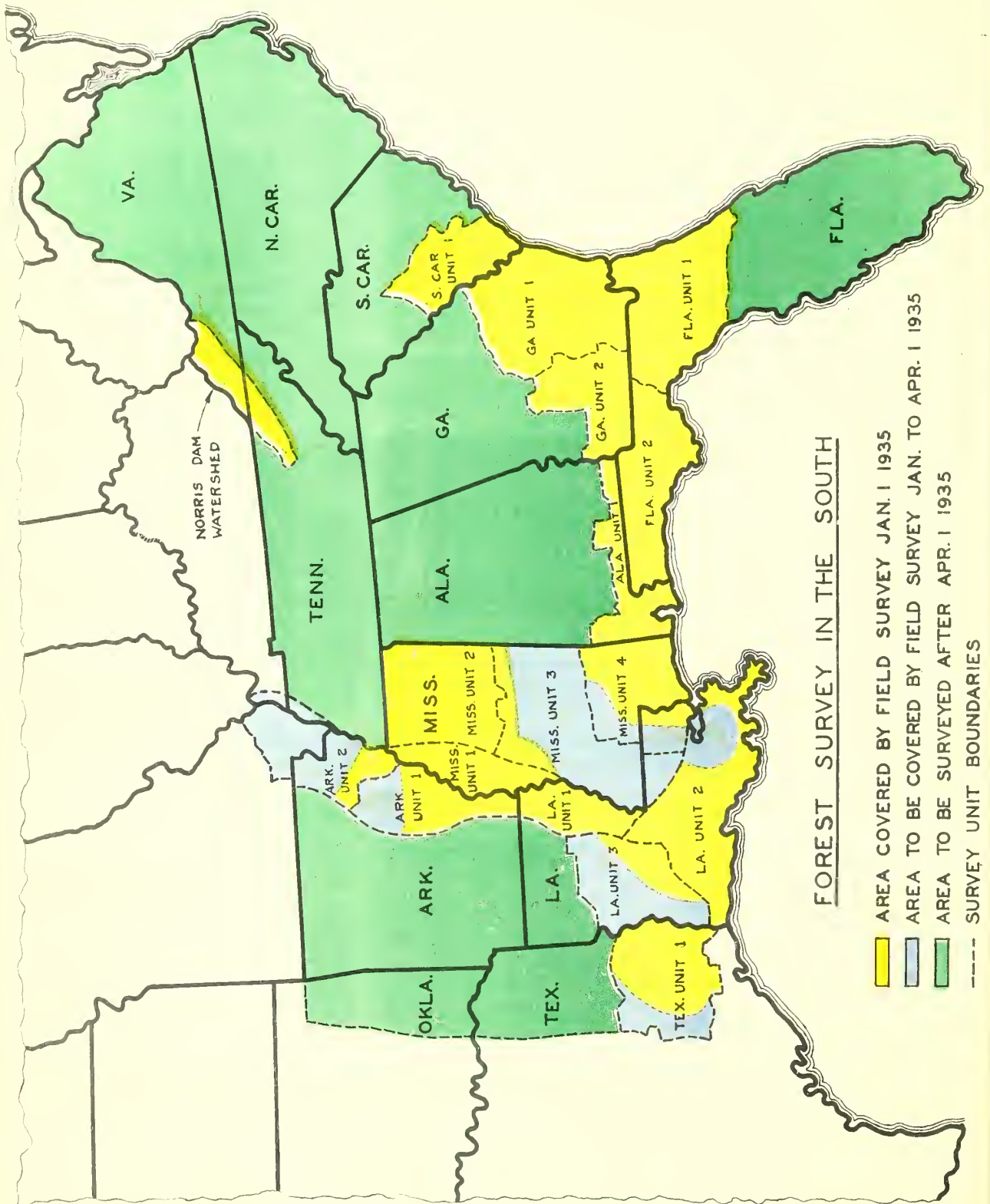
A group of nineteen statistical experts and skilled computers is summarizing and analyzing the tremendous mass of field data gathered in each survey unit by the field crews. In this computation work modern electric sorting and tabulating machines and many other timesaving devices are being effectively used. In the analysis of the field data that have already been gathered by the Survey, it is estimated that more than half a million tabulating machine cards will be used.

As soon as analysis of the survey data is completed for any unit, a comprehensive statistical report will be prepared. This report will give essential information on the volume, growth, and present drain of the timber resource, and in the naval-stores belt will furnish data on naval-stores croppage and production.

On the following map is shown the status of the field work of the Survey on January 1, 1935.

The Forest Survey in the South is an activity of the Southern Forest Experiment Station of the United States Forest Service. Further information concerning the Survey can be obtained by writing to the Director, Southern Forest Experiment Station, 600 Stern Building, 348 Baronne Street, New Orleans, La.

Figure 1a



FOREST SURVEY IN THE SOUTH

- AREA COVERED BY FIELD SURVEY JAN. 1 1935
- AREA TO BE COVERED BY FIELD SURVEY JAN. TO APR. 1 1935
- AREA TO BE SURVEYED AFTER APR. 1 1935
- SURVEY UNIT BOUNDARIES

February 23, 1935.

SOUTHERN FOREST EXPERIMENT STATION

E. L. Demmon, Director

New Orleans, La.



ADVANCE INFORMATION ON THE SUPPLY OF PULPWOOD

IN SURVEY UNIT #1

SOUTH CAROLINA

By

SOUTHERN FOREST SURVEY STAFF

I. F. Eldredge

Regional Survey Director

* - This is an advance release of Forest Survey data that will be included in complete reports to be published later. This information is subject to correction or amplification as computations proceed.

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V. B. Davis	Field Supervisor
J. A. Putnam	Field Supervisor

ADVANCE INFORMATION ON THE SUPPLY OF PULPWOOD
IN SURVEY UNIT #1
SOUTH CAROLINA

By

SOUTHERN FOREST SURVEY STAFF

I. F. Eldredge

Regional Survey Director

This report presents information concerning the quantity of pulpwood in Survey Unit #1, South Carolina which covers twelve counties in the southern part of the state. Its location is shown in Figure 1. The data given in this release are preliminary and are subject to correction and modification when final computations are completed. It is believed, however, that the changes in estimates of pulpwood will neither be extensive nor important. This information is given in advance of the publication of a comprehensive report for the unit covering the quantity, character, growth, and economic aspects of the timber supply expressed in terms of lumber, naval stores, poles, etc., as well as pulpwood.

The estimates of land area and pulpwood volume given are based on data gathered during the period from May to August 1934 by the Forest Survey, a part of the U. S. Forest Service and an activity of the Southern Forest Experiment Station. These data are based on the measurement of the timber and the record of conditions on 6,400 quarter-acre sample plots established in a systematic line plot survey grid-ironing the entire unit. The field work was done by parties of specially trained timber estimators.

The total land area of this unit is 5,186,900 acres. The acreage in each of the several land-use classes is shown in Table 1. Approximately 58 percent of the total land area of the unit is classified as forest land. Thirty-six percent is agricultural, and the remainder falls into other nonforest classes. Thirty-two percent of the forest area is in the flatwoods, the low lying portion of the Atlantic Coastal Plain adjacent to the Atlantic Ocean. This area for the most part is poorly drained and better suited to the growth of timber than to agricultural use. Forty to fifty miles back from the coast lie the rolling uplands on which are found 31 percent of the forest area. Timbered swamps, bays, and poorly drained branch heads account for an additional 29 percent of the forest land while bottomlands lying along the larger rivers and streams bear the remaining 8 percent.

The unit is well served from the viewpoint of transportation. The Seaboard Air Line, the Southern, and the Atlantic Coast railway systems traverse the area and with the Charleston and Western Carolina and the Hampton and Branchville lines reach all parts of the unit both from Savannah and Charleston. Numerous streams suitable for barge traffic penetrate the lower part of the unit. Hard surface roads traverse the area in all directions. Probably not more than 5 percent of the entire unit lies more than 10 miles airline from either rail, highway, or water transportation.

Table 1. - Distribution of land area by class of land use, Survey Unit #1, South Carolina¹

Land use classes	Area in acres	Percent of total area
Forest	2,993,000	57.7
Nonforest:		
Agricultural:		
In cultivation:		
Old crop land ²	1,441,000	27.8
New crop land ³	6,400	.1
Out of cultivation:		
Idle ⁴	197,700	3.8
Abandoned ⁵	181,600	3.5
Pasture:		
Improved ⁶	31,400	.6
Total agricultural	1,858,100	35.8
Other areas:		
Marsh	212,200	4.1
Waterways	32,200	.6
Towns and villages	48,200	.9
Roads, railroads, etc.	43,200	.9
Total other areas	335,800	6.5
Total forest and nonforest	5,186,900	100.0

¹ Does not include coastal islands and meanderable water areas.

² Land cultivated at least 5 years and on which a farm crop was raised within 2 years prior to the date of survey.

³ Land recently converted from forest to crop land.

⁴ Cultivated land that has been idle for two years or more, but which has not reached the abandoned stage.

⁵ Land once cultivated but showing distinct evidence of having been abandoned for agricultural crop production; no attempt is being made to maintain it as improved pasture.

⁶ Cleared land under fence used primarily for grazing, where a real attempt has been made to produce and maintain a sod.

Forest Area

The forest area classified by forest conditions and by forest type groups is shown in Table 2. The forest types in this unit fall into three broad groups having significance from the viewpoint of pulpwood production. In the first group, the turpentine pines, longleaf and slash, predominate. In the second group, the non-turpentine pines, including loblolly, shortleaf, pond, and spruce pines are the leading species. Hardwoods are found to a limited extent in both of these type groups. In the third group, hardwoods predominate but pine species may be found to a very limited extent. In round figures, the type group in which the nonturpentine pines predominate takes up 41 percent of the forest area, the turpentine pine group 32 percent, and the hardwood group 27 percent. Almost 45 percent of the forest area bears stands of second-growth of saw-log size. The minimum diameter for trees here considered to be of saw-log size is 9 inches for pines and cypress and 13 inches for hardwoods.

Figure 1

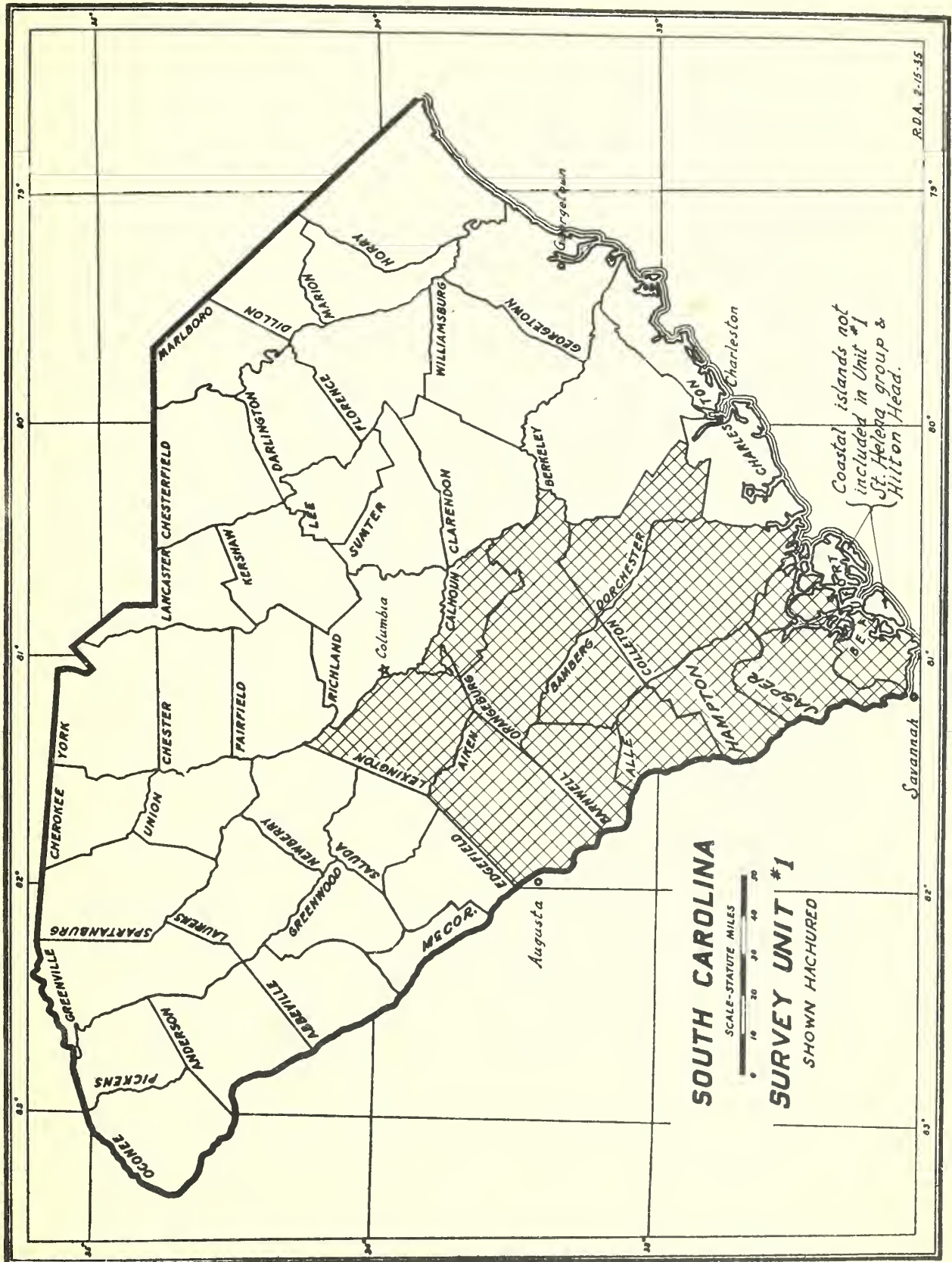


Table 2. - Forest area by forest conditions and forest type groups, Survey Unit #1, South Carolina ¹

Forest Conditions ²	Forest type groups			Total	Percent of total forest area
	Longleaf and slash pine predomi- nating	Loblolly and other nonturpen- tine pines predomi- nating	Hardwood predomi- nating		
----- Acres -----					
Old-growth:					
Uncut	16,100	103,600	98,100	217,800	7.3
Partly-cut	61,800	66,800	105,300	233,900	7.8
Second-growth:					
Saw-log size:					
Uncut	327,100	524,100	255,500	1,106,700	37.0
Partly-cut	29,700	159,900	37,800	227,400	7.6
Under saw-log size:					
Uncut	435,700	275,600	229,800	941,100	31.4
Partly cut	25,800	17,700	11,200	54,700	1.8
Clear-cut ³	8,900	3,200	4,800	16,900	.6
Reproduction	53,800	73,100	67,600	194,500	6.5
Total	958,900	1,224,000	810,100	2,993,000	100.0
Percent of total forest area	32.0	40.9	27.1	100.0	

¹ Does not include coastal islands.

² No area was classified as noncommodity (forest areas that do not bear commercial timber species) in this survey unit.

³ Clear-cut contains a small proportion of fire-killed condition.

Volume Estimate

In the following tables, cordwood volumes are classified by pulping and nonpulping species groups. The pulping species group is subdivided into pine and hardwood, and the pine subgroup in turn is reclassified as turpentine and nonturpentine-pines. The turpentine-pines are further subdivided into round, working and idle, and worked-out groups. These species groups are defined as follows:

1. - Round turpentine-pines - Longleaf and slash pine trees that have never been worked for naval stores, that is, no cups have been hung or faces made for the production of turpentine and rosin.
2. - Working and idle turpentine-pines - Longleaf and slash pine trees that are either being worked for naval stores at the present time; or are in a temporary period of rest between working operations.
3. - Worked-out turpentine-pines - Longleaf and slash pine trees on which as many faces have been placed as the trees will stand; these trees have served their purpose in the production of naval stores and are ready for the axe.

4. - The nonturpentine-pines - Loblolly, shortleaf, pond, and scrub pines. They are not used in the production of naval stores, and of course, bear no cups or faces.
5. - Pulping hardwoods - Hardwood species that can be used in the manufacture of paper. They include the gums, the maples, the bays, magnolia, cottonwood, poplar, etc.
6. - Nonpulping hardwoods - Hardwood species that are not generally considered of value for the production of paper, such as oak, hickory, ash, cypress, hackberry, and sycamore.

Loblolly pine is by far the most important of the nonturpentine pines in this unit. In cordwood volume it makes up 78 percent of the total cordage for this group of pines, while pond, shortleaf, and spruce pines make up the bulk of the remainder. Among the pulping hardwoods the major portion of the volume is found in the three gum species. Red gum accounts for 33 percent, black gum 41 percent, and tupelo gum 10 percent of the pulping hardwood cordage; the remaining 16 percent being mostly maple and yellow poplar. In the nonpulping hardwood group, cypress accounts for 30 percent of the volume, the red oaks 31 percent, the white oaks 13 percent, and scrub oaks 3 percent. The remaining 23 percent is accounted for by numerous miscellaneous species, chief among which are the ashes, the hickories, and the elms.

The hardwoods and cypress occur chiefly in the bottomlands and in the swamps, bays, ponds, and branch heads. The best stands are to be found on the flood plains of the larger streams. The turpentine pines are found mainly on the higher ground. Loblolly pine may be found on the higher ground with the turpentine pines but is more characteristic of the lower-lying areas and is often found with the hardwoods. It grows up quickly on agricultural lands after they have been abandoned for cultivation and many old field stands of this species are to be found in the unit.

In estimating the volume of pulpwood, only live timber of pulping species was considered. All sound trees five inches and over in diameter at breast height were included; wood under four inches in diameter outside of bark was excluded from the estimate. No limbwood was included. An approximate deduction was made for woods cull, that is, that portion of the trees that would be left in the woods on account of rot, fire scar, crook, bad knots, or other defect. Volumes of the entire butt sections (approximately 10 feet long) of working, resting, and worked-out turpentine trees were omitted from the estimate. Later information may show that a substantial percentage of these butt sections can be used for pulpwood. In that event, the totals given here will be proportionately increased in later reports.

Throughout this release, where the subdivision of classifications has resulted in relatively small tabular values under certain of the headings, these small amounts are to be taken, not as exact expressions of the items, but as showing their relative amounts in comparison with other items and the proportion which they make up of the totals. Under the system of sampling used in the collection of survey volume and area data, items which are of infrequent occurrence and relatively small in quantity cannot be determined with the degree of accuracy obtainable for the items which occur in greater quantities.

The total amount of cordwood, both pulping and nonpulping, in stands in South Carolina Unit #1, is given in Table 3 by species groups and forest type groups. The cord used is the standard cord, 4 by 4 by 8 feet, measured with bark on.

Table 3. - Estimate of cordwood, by pulping and nonpulping species groups, and by forest type groups, Survey Unit #1, South Carolina ¹

Tree species groups	Forest type groups			Total
	Longleaf and slash pine predominating	Loblolly and other nonturpentine pines predominating	Hardwood predominating	
----- Thousands of cords ² -----				
Pulping species:				
Pines:				
Turpentine pines:				
(longleaf and slash)				
Round	3,199	265	11	3,475
Working and idle	1,171	94	2	1,267
Worked-out	181	15	-	196
Nonturpentine pines				
(loblolly, shortleaf, pond, and scrub)				
	883	11,324	306	12,513
Total pines	5,434	11,698	319	17,451
Hardwoods				
(gum, maple, bay, magnolia, etc.)				
	354	3,232	7,132	10,718
Total cordwood in pulping species				
	5,788	14,930	7,451	28,169
Nonpulping species:				
Hardwoods				
(cypress, oak, hickory, ash, etc.)				
	510	2,019	3,906	6,435
Total cordwood	6,298	16,949	11,357	34,604

¹ Does not include coastal islands.

² To convert to full number of cords add "000".

While Survey Unit #1, South Carolina, lies toward the northern limits of the naval-stores belt, the naval-stores industry is actively extending its operations into this area, and it is reasonable to assume that a considerable portion of the longleaf and slash pine timber will be worked out for turpentine and rosin before it is available for utilization as pulpwood. Taking this into account, Table 4 has been prepared to show the volume of pulpwood in species not used in naval-stores production and in turpentine-pines which have already been fully exploited by naval-stores operators. In this unit, 72 percent of the total pine cordwood volume is in the nonturpentine pines and 1 percent in worked-out turpentine pines. The amount of pulpwood in the form of worked-out turpentine pines increases each year. This is due to the fact that the naval-stores industry annually abandons working trees in its older

operations transferring its activity to round timber. These worked-out trees are not usually utilized for saw-timber or other products as rapidly as they are thrown out of naval-stores production and are left to accumulate in the woods.

The volume estimates given in this release are based upon a conversion into cords of standing timber suitable for pulpwood. No attempt is made here to estimate the proportion of the amount of standing timber that will presently be available for use as pulpwood. This estimate would be governed by such factors as the prior claims of established industries, the accessibility of the timber stands and the percentage of stands that must be reserved to assure reproduction and to provide growing stock for continued operation.

Table 4. - Estimate of pulpwood, not including round, working, or idle turpentine pine, classified by tree species groups and forest type groups, Survey Unit #1, South Carolina¹

Tree species groups	Forest type groups			Total
	Longleaf and slash pine predominating	Loblolly and other nonturpentine pines predominating	Hardwood predominating	
----- Thousands of cords ² -----				
Pines:				
Turpentine pines:				
(longleaf and slash)				
Worked-out	181	15	-	196
Nonturpentine pines				
(loblolly, shortleaf, pond, and scrub)	883	11,324	306	12,513
Total pines	1,064	11,339	306	12,709
Hardwoods				
(gum, maple, bay, magnolia, etc.)	354	3,232	7,132	10,718
Total pulpwood, (not including round, or working and idle turpentine pines)	1,418	14,571	7,438	23,427

¹ Does not include coastal islands.

² To convert to full number of cords add "000".

The total estimate of cordwood, exclusive of that in round, working, and idle turpentine pines, is shown by diameter classes in Table 5. Trees in the 6, 8, 10, and 12 inch diameter classes are not usually in demand by the lumber industry. The trees in these classes make up 38 percent of the total nonturpentine pine and worked-out turpentine pine cordwood and 44 percent of the cordwood in the pulping hardwood species.

Table 5. - Estimate of cordwood, not including round, working, or idle turpentine pine, classified by forest type groups, and by species groups and diameters of trees, Survey Unit #1, South Carolina¹.

Tree species groups	Tree diameters ²	Forest type groups			Total
		Longleaf and slash pine predominating	Loblolly and other nonturpentine pines predominating	Hardwood predominating	
	Inches	----- Thousands of cords ³ -----			
Worked-out turpentine pines (longleaf and slash)	6" - 8"	18	3	-	21
	10" - 12"	91	7	-	98
	14" - 18"	63	5	-	68
	20" & over	9	-	-	9
Total worked-out turpentine pines		181	15	-	196
Nonturpentine pines (loblolly, shortleaf, pond, and scrub)	6" - 8"	174	1,482	37	1,693
	10" - 12"	285	2,677	66	3,028
	14" - 18"	290	3,752	103	4,145
	20" & over	134	3,413	100	3,647
Total nonturpentine pines		883	11,324	306	12,513
Pulping hardwoods (gum, maple, bay, magnolia, etc.)	6" - 8"	120	839	1,077	2,036
	10" - 12"	119	940	1,599	2,658
	14" - 18"	85	1,031	2,703	3,819
	20" & over	30	422	1,753	2,205
Total pulping hardwoods		354	3,232	7,132	10,718
Nonpulping hardwoods (cypress, oak, hickory, ash, etc.)	6" - 8"	209	466	690	1,365
	10" - 12"	211	544	1,092	1,847
	14" - 18"	81	539	1,079	1,699
	20" & over	9	470	1,045	1,524
Total nonpulping hardwoods		510	2,019	3,906	6,435
Total cordwood (not including round, working, or idle turpentine pines)		1,928	16,590	11,344	29,862

¹ Does not include coastal islands.

² Diameter measurements on all nonturpentine pines and all hardwoods were taken at 4 - 1/2 feet above the ground. Diameter measurements on worked-out pines were taken at 10 feet above the ground, and represent the bottom diameter of the part of the stem above the turpentine-butt section. The two-inch diameter classes used are designated by the midpoint of each class; accordingly the 6-inch class includes trees from 5.0 to 6.9 inches, and the 8-inch class from 7.0 to 8.9 inches.

³ To convert to full number of cords add "000".

The estimate of cordwood by diameter classes for the round, working, and idle turpentine pines is shown in Table 6. The volume in trees which are in demand by the naval-stores industry amounts to only 27 percent of the total pine volume.

Table 6. - Estimate of cordwood in round, and in working and idle turpentine pines, by forest type groups and diameters of trees, Survey Unit #1, South Carolina¹

Tree species groups	Tree diameters ²	Forest type groups			Total
		Longleaf and slash pine predominating	Loblolly and other nonturpentine pines predominating	Hardwood predominating	
	Inches	----- Thousands of cords ³ -----			
Round turpentine pines (longleaf and slash)	6" - 8"	1,184	78	3	1,265
	10" - 12"	1,106	79	5	1,190
	14" - 18"	600	82	3	685
	20" & over	309	26	-	335
Total round turpentine pines		3,199	265	11	3,475
Working and idle turpentine pines (longleaf and slash)	6" - 8"	202	13	-	215
	10" - 12"	539	35	2	576
	14" - 18"	351	38	-	389
	20" & over	79	8	-	87
Total working and idle turpentine pines		1,171	94	2	1,267
Total		4,370	359	13	4,742

¹ Does not include coastal islands.

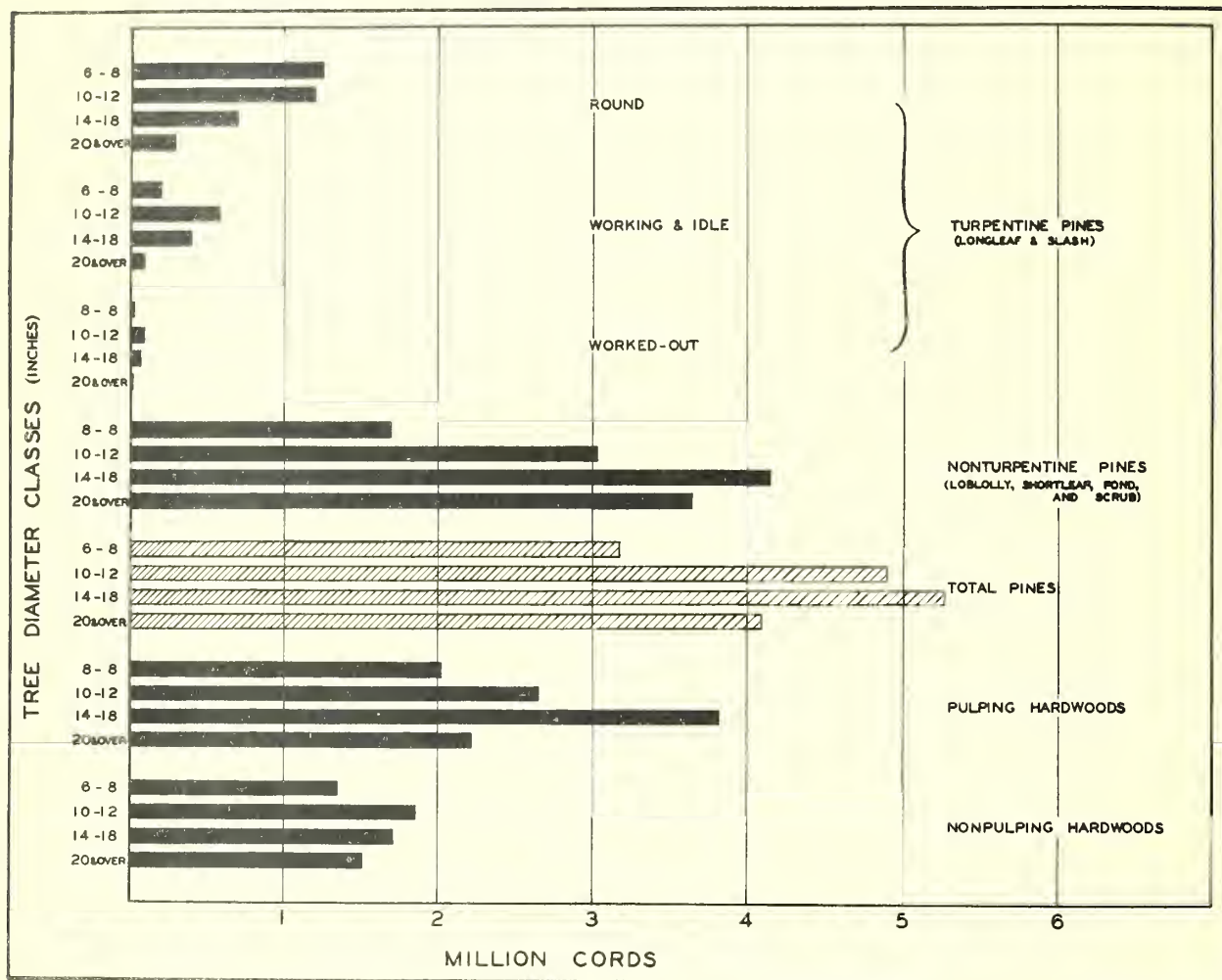
² Diameter measurements on round turpentine pines, nonturpentine pines, and hardwoods were taken at 4 - 1/2 feet above the ground. Diameter measurements on working, idle, and worked-out turpentine pines were taken at 10 feet above the ground, and represent the bottom diameter of the part of the stem above the turpentine-butt section. The two-inch diameter classes used are designated by the midpoint of each class; accordingly the 6-inch class includes trees from 5.0 to 6.9 inches, and the 8-inch class from 7.0 to 8.9 inches.

³ To convert to full number of cords add "000".

Taken together the two preceding tables cover all of the species groups, and show for each group the distribution of volume by diameter classes. Combining the pulping species, both pine and hardwood, 19 percent of the total pulpwood is in trees of the 6 and 8 inch diameter classes, 27 percent is in trees of the 10 and 12 inch classes, 32 percent is in trees of the 14 to 18 inch classes, and 22 percent is in larger trees.

Significant data from Tables 5 and 6 are presented graphically in Figure 2.

Figure 2. - Estimate of cordwood volume, classified by species groups and tree diameter classes, ¹ Survey Unit #1, South Carolina ²



¹ Diameter measurements on round turpentine pines, nonturpentine pines, and hardwoods were taken at 4 - 1/2 feet above the ground. Diameter measurements on working, idle, and worked-out turpentine pines were taken at 10 feet above the ground, and represent the bottom diameter of the part of the stem above the turpentine-butt section. The two-inch diameter classes used are designated by the midpoint of each class; accordingly the 6-inch class includes trees from 5.0 to 6.9 inches, and the 8-inch class from 7.0 to 8.9 inches.

² Does not include coastal islands.

The cordwood volume for the average acre, classified by species groups and diameter classes, is shown in Table 7. The volume for the average acre is a theoretical figure arrived at by dividing the total number of cords of wood in each species group and diameter class by the forest acreage bearing commercial timber species.

Table 7. - Estimate of cordwood on the average acre of forest land,¹ classified by species groups and diameters of trees, Survey Unit #1, South Carolina²

Tree species groups	Tree diameters in inches ³									
	6" - 8"		10" - 12"		14" - 18"		20" & over		Total	
	Cords	% of total	Cords	% of total	Cords	% of total	Cords	% of total	Cords	% of total
Turpentine pines:										
(longleaf and slash)										
Round	.42	3.6	.40	3.5	.23	2.0	.11	.9	1.16	10.0
Working and idle	.07	.6	.19	1.6	.13	1.1	.03	.3	.42	3.6
Worked-out	.01	.1	.03	.3	.02	.1	.01	.1	.07	.6
Nonturpentine pines										
(loblolly, shortleaf, pond, and scrub)	.57	4.9	1.01	8.7	1.38	12.0	1.22	10.6	4.18	36.2
Total pine pulpwood	1.07	9.2	1.63	14.1	1.76	15.2	1.37	11.9	5.83	50.4
Pulping hardwoods										
(gum, maple, bay, magnolia, etc.)	.68	5.9	.89	7.7	1.27	11.0	.74	6.4	3.58	31.0
Total pulpwood	1.75	15.1	2.52	21.8	3.03	26.2	2.11	18.3	9.41	81.4
Nonpulping hardwoods										
(cypress, oak, hickory, ash, etc.)	.45	3.9	.62	5.4	.57	4.9	.51	4.4	2.15	18.6
Total	2.20	19.0	3.14	27.2	3.60	31.1	2.62	22.7	11.56	100.0

¹ The entire forest area of 2,993,000 acres was considered in finding the average acre.

² Does not include coastal islands.

³ Diameter measurements on round turpentine pines, nonturpentine pines, and hardwoods were taken at 4 - 1/2 feet above the ground. Diameter measurements on working, idle, and worked-out turpentine pines were taken at 10 feet above the ground, and represent the bottom diameter of the part of the stem above the turpentine-butt section. The two-inch diameter classes used are designated by the midpoint of each class; accordingly the 6-inch class includes trees from 5.0 to 6.9 inches, and the 8-inch class from 7.0 to 8.9 inches.

Growth

The calculation of the annual growth of the present timber stands in this unit has not been completed, and the result of the Survey's findings in this respect will be shown in a later more comprehensive report for the unit. This report will be published as soon as all field data have been assembled, computed, and analyzed. It will be sent to those who express a desire to receive copies.

FOREST SURVEY RELEASE* No. 11

April 11, 1935.

SOUTHERN FOREST EXPERIMENT STATION

E. L. Demmon, Director

New Orleans, La.



PULPING AND NONPULPING CORDWOOD VOLUME

IN SURVEY UNIT #2

MISSISSIPPI

By

SOUTHERN FOREST SURVEY STAFF

I. F. Eldredge

Regional Survey Director

* - This is an advance release of Forest Survey data that will be included in complete reports to be published later. This information is subject to correction or amplification as computations proceed.

Southern Forest Survey Staff

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PULPING AND NONPULPING CORDWOOD VOLUME

IN SURVEY UNIT #2, MISSISSIPPI

This report presents advance information on the supply of cordwood in both pulping and nonpulping tree species in an area of approximately 8,153,500 acres in northern Mississippi. As shown in Fig. 1, this area covers the major portion of twenty-seven counties lying east of the bluffs that rim the delta of the Mississippi River. The general topography is that of a rolling, well-drained upland, with an average elevation above sea level of 300 to 800 feet; the highest levels and roughest topography occur in the northeast. The Unit is drained by the following rivers: In the northeast, the Tennessee; in the east, the Tombigbee; and in the central and western part, the Cold Water, Tallahatchie, Yocona, Yalobusha, and Big Black, tributaries of the Yazoo which flows into the Mississippi.

All or part of DeSoto, Benton, Marshall, Tate, Panola, Lafayette, and Yalobusha counties are included in a subregion differing somewhat from the rest of the area (see Fig. 2). This subregion is distinguished by the presence of an upland hardwood type, characterized by hickory and mixed oaks. Along the western side of the Tombigbee River lies another distinctive subregion---the northwestern extremity of the Alabama Black Belt, a prairie-like country of limestone soils, now largely under farm cultivation. With the exception of these Tombigbee black lands, where wooded areas are scarce, forests and farms are scattered more or less uniformly over the entire Unit; the largest areas of contiguous forest land are to be found in the northeast.

The region is well served with railroads, among which may be mentioned the Illinois Central; Gulf, Mobile, and Northern; Mobile and Ohio; Columbus and Greenville; and the Frisco Lines. Less than 5 percent of the total land area is more than 5 miles distant from these railroads or from state and county highways, nearly all of which are graded and many of which are surfaced with gravel.

The estimates of cordwood volume given here are classified by pulping and nonpulping species. They are based on data gathered from February 1932 through April 1933 by the Forest Survey, a part of the U.S. Forest Service and an activity of the Southern Forest Experiment Station. Specially trained timber estimators, who surveyed the entire Unit along parallel compass lines, made the inventory by systematically measuring the timber and recording the forest and land-use conditions on 10,526 one-quarter acre sample plots.

All data given in this release are preliminary and subject to correction and modification when final computations have been completed; but changes in the estimates of volume are not likely to be extensive or important. At this time no statement concerning the availability of present pulpwood supplies can be made with confidence. Such availability figures can only be set forth after data on timber growth, industrial use, and economic aspects of forest products industries have been interpreted; for continuous industrial use of forest products must be based upon the conception of the forest as a self-perpetuating crop, rather than an exhaustible mine. These survey data covering the character and economic aspects, as well as the quantity, growth, and drain of the forest crop are now being summarized and interpreted. When this interpretive work is complete, the Forest Survey plans to publish a comprehensive, detailed report for the Unit, which will cover not only pulpwood but all other forest products.

Land Area

In the distribution of area by class of land use, shown in Table 1, slightly less than 38 percent of the total land area is classified as forest land, whereas more than 60 percent is agricultural.

Table 1. - Distribution of area by class of land use

Land use classes	Area in acres	Percent of total area
Forest	3,089,100	37.9
Agricultural:		
In cultivation:		
Old cropland ¹	2,636,000	32.3
New cropland ²	110,000	1.4
Out of cultivation:		
Idle ³	318,400	3.9
Abandoned ⁴	775,400	9.5
Pasture:		
Improved ⁵	697,100	8.6
Woodland ⁶	369,500	4.5
Total agricultural	4,906,400	60.2
Other:		
Waterways	34,100	.4
Towns and villages	31,000	.4
Roads, railroads, etc.	92,900	1.1
Total other	158,000	1.9
Total area	8,153,500	100.0

¹ Land cultivated at least five years and on which a farm crop was raised within two years prior to the date of survey.

² Land recently converted from forest to cropland.

³ Cultivated land which has been idle for two years or more but which has not reached the abandoned stage.

⁴ Land once cultivated but showing distinct evidence of having been abandoned for agricultural crop production; no attempt has been made to maintain it as improved pasture.

⁵ Cleared land under fence, used primarily for grazing, where a real attempt has been made to produce and maintain a sod.

⁶ More or less wooded areas used primarily for grazing, and fenced or blocked in such a way that grazing of any kind is confined to the area. Usually no attempt has been made to improve the sod.

Forest Area

In Table 2 the forest area of 3,089,100 acres is classified by forest conditions and forest type groups. The forest conditions are divided into old-growth, defined as original, mature stands; and second-growth, which is young stands developed as a result of forest cutting and other causes. Each of these conditions is further classified as follows:

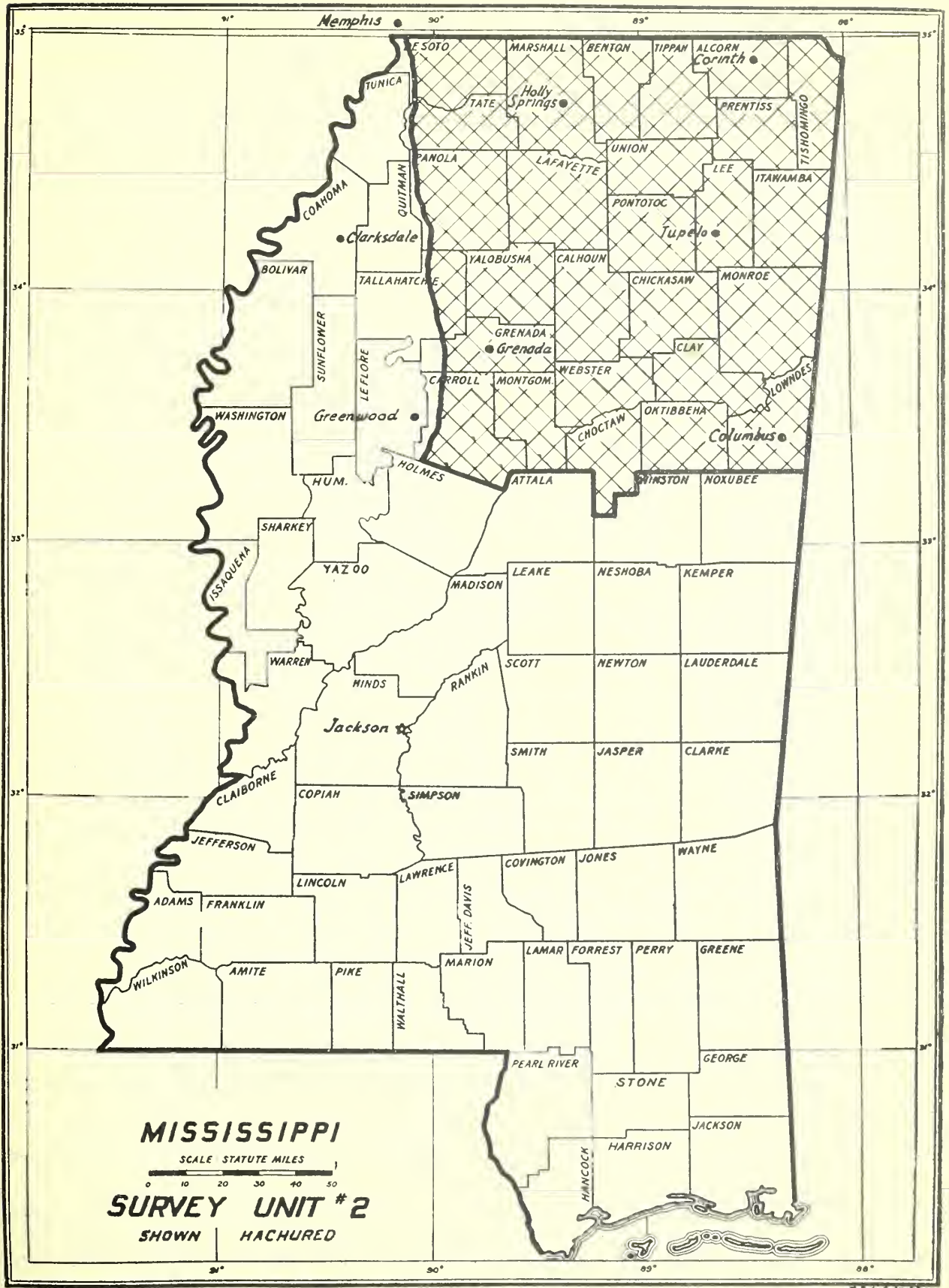


Figure 1. Map showing geographical location of the Unit.

- Uncut: Stands in which there has been no cutting, or in which only an occasional tree has been cut for some special purpose.
- Culled: Stands from which a portion of the high-grade trees has been removed, generally for a special purpose; but in which enough trees of saw-log size in one or more of the valuable species are left to justify another lumbering operation.
- Cut-over: Stands from which practically all trees of merchantable size and quality have been removed, and in which too few are left to justify another lumbering operation at present.

Second-growth stands occupy more than 96 percent of the total forest area, and almost two thirds of this area is classified as uncut. Many of these uncut second-growth stands are not of merchantable saw-timber size at present. The noticeable lack of old-growth stands in this Unit (less than 4 percent) is evidence of the thoroughness with which the forests have been exploited for lumber.

Table 2. - Forest area by forest conditions and forest type groups

Forest conditions	Forest type groups classified by predominant species			Total all types	Percent of total forest area
	Pine	Pine- hardwood	Hardwood		
----- Acres -----					
Old-growth:					
Uncut	-	800	7,700	8,500	.3
Culled	1,500	7,000	17,800	26,300	.8
Cut-over	2,300	16,200	61,300	79,800	2.6
Total old-growth	3,800	24,000	86,800	114,600	3.7
Second-growth:					
Uncut	501,100	426,100	974,500	1,901,700	61.6
Culled	55,000	73,600	38,700	167,300	5.4
Cut-over	173,600	435,300	296,600	905,500	29.3
Total second-growth	729,700	935,000	1,309,800	2,974,500	96.3
Total all conditions	733,500	959,000	1,396,600	3,089,100	
Percent of total forest area	23.8	31.0	45.2		100.0

Under the system of sampling used in the collection of survey data, items which are of infrequent occurrence, and relatively small in quantity, cannot be determined with as high a degree of accuracy as is obtainable for items which occur more frequently, and in substantially greater quantities. Therefore, small tabular figures are to be taken as showing, not the exact magnitudes of the items involved, but their relative magnitudes in comparison with those of other items.



Figure 2. Map showing geographical distribution of forest types.

Volume Estimate

Only live timber was considered in estimating the volume of cordwood. The volume of all sound trees five inches and over in diameter at breast height was included; the stemwood less than four inches in diameter outside of bark, and the limbwood were not included. The pulping pine species, shortleaf and loblolly, make up over 65 percent of the total volume of pulping cordage; the gum species account for most of the volume in the pulping hardwoods. The total estimate is given in Table 3, classified by species groups and by forest type groups, with no deduction for cull.

Table 3. - Cordwood volume by pulping and nonpulping species groups and by forest type groups

Tree species groups	Forest type groups classified by predominant species			Total all types	Percent of total volume
	Pine	Pine-hardwood	Hardwood		
----- Thousands of cords ¹ -----					
Pulping pine ²	6,191	3,646	193	10,030	34.0
Pulping hardwood ³	294	1,160	3,869	5,323	18.1
Total pulping species	6,485	4,806	4,062	15,353	52.1
Nonpulping hardwood ⁴	845	4,036	9,256	14,137	47.9
Total all species	7,330	8,842	13,318	29,490	
Percent of total volume	24.8	30.0	45.2		100.0

¹ To convert to full number of cords add "000".

² Shortleaf and loblolly.

³ Gum, cottonwood, willow, cypress, tupelo, maple.

⁴ Oak, hickory, ash, hackberry, elm, pecan, etc.

The total estimate of cordwood is shown in Table 4 by tree diameter classes in species groups and forest type groups. Trees in the 6-, 8-, 10-, and 12-inch diameter classes comprise nearly 72 percent of the pine cordage and nearly 58 percent of the pulping hardwood cordage in all forest type groups. Combining both pulping and nonpulping species, 28 percent of the total cordage is in trees of the 6- and 8-inch diameter classes, and 38 percent is in trees of the 10- and 12-inch classes. Thrifty of growth, trees of these sizes form the nucleus from which future saw-timber crops must develop; and periodical thinnings of these young stands can furnish a supply of pulpwood, and in addition, accelerate the growth of such trees as are reserved for saw-timber production.

Significant data shown in Table 4 are presented graphically in Fig. 3.

Table 4. - Cordwood volume by tree diameters in species groups and forest type groups

Tree species groups	Tree diameter classes	Forest type groups classified by predominant species			Total all types	Percent of total volume
		Pine	Pine-hardwood	Hardwood		
----- <i>Thousands of cords</i> ¹ -----						
Pulping pine: ²	6" - 8" ³	2,121	1,214	41	3,376	11.4
	10" - 12"	2,400	1,325	71	3,796	12.9
	14" - 18"	1,356	779	46	2,181	7.4
	20" & over	314	328	35	677	2.3
Total pine		6,191	3,646	193	10,030	34.0
Pulping hardwood: ⁴	6" - 8"	92	345	793	1,230	4.2
	10" - 12"	124	459	1,264	1,847	6.2
	14" - 18"	51	249	958	1,258	4.3
	20" & over	27	107	854	988	3.3
Total pulping hardwood		294	1,160	3,869	5,323	18.0
Total pulping species		6,485	4,806	4,062	15,353	52.0
Nonpulping hardwood: ⁵	6" - 8"	356	1,143	2,164	3,663	12.4
	10" - 12"	304	1,703	3,524	5,531	18.8
	14" - 18"	119	736	1,915	2,770	9.4
	20" & over	66	454	1,653	2,173	7.4
Total nonpulping hardwood		845	4,036	9,256	14,137	48.0
Total all species		7,330	8,842	13,318	29,490	
Percent of total volume		24.8	30.0	45.2		100.0

¹ To convert to full number of cords add "000".² Shortleaf and loblolly.³ Trees ranging from 5.0" to 8.9" in diameter outside of bark at breast height are placed in the 6" - 8" class; corresponding limits apply to the other diameter classes.⁴ Gum, cottonwood, willow, cypress, tupelo, maple.⁵ Oak, hickory, ash, hackberry, elm, pecan, etc.

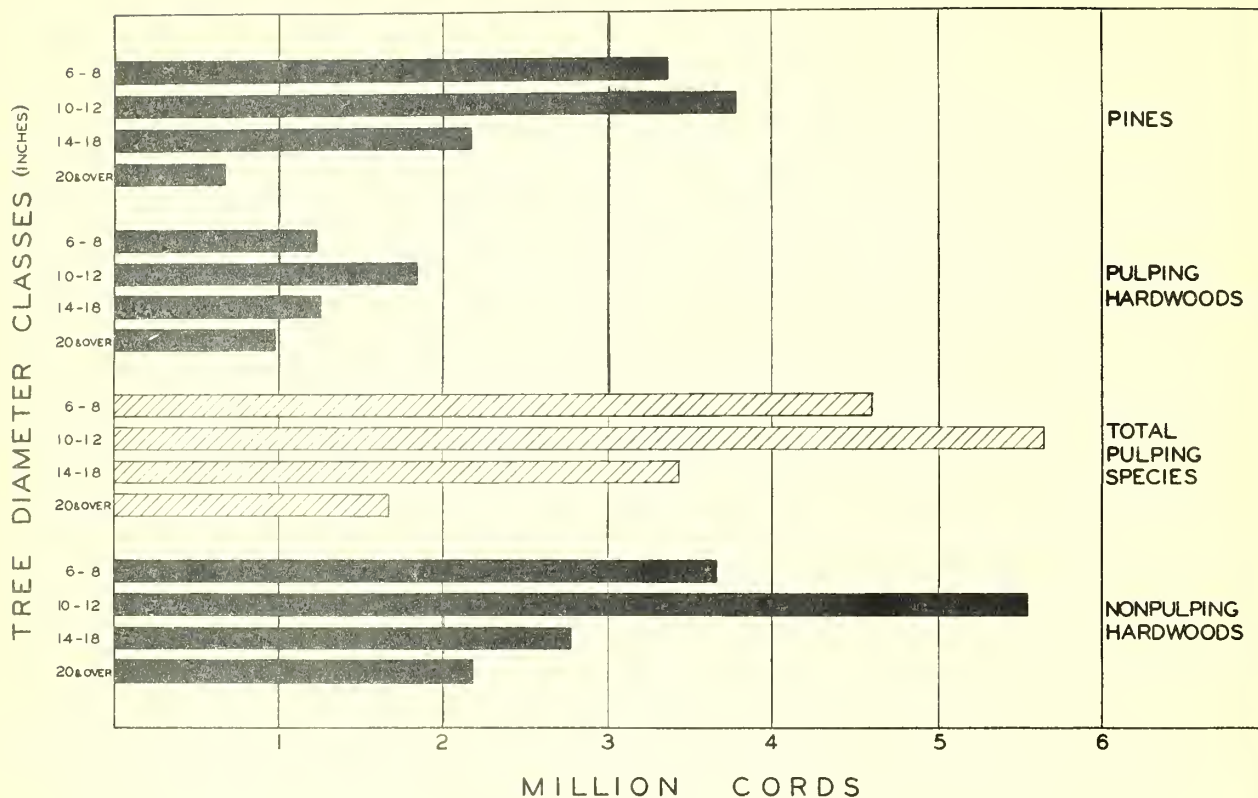


Figure 3. - Graph showing cordwood volume by species groups and tree diameter classes

Cordwood volume for the average acre is shown in Table 5 by species groups and tree diameter classes. The volume for the average acre is a theoretical figure derived by dividing the total number of cords of wood in each species group and tree diameter class by the total forest acreage. The average acre bears over $9\frac{1}{2}$ cords of wood in all species; more than half this amount is in the pulping species. The stand of pine on the average acre is 3.25 cords, considering trees of all sizes regardless of the fact that they may be of a size and quality most suited for lumber production. More than 71 percent of this volume of pine cordwood, or 2.32 cords per acre, is in trees less than 13 inches in diameter. In the pulping hardwoods more than 58 percent of the volume, or 1.0 cord per acre, is in trees less than 13 inches in diameter.

The volume of pulpwood that can be cut from trees less than 13 inches in diameter without reducing the forest growing stock cannot be determined until calculations showing the timber growth rate have been completed. When growth data have been completely summarized, and the probable future needs of the lumber and other forest products industries have been determined, the industrial demand for wood will be balanced against the forest growth. By this means of comparison it will be possible to estimate accurately how much wood can be consumed annually without decreasing the forest capital. These estimates will be presented in the comprehensive report to be published later.

Table 5. - Cordwood volume on the average acre of forest land, classified by species groups and tree diameters¹

Tree species groups	Tree diameter classes								Total all diameter classes	
	6" - 8" ²		10" - 12"		14" - 18"		20" & over			
	Cords	% of total	Cords	% of total	Cords	% of total	Cords	% of total	Cords	% of total
Pulping pine ³	1.09	11.4	1.23	12.9	.71	7.4	.22	2.3	3.25	34.0
Pulping hardwood ⁴	.40	4.2	.60	6.2	.40	4.2	.32	3.4	1.72	18.0
Total pulping species	1.49	15.6	1.83	19.1	1.11	11.6	.54	5.7	4.97	52.0
Nonpulping hardwood ⁵	1.19	12.5	1.79	18.8	.90	9.4	.70	7.3	4.58	48.0
Total all species	2.68	28.1	3.62	37.9	2.01	21.0	1.24	13.0	9.55	100.0

¹ The entire forest area of 3,089,100 acres was considered in finding the average acre.

² Trees ranging from 5.0" to 8.9" in diameter outside of bark at breast height are placed in the 6" - 8" class; corresponding limits apply to the other diameter classes.

³ Shortleaf and loblolly.

⁴ Gum, cottonwood, willow, cypress, tupelo, maple.

⁵ Oak, hickory, ash, hackberry, elm, pecan, etc.

Summary

Approximately 38 percent, or 3,089,100 acres, of the 8,153,500 acres in Mississippi Survey Unit #2, is forest land. Ninety-six percent of the forest area is in second-growth stands; 55 percent is in the pure pine and mixed pine-hardwood types. The timber volume in the Unit in live, sound trees is estimated at more than 29 million cords, of which more than 15 million cords are in pulping species. Well-distributed roads and railroads make all parts of the Unit accessible. No figures for average growth are as yet available.

SOUTHERN FOREST EXPERIMENT STATION

E. L. Demmon, Director

New Orleans, La.



PULPING AND NONPULPING CORDWOOD VOLUME

IN SURVEY UNIT #2

GEORGIA

By

SOUTHERN FOREST SURVEY STAFF

I. F. Eldredge

Regional Survey Director

* - This is an advance release of Forest Survey data that will be included in complete reports to be published later. This information is subject to correction or amplification as computations proceed.

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PULPING AND NONPULPING CORDWOOD VOLUME

IN SURVEY UNIT #2, GEORGIA

This report presents advance information on the wood supply in Georgia Survey Unit #2, an area of approximately 5,585,900 acres in the southwestern part of the State. Twenty-two counties, as indicated in figure 1, are wholly included in the Unit, the borders of which coincide with the Florida and Alabama state lines on the south and west. It is a rolling, well-drained country, of small urban and rural farm communities and extensive forest tracts. The average elevation above sea level ranges from less than 100 feet to approximately 400 feet, but no part, generally speaking, is markedly different from the rest. From a topographical standpoint, the Unit's most characteristic features are its successive series of gentle slopes and small streams. The principal rivers, all of which flow southward toward the Gulf, are the Chattahoochee, Ocmulgee, Little, and Flint.

The forest area can be divided into three major topographical classes: (1) The rolling uplands, which include approximately 59 percent of the total; (2) the swamps and bays, 22 percent; and (3) the flatwoods, 16 percent. The remaining 3 percent of the forest area is in bottomlands.

The entire Unit is exceptionally well equipped with transportation facilities. Among the numerous railroads which render all parts of it readily accessible are: The Atlantic Coast Line; Seaboard Airline; Southern; Georgia; Georgia Northern; Georgia and Florida; Southwestern and Gulf; and Atlanta, Birmingham, and Coast. In addition, more than half a dozen state or federal highways, interconnected at frequent intervals by graded or dirt county roads, form a more or less complete network throughout the Unit. Less than 5 percent of the total area is more than 5 miles from railroads, highways, or roads.

The estimates of land area and wood volume given in this report are based on data gathered from April to July 1934 by the Forest Survey, a part of the U.S. Forest Service and an activity of the Southern Forest Experiment Station. Three-man crews of specially trained timber estimators made the inventory by measuring the timber and recording the forest and land-use conditions on 6,911 one-quarter acre sample plots located at intervals of 600 feet on parallel compass lines 10 miles apart.

This release gives area and volume data which are preliminary and subject to correction and modification when final computations are completed; but such changes are not likely to be extensive or important.

In presenting this estimate of timber suitable for conversion into pulpwood, no consideration is given to the prior claims of other forest industries. The lumber industry of the future, for example, must depend largely upon the continual growth of young trees now below saw-timber size; hence too widespread a use for pulpwood of trees in the 6- to 14-inch diameter classes would jeopardize the future of the lumber industry. Therefore, before any planned expansion of the pulpwood industry in this Unit is undertaken, the needs of other industries must be taken into account. As soon as survey data covering the growth, drain, character, and economic aspects of the forest have been analyzed and interpreted, a basis will have been established for determining the volume of pulpwood, saw-timber, and naval-stores products that this Unit can perpetually produce. The Forest Survey plans to publish these findings later in a comprehensive, detailed report.

Land Area

Table 1 classifies the area by major land uses. More than 54 percent of the area is designated as forest land; nearly 44 percent as agricultural. The percentage of recently cleared or new cropland is noticeably less than that of idle and abandoned land.

TABLE 1. -- *Area classified by major land uses*

Land use classes	Area in acres	Percent of total area
Forest	3,020,400	54.1
Agricultural:		
In cultivation:		
Old cropland ¹	2,048,200	36.7
New cropland ²	8,800	0.2
Out of cultivation:		
Idle ³	207,700	3.7
Abandoned ⁴	95,900	1.7
Improved pasture: ⁵	63,100	1.1
Total agricultural	2,423,700	43.4
Other:		
Waterways	26,400	0.5
Towns and villages	50,300	0.9
Roads, railroads, etc.	65,100	1.1
Total other	141,800	2.5
Total area	5,585,900	100.0

¹ Land cultivated at least five years and on which a farm crop was raised within two years prior to the date of survey.

² Land recently converted from forest to cropland.

³ Cultivated land which has been idle for two years or more, but which has not reached the abandoned stage.

⁴ Land once cultivated but showing distinct evidence of having been abandoned for agricultural crop production; no attempt has been made to maintain it as improved pasture.

⁵ Cleared land under fence used primarily for grazing; a real attempt has been made to produce and maintain a sod.

Under the system of sampling used in the collection of survey data, items which are of infrequent occurrence and relatively small in quantity cannot be determined with as high a degree of accuracy as is obtainable for items which occur more frequently and in substantially greater quantities. Small tabular figures, therefore, are to be taken as showing, not the exact magnitudes of the items involved, but their relative magnitudes in comparison with those of other items.

Forest Area

The forest area of 3,020,400 acres is classified in table 2 by forest conditions and forest type groups. Forest conditions can be distinguished from one another by means of the following definitions:

- Old-growth: Stands composed predominantly of saw-log-sized trees that have the characteristics of the original mature trees found in the region. ("Saw-log-sized" signifies a minimum diameter of 13.0 inches outside of bark at breast height in the hardwood species, or 9.0 inches in the pine species).
- Uncut: Old-growth stands from which less than 10 percent of the volume has been cut.
- Partly-cut: Old-growth stands from which 10 percent or more of the volume has been cut, but in which the remaining volume per acre in saw-log-sized trees is at the rate of at least 1,000 board feet of hardwood or hardwood and pine mixed, or 600 board feet of pine.
- Second-growth: Stands that have succeeded the original old-growth as a result of forest cutting or other causes.
- Saw-log size uncut: Second-growth stands from which less than 10 percent of the saw-log-sized trees have been cut, and in which the volume per acre is at the rate of at least 600 board feet.
- Saw-log size partly-cut: Second-growth stands from which 10 percent or more of the saw-log-sized trees have been cut, but in which the remaining volume per acre is at the rate of at least 400 board feet.
- Under saw-log size uncut: Second-growth stands in which the volume per acre of saw-log-sized timber is at the rate of less than 600 board feet. Less than 10 percent of the trees under saw-log size have been cut.
- Under saw-log size partly-cut: Second-growth stands similar to the preceding, except that 10 percent or more of the trees under saw-log size have been cut.
- Clear-cut: Cut-over stands in which the volume per acre in saw-log-sized trees is at the rate of less than 1000 board feet of hardwood or hardwood and pine mixed, or less than 600 board feet of pine; and in which an insufficient quantity of young growth has come in to classify the stands either as reproduction or as second-growth under saw-log size.
- Reproduction: Areas of young-growth bearing seedlings less than 1 inch in diameter at the rate of at least 80 per acre.

Nearly 17 percent of the total forest area, or more than 500,000 acres, is in old-growth timber stands; more than 69% is in second growth. Clear-cut areas which have not yet reproduced make up 8.2 percent, and noncommodity 0.2 percent of the total.

TABLE 2. -- Forest area by forest conditions and forest type groups

Forest conditions	Forest type groups classified by predominant species			Total all types	Percent of total forest area
	Turpentine ¹ pine	Nonturpen- tine pine	Hardwood		
----- Acres -----					
Old-growth:					
Uncut	20,800	29,500	46,400	96,700	3.2
Partly-cut	245,300	51,800	109,500	406,600	13.5
Total	266,100	81,300	155,900	503,300	16.7
Second-growth:					
Saw-log size:					
Uncut	597,900	167,000	58,300	805,200	26.7
Partly-cut	87,800	32,800	12,800	133,400	4.4
Under saw-log size:					
Uncut	796,500	139,100	185,100	1,120,700	37.1
Partly-cut	20,000	5,600	7,200	32,800	1.1
Total	1,484,200	344,500	263,400	2,092,100	69.3
Clear-cut ²	234,000	4,800	10,400	249,200	8.2
Reproduction	131,900	18,300	19,200	169,400	5.6
All area except noncommodity ³	2,116,200	448,900	448,900	3,014,000	99.8 ⁴
Percent of total forest area	70.0	14.9	14.9	99.8 ⁴	

¹ Longleaf and slash pine.

² The area classified as clear-cut includes a relatively small amount of the fire-killed condition.

³ Forest areas that do not have the qualities essential for the growth of commercial timber species; since these areas do not bear commercial timber species, they are therefore not included in the three major type groups.

⁴ Exclusive of 0.2 percent of the forest area, or 6400 acres, in the noncommodity class.

Volume Estimates

The volume estimates are expressed in standard cords, 4x4x8 feet, measured with bark on, and include only the stemwood 4.0 inches or larger in diameter in all live, sound trees whose diameter at breast height is at least 5.0 inches outside of bark. The estimates therefore disregard altogether all trees less than 5.0 inches in

diameter at breast height, and exclude all stemwood less than 4.0 inches in diameter outside of bark, as well as all limbwood. An approximate deduction was made for woods cull--that part of the tree that would be left in the woods because of rot, fire-scar, crook, bad knots, or other defects. The volume of the entire butt sections (approximately 10 feet long) of working, resting, and worked-out turpentine trees was also omitted from the estimates; but later information may indicate that a substantial percentage of these butt sections can be used for pulpwood.

Georgia Survey Unit #2 is within the limits of the naval-stores belt, where the naval-stores industry maintains extensive operations. Accordingly, the pines are classified as turpentine and nonturpentine; turpentine pines are then further classified as round, working and idle, or worked out. These terms and species groups are defined as follows:

Turpentine pines (round):	Longleaf and slash pine trees that have never been worked for naval stores; that is, no cups have been hung nor faces made for the production of turpentine and rosin.
Turpentine pines (working and idle):	Longleaf and slash pine trees that either are being worked for naval stores at present, or are in a temporary period of rest.
Turpentine pines (worked-out):	Longleaf and slash pine trees on which as many faces have been worked as the trees will stand. These trees have served their purpose in the production of naval stores and are available for other uses.
Nonturpentine pines:	Loblolly, shortleaf, pond, sand, and spruce pines. These are not used in the production of naval stores.
Pulping hardwoods:	Hardwood species that can be used in the manufacture of paper. They include the gums, bays, maples, and magnolia, etc.
Nonpulping hardwoods:	Hardwood species that are not generally considered of value for the production of paper, such as oak, hickory, ash, cypress, etc.

Table 3 gives the total cordwood volume for the Unit, classified by the above species groups and by the three major forest type groups. Approximately 88 percent, or 16,640,000 cords, is in pulping species; only 12 percent, or 2,248,000 cords, is in nonpulping species. Nearly half the volume in pulping species, or 7,931,000 cords, is in round, working, and idle turpentine pines, trees which have not yet been worked out by the turpentine operators. The remaining 52 percent of the pulping volume, or 8,709,000 cords, is in the worked-out turpentine pines, the nonturpentine pines, and the pulping hardwoods. Loblolly is the outstanding species among the nonturpentine pines; black gum and red gum are the predominant species in the pulping hardwoods.

In the nonpulping hardwoods, which comprise approximately 12 percent of the total cordwood volume of the Unit, cypress, red oak, and white oak are the predominant species. These account for 38, 34, and 11 percent respectively, of the total of 2,248,000 cords.

TABLE 3. -- Cordwood volume in pulping and nonpulping species groups by forest type groups

Tree species groups	Forest type groups classified by predominant species			Total all types	Percent of total volume
	Turpentine pine	Nonturpentine pine	Hardwood		

----- Thousands of cords ¹ -----

Pulping species:					
Turpentine pines: ²					
Round	4,338	162	45	4,545	24.1
Working and idle	3,264	97	25	3,386	17.9
Worked-out	1,370	39	6	1,415	7.5
Nonturpentine pines ³	633	3,215	113	3,961	21.0
Total pines	9,605	3,513	189	13,307	70.5
Hardwoods ⁴	556	675	2,102	3,333	17.6
Total pulping	10,161	4,188	2,291	16,640	88.1
Nonpulping hardwoods ⁵	472	416	1,360	2,248	11.9
Total all species	10,633	4,604	3,651	18,888	100.0
Percent of total volume					
	56.3	24.4	19.3	100.0	

¹ To convert to full number of cords add "000".

² Longleaf and slash pine.

³ Loblolly, shortleaf, pond, sand, and spruce pine.

⁴ Gum, maple, bay, magnolia, etc.

⁵ Cypress, oak, hickory, ash, beech, elm, mulberry, dogwood, persimmon, etc.

No attempt is made here to estimate the proportion of standing timber which will presently be available for use as pulpwood. Among the factors governing such an estimate are the prior claims of established industries, the accessibility of the timber stands, and the provision for reproduction and growing stock for future cuts. It is reasonable to assume that because of the extensive turpentine operations in the Unit, a considerable number of the present round, and working and idle turpentine pines will not be available for pulp until they are fully worked out. Worked-out longleaf and slash pine species do not contribute heavily to the total cordage of the pulping species in this Unit; their aggregate, 1,415,000 cords, is only 7½ percent of the whole. However, owing to the fact that the naval-stores operators annually abandon working trees at a faster rate than they are absorbed by the lumber industry, the amount of pulpwood in the form of worked-out turpentine pines has increased each year.

Table 4 has therefore been prepared from the data given in table 3 in order to emphasize the volume of pulpwood in turpentine pines that have already been fully exploited by naval-stores operators, as well as the volume in species not used in naval-stores production.

TABLE 4. -- Cordwood volume in worked-out turpentine pine, nonturpentine pine, and pulping hardwood species, by forest type groups

Tree species groups	Forest type groups classified by predominant species			Total all types	Percent of total volume
	Turpentine pine	Nonturpentine pine	Hardwood		
----- Thousands of cords ¹ -----					
Worked-out turpentine pines ²	1,370	39	6	1,415	16.2
Nonturpentine pines ³	633	3,215	113	3,961	45.5
Total pines	2,003	3,254	119	5,376	61.7
Pulping hardwoods ⁴	556	675	2,102	3,333	38.3
Total cordwood	2,559	3,929	2,221	8,709	100.0
Percent of total volume	29.4	45.1	25.5	100.0	

¹ To convert to full number of cords add "000".

² Longleaf and slash pine.

³ Loblolly, shortleaf, pond, sand, and spruce pine.

⁴ Gum, maple, bay, magnolia, etc.

The cordwood volume in worked-out and nonturpentine pines, and in pulping hardwoods, is shown by tree-diameter classes in table 5. Trees in the 6-, 8-, 10-, and 12-inch diameter classes comprise nearly 45 percent of the total cordage in the worked-out and nonturpentine pine species and nearly 49 percent of the total cordage in the pulping hardwoods. These young trees are not being utilized at present, but the extent to which they can be converted into pulpwood must necessarily be governed by the demand of other forest products industries. Worked-out turpentine trees in these diameter classes, which comprise 8.8 percent of the total cordwood volume, are usually slow of growth; but the reverse, ordinarily, is true of the nonturpentine pine and pulping hardwood trees in the same classes. Thrifty of growth and comprising 37.3 percent of the total cordwood volume, they thus serve as a nucleus for future timber crops on which the various wood-using industries must depend. Properly managed, particularly to the extent of periodical thinnings, these young stands will furnish an increasing supply of pulpwood and other forest products.

TABLE 5. -- Cordwood volume in worked-out turpentine pine, nonturpentine pine, and pulping hardwood species, by tree diameter classes and forest type groups

Tree species groups	Tree diameter classes ¹	Forest type groups classified by predominant species			Total all types	Percent of total volume
		Turpen- tine pine	Nonturpen- tine pine	Hardwood		

	<i>Inches</i> ²	----- <i>Thousands of cords</i> ³ -----				
Worked-out turpentine pines ⁴	6" - 8"	108	2	1	111	1.3
	10" - 12"	634	17	2	653	7.5
	14" - 18"	541	17	1	559	6.4
	20" & over	87	3	2	92	1.0
Total worked-out turpentine pines		1,370	39	6	1,415	16.2
Nonturpentine pines ⁵	6" - 8"	109	450	19	578	6.6
	10" - 12"	206	818	30	1,054	12.1
	14" - 18"	247	1,105	29	1,381	15.9
	20" & over	71	842	35	948	10.9
Total nonturpentine pines		633	3,215	113	3,961	45.5
Pulping hardwoods ⁶	6" - 8"	227	150	346	723	8.3
	10" - 12"	137	218	546	901	10.3
	14" - 18"	156	207	793	1,156	13.3
	20" & over	36	100	417	553	6.4
Total pulping hardwoods		556	675	2,102	3,333	38.3
Total		2,559	3,929	2,221	8,709	100.0
Percent of total volume		29.4	45.1	25.5	100.0	

¹ Nonturpentine pines and hardwoods were measured at 4 - 1/2 feet from the ground. Worked-out turpentine pines were measured above the turpentine-butt section, 10 feet from the ground.

² Trees ranging from 5.0" - 8.9" in diameter outside of bark are placed in the 6" - 8" class; corresponding limits apply to the other diameter classes.

³ To convert to full number of cords add "000".

⁴ Longleaf and slash pine.

⁵ Loblolly, shortleaf, pond, sand, and spruce pine.

⁶ Gum, maple, bay, magnolia, etc.

Table 6 gives the estimate of cordwood by forest type groups and tree diameter classes for the round, working and idle turpentine pines, and the nonpulping hardwoods. Taken together, tables 5 and 6 cover all the species groups, and show for each group the distribution of volume by tree diameter classes. Significant data from these tables are presented graphically in figure 2.

TABLE 6. -- Cordwood volume in round, working and idle turpentine pine, in nonturpentine pine, and in nonpulping hardwood species, by tree diameter classes and forest type groups

Tree species groups	Tree diameter classes ¹	Forest type groups classified by predominant species			Total all types	Percent of total volume
		Turpen- tine pine	Nonturpen- tine pine	Hardwood		
<i>Inches</i> ² ----- <i>Thousands of cords</i> ³ -----						
Turpentine pines: ⁴						
Round	6" - 8"	2,168	50	16	2,234	21.9
	10" - 12"	1,382	54	16	1,452	14.3
	14" - 18"	620	44	13	677	6.6
	20" & over	168	14	-	182	1.8
Total		4,338	162	45	4,545	44.6
Working and idle	6" - 8"	521	12	3	53	65.3
	10" - 12"	1,845	54	12	1,911	18.8
	14" - 18"	820	28	7	855	8.4
	20" & over	78	3	3	84	.8
Total		3,264	97	25	3,386	33.3
Nonpulping	6" - 8"	184	87	311	582	5.7
hardwoods ⁵	10" - 12"	146	95	392	633	6.2
	14" - 18"	103	140	373	616	6.1
	20" & over	39	94	284	417	4.1
Total		472	416	1,360	2,248	22.1
Total cordwood		8,074	675	1,430	10,179	100.0
Percent of total volume		79.3	6.6	14.1	100.0	

¹ Round turpentine pines, nonturpentine pines, and hardwoods were measured at 4-1/2 feet from the ground. Working and idle turpentine pines were measured above the turpentine-butt section, 10 feet from the ground.

² Trees ranging from 5.0" - 8.9" in diameter outside of bark are placed in the 6" - 8" class; corresponding limits apply to the other diameter classes.

³ To convert to full number of cords add "000".

⁴ Longleaf and slash pine.

⁵ Cypress, oak, hickory, ash, beech, elm, mulberry, dogwood, persimmon, etc.

Table 7 classifies the cordwood volume for the average acre by species groups and tree diameter classes. This volume for the average acre is a theoretical figure derived by dividing the total volume for the Unit by the forest acreage, exclusive of the noncommodity class. The accompanying table shows that the average acre bears more than 6¼ cords of wood in all species. By far the greatest percentage of this

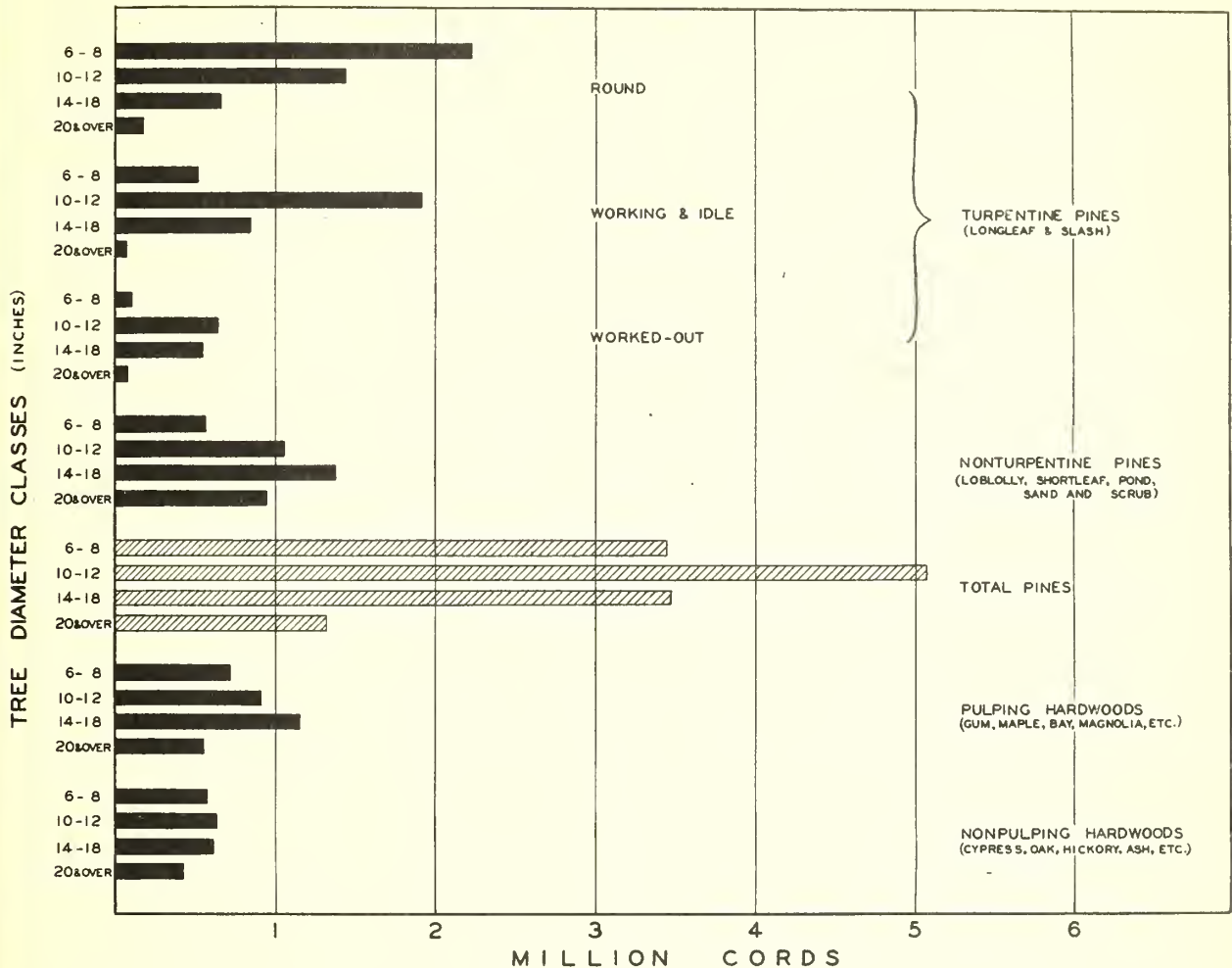


FIGURE 2. -- Classification of cordwood volume by species groups and tree diameter classes. Round turpentine pines, nonturpentine pines, and hardwoods were measured at 4-1/2 feet from the ground. Working and idle turpentine pines were measured above the turpentine-butt section, 10 feet from the ground. Trees ranging from 5.0" - 8.9" in diameter outside of bark are placed in the 6" - 8" class; corresponding limits apply to the other diameter classes.

quantity is in pulping species. Of the 5½ cords of pulping species on the average acre, more than 2½ cords, or approximately 42 percent of the total, are in round, and working and idle turpentine pines. For the immediate future this volume is presumably reserved for naval-stores utilization; following its exploitation by that industry, it will be available for other uses. Whether it will then be given over to the manufacture of pulp, lumber, or other forest products, will depend on the size and quality of the individual trees, and on the existing demand for each product. Considering all cordwood on the average acre, more than 60 percent of the volume is found in trees whose diameters range between 5.0 and 12.9 inches.

TABLE 7. -- Cordwood volume on the average acre of forest land by pulping and nonpulping species groups and tree diameter classes¹

Tree species groups	Tree diameters in inches ²								Total all diameter classes	
	6" - 8"		10" - 12"		14" - 18"		20" & over		Cords	% of total
	Cords	% of total	Cords	% of total	Cords	% of total	Cords	% of total		
Pulping:										
Turpentine pine: ³										
Round	.74	11.8	.49	7.7	.22	3.6	.06	1.0	1.51	24.1
Working and idle	.18	2.9	.63	10.1	.28	4.5	.03	.4	1.12	17.9
Worked-out	.03	.5	.22	3.5	.19	3.0	.03	.5	.47	7.5
Nonturpentine pine ⁴	.20	3.1	.35	5.6	.46	7.3	.31	5.0	1.32	21.0
Total pine	1.15	18.3	1.69	26.9	1.15	18.4	.43	6.9	4.42	70.5
Hardwood ⁵	.24	3.8	.30	4.8	.38	6.1	.18	2.9	1.10	17.6
Total pulping	1.39	22.1	1.99	31.7	1.53	24.5	.61	9.8	5.52	88.1
Nonpulping hardwood ⁶	.19	3.1	.21	3.3	.21	3.3	.14	2.2	.75	11.9
Total all species	1.58	25.2	2.20	35.0	1.74	27.8	.75	12.0	6.27	100.0

¹ The 3,014,000 acres of forest area bearing commercial timber species were used in finding the average acre.

² Round turpentine pines, nonturpentine pines, and hardwoods were measured at 4 - 1/2 feet from the ground. Working, idle, and worked-out turpentine pines were measured above the turpentine-butt section, 10 feet from the ground. Trees ranging from 5.0" - 8.9" in diameter outside of bark are placed in the 6" - 8" class; corresponding limits apply to the other diameter classes.

³ Longleaf and slash pine.

⁴ Loblolly, shortleaf, pond, sand, and spruce pine.

⁵ Gum, maple, bay, magnolia, etc.

⁶ Cypress, oak, hickory, ash, beech, elm, mulberry, dogwood, persimmon, etc.

Summary

Georgia Survey Unit #2 covers an area of nearly 5,586,000 acres, of which approximately 54 percent, or 3,020,400 acres, is forest land. Nearly 70 percent of the forest area is in second-growth stands. Eighty-eight percent of the total volume of cordwood, or nearly 17 million cords, is in pulping species; but almost half this amount (7,931,000 cords) is composed of round, and working and idle turpentine trees. The Unit is exceptionally well furnished with railroad lines and highways. No estimate can be given at present regarding the availability of the pulpwood supply because the growth rate and prior claims of other forest products industries have not as yet been established.

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SOUTHERN FOREST EXPERIMENT STATION

E. L. Demmon, Director

New Orleans, La.



THE SUPPLY AND STATUS OF NAVAL-STORES TIMBER

IN SURVEY UNIT NO. 2,

GEORGIA

By

SOUTHERN FOREST SURVEY STAFF

I. F. Eldredge

Regional Survey Director

* - This is an advance release of Forest Survey data that will be included in complete reports to be published later. This information is subject to correction or amplification as computations proceed.

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THE SUPPLY AND STATUS OF NAVAL-STORES TIMBER

IN SURVEY UNIT NO. 2, GEORGIA

This release is a brief presentation of the more significant naval-stores data gathered by the Forest Survey in Unit No. 2, Georgia. The Survey is an activity of the Southern Forest Experiment Station with headquarters at New Orleans, Louisiana. Its objects are to make an inventory of the South's present supply of timber and other forest products; and to formulate forest-management policies based on estimates of timber growth and drain, interpreted in the light of anticipated future economic and social conditions. This and other releases of advance survey information are preliminary to the publication of final, complete reports for each survey unit. In these final reports, all phases of the inventory data will be shown, correlated with existing economic conditions.

The land-use classification and 1934-35 turpentine-crop data, and all information concerning the number, size, and species of trees in this Unit, were computed from basic information gathered on 6,911 one-quarter acre sample plots uniformly distributed throughout the entire area at intervals of 660 feet on parallel east-west compass lines 10 miles apart. The resource inventory was made during the period from April to July 1934. Working independently of the line-plot survey, other field men gathered data, by means of a still-to-still canvass, on the number, size, and character of naval-stores operations. In this canvass, made during the period from July to September 1934, the field men questioned practically 100 percent of the turpentine still operators in the Unit.

Land-use Classes

Survey Unit No. 2, located in the southwestern part of Georgia, is shown in figure 1. It is a part of the Eastern Coastal Plain; its average elevation above sea level ranges from 100 to 400 feet. The Unit is rolling, and is well drained by such river systems as the Flint, Chattahoochee, and Ocmulgee, all of which, with their numerous tributaries, flow in a southerly direction. Its light, sandy soils are well adapted to the cultivation of a variety of crops. Comprising a land area of approximately 5,585,900 acres, the Unit is predominantly rural. The widespread network of railroads, highways, and roads that interconnect its numerous small towns affords excellent transportation facilities.

More than half the total land area, or 3,020,400 acres, is forest land. Approximately 97 percent of this area falls into three major topographic classes, namely: (1) rolling uplands, 59 percent; (2) swamps and bays, 22 percent; (3) flat-woods, 16 percent; the remaining 3 percent is in river bottomlands.

Table 1 classifies the area by land uses. Cultivated land, exclusive of temporarily idle and abandoned agricultural land, occupies approximately 37 percent of the total land area; thus accounting in part for the importance of farm crop production in the Unit. Forest products, among which naval-stores rank high, are also important. The Unit lies wholly within the naval-stores belt, where extensive turpentine operations are being carried on.

TABLE 1. -- *Area classified by major land uses*

Land-use classes	Area in acres	Percent of total area
Forest	3,020,400	54.1
Agricultural:		
In cultivation:		
Old cropland ¹	2,048,200	36.7
New cropland ²	8,800	0.2
Out of cultivation:		
Idle ³	207,700	3.7
Abandoned ⁴	95,900	1.7
Improved pasture ⁵	63,100	1.1
Total agricultural	2,423,700	43.4
Other:		
Waterways	26,400	0.5
Towns and villages	50,300	0.9
Roads, railroads, etc.	65,100	1.1
Total other	141,800	2.5
Total area	5,585,900	100.0

¹ Land cultivated at least five years and on which a farm crop was raised within two years prior to the date of survey.

² Land recently converted from forest cropland.

³ Cultivated land that has been idle for two years or more, but has not reached the abandoned stage.

⁴ Land once cultivated but showing distinct evidence of having been abandoned for agricultural crop production; no attempt has been made to maintain it as improved pasture.

⁵ Cleared land under fence used primarily for grazing; a real attempt has been made to produce and maintain a sod.

Forest Types and Turpentine History

The 3,014,000 acres¹ that bear commercial species are shown in table 2, classified by the major forest types and by turpentine crop history. The turpentine crop histories are defined as follows:

Round crop areas: Areas bearing sufficient longleaf and slash pine trees to justify future working, upon which no cups have as yet been hung.

¹ In the following tables, the 3,014,000 acres of forest area used as a basis in calculations does not include approximately 6,400 acres of noncommodity forest land noted in the field work. Noncommodity forest land is defined as forest areas that have not the qualities essential for the growth of commercial timber species; since these areas do not bear commercial timber species, they are not included in the three major type groups.

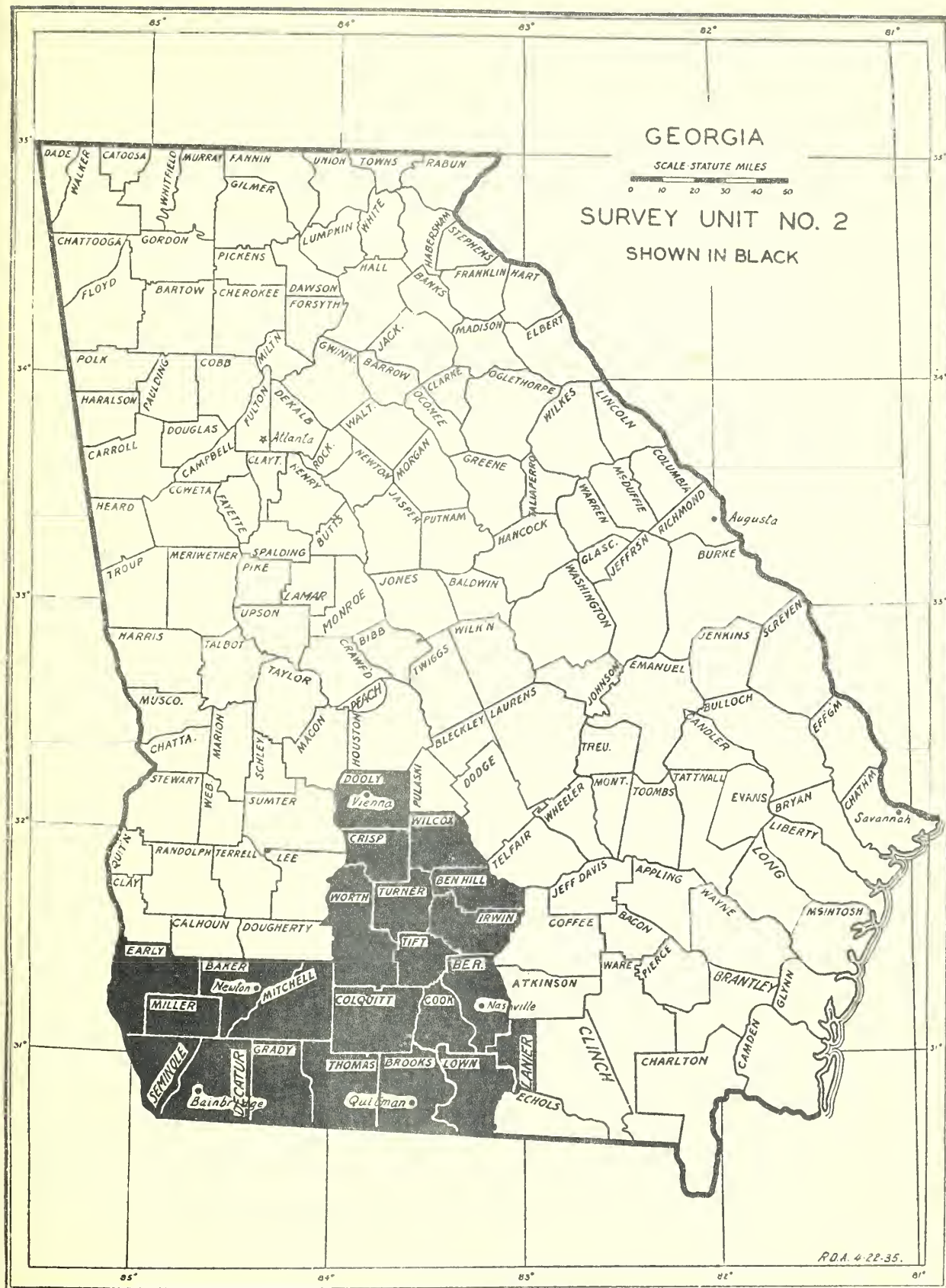


FIGURE 1. -- Geographic location of Survey Unit No. 2, Georgia.

Working crop areas: Areas bearing trees that are now being worked for naval stores.

Idle crop areas: Areas bearing trees once worked for naval stores, on which operations were discontinued before the turpentine faces reached a height of five feet. These faces may possibly be worked again.

Worked-out crop areas: Areas bearing trees once worked for naval stores, on which operations were discontinued when the turpentine faces had reached a height of five feet or more. Worked-out crop areas include both crops in which the trees are resting prior to further working on back faces, and crops in which the trees are completely exhausted for naval-stores operations.

Nonturpentine areas: Areas occupied for the most part by nonturpentine species, in which there are too few turpentine trees to justify working.

The turpentine acreage makes up more than 78 percent of the forest area. Working crops occupy at present 854,000 acres, or 28.3 percent of the total forest area. Since nearly 22 percent of the forest area is in round crops, a considerable supply of trees suitable for future naval-stores working is indicated.

TABLE 2. -- Forest area that bears commercial timber species, classified by turpentine crop history and by forest type groups, season 1934-35

Turpentine crop history	Forest type groups classified by predominant species			Total	Percent of total
	Longleaf and slash pine	Loblolly and other nontur- pentine pine	Hardwood		
----- Acres -----					
Round	565,600	55,900	32,000	653,500	21.7
Working	777,300	49,500	27,200	854,000	28.3
Idle	51,100	1,600	-	52,700	1.7
Worked-out and resting	708,600	47,100	41,500	797,200	26.5
Nonturpentine area	13,600	294,800	348,200	656,600	21.8
Total	2,116,200	448,900	448,900	3,014,000	100.0
Percent of total	70.2	14.9	14.9	100.0	

Classification of Working Turpentine Area

The total working turpentine area in this Unit, 854,000 acres, is being worked by seven classes of naval-stores operators. They are defined as follows:

- Operator:** A person who maintains a turpentine still and processes crude gum from his own or leased timber exclusively.
- Operator and farmer:** An operator who spends at least half his time farming.
- Operator and gum-buyer:** A person who, in addition to stilling gum from his own or leased timber, buys crude gum from other producers, processes it, and sells the finished products, turpentine and rosin, in his own name.
- Operator and custom-stiller:** A person who, in addition to stilling gum from his own or leased timber, processes gum for other producers, who market the turpentine and rosin in their own names.
- Operator, gum-buyer, and custom-stiller:** An operator who is also a gum-buyer and a custom-stiller.
- Gum-producer-seller:** A person who maintains no still, but works his own or leased timber for crude gum, which he sells to stillers.
- Gum-producer-shipper:** A person who maintains no still, but works his own or leased timber for crude gum which, when custom-stilled, he markets in his own name.

Table 3 shows the owned and leased area that each class of gum-producer works. Nearly seven-eighths of the working naval-stores area in the Unit is leased. Practically 95 percent of the working naval-stores acreage is in the hands of the several classes of still operators; which means that only 5 percent of the working area is being worked by small gum-producers.

TABLE 3. -- *Turpentine working acreage classified as owned and leased, and by types of operations producing crude gum, season 1934-35*

Types of operations	Gross working acreage			Percent of total
	Owned	Leased	Total	
----- Acres -----				
Operator	51,500	499,500	551,000	64.5
Operator and farmer	9,900	16,300	26,200	3.1
Operator and gum-buyer	23,700	180,800	204,500	23.9
Operator and custom-stiller	2,200	25,100	27,300	3.2
Operator, gum-buyer, and custom-stiller	-	1,400	1,400	.2
Gum-producer-seller	23,100 ¹	15,300 ¹	38,400 ¹	4.5
Gum-producer -shipper	3,200 ¹	2,000 ¹	5,200 ¹	.6
Total	113,600	740,400	854,000	100.0
Percent of total	13.3	86.7	100.0	

¹ Estimated from information furnished by still operators.

Table 2 shows the forest area classified by the turpentine crop histories as indicated by the proportion of sample plots found in each class of crop; table 4, on the other hand, classifies the turpentine condition of longleaf and slash pine trees regardless of the history of the crops in which they are found. The trees are shown in two-inch diameter classes--all forest types combined. Definitions are as follows:

- Round trees: Longleaf and slash pine trees that have never been worked for naval stores.
- Working trees: Longleaf and slash pine trees that are being worked for naval stores.
- Idle trees: Trees that have been worked for naval stores in the past, but are not now, for one reason or another, being worked, although their naval-stores productivity has not been exhausted; such trees have one or more future faces.
- Worked-out trees: Trees that have been worked until their usefulness as naval-stores producers has been exhausted.

Nearly 67 percent, or a total of 80,463,000, of the slash and longleaf pine trees in the Unit are round and between 3.0 and 8.9 inches in diameter. These trees form the nucleus from which future naval-stores production must develop; hence extensive cuttings of these immature trees, such as for pulpwood, will reduce the growing stock upon which the naval-stores industry must depend.

TABLE 4. -- Number of longleaf and slash pine trees, classified by diameter classes and their individual turpentine history, season 1934-35

Tree diameter 4½ feet from the ground ¹	Tree turpentine history				Total	Percent of total
	Round	Working	Idle	Worked-out		
<i>Inches</i>	<i>Thousands of trees²</i>					
3.0 - 4.9	36,587	- ³	- ³	- ³	36,587	30.4
5.0 - 6.9	27,196	- ³	332	243	27,771	23.1
7.0 - 8.9	16,680	2,141	2,192	956	21,969	18.2
9.0 - 10.9	5,911	5,592	2,812	1,799	16,114	13.4
11.0 - 12.9	2,345	3,371	2,013	1,748	9,477	7.9
13.0 - 14.9	943	1,678	1,007	1,368	4,996	4.1
15.0 - 16.9	403	591	431	693	2,118	1.8
17.0 - 18.9	188	188	176	249	801	.7
19.0 and larger	150	134	80	153	517	.4
Total	90,403	13,695	9,043	7,209	120,350	100.0
Percent of total	75.1	11.4	7.5	6.0	100.0	

¹ For working, idle, and worked-out turpentine trees this diameter is calculated from the diameter measured 10 feet from the ground in order to correct for the influence of turpentine faces at breast height.

² To convert to full number of cups add "000".

³ The number of trees in this class is negligible.

TABLE 5. -- Working turpentine cups classified by year of working and diameter of working trees, season 1934-35

Tree diameter 4½ feet from the ground 1/	Year of working						Total
	1st year	2nd year	3rd year	4th year	5th year	6th year and up	
Inches	Thousands 2/ of cups	Thousands 2/ of cups	Thousands 2/ of cups	Thousands 2/ of cups	Thousands 2/ of cups	Thousands 2/ of cups	Thousands 2/ of cups
Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Under 7.0 3/	---	---	---	---	---	---	---
7.0 - 8.9	447	287	112	326	578	323	2,143
	10.9	8.4	11.4	21.3	23.9	18.0	14.7
9.0 - 10.9	1,713	1,630	470	550	684	559	5,606
	41.7	47.7	47.8	29.6	28.2	31.2	38.5
11.0 - 12.9	1,055	719	224	511	642	499	3,650
	25.7	21.0	22.8	27.5	26.5	27.8	25.0
13.0 - 14.9	594	415	99	220	358	255	1,951
	14.5	12.1	10.0	11.9	14.8	14.8	13.4
15.0 - 16.9	169	182	48	102	125	102	728
	4.1	5.3	4.9	5.5	5.2	5.7	5.0
17.0 - 18.9	61	93	25	48	22	35	284
	1.5	2.7	2.5	2.6	.9	1.9	1.9
19.0 and larger	64	96	6	29	13	10	218
	1.6	2.8	.6	1.6	.5	.6	1.5
Total	4,103	3,422	984	1,856	2,422	1,793	14,580
	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Percent	28.1	23.5	6.8	12.7	16.6	12.3	100.0

¹ Corrected to remove the influence of turpentine on tree diameter; calculated from the diameter measured 10 feet from the ground.

² To convert to full number of cups add "000".

³ The number of cups on trees under 7.0 inches in diameter is negligible.

As shown in table 4, the total number of trees now being worked in the Unit is 13,695,000. The number of cups hanging on them is 14,580,000, an average of 1.06 cups per tree. Table 5 classifies these working cups by the diameter of the trees on which they hang and by the stage of working of the faces. During the past three years there has been a pronounced tendency in this Unit to cup the larger trees, ranging between 9.0 and 12.9 inches, rather than those less than 9.0 inches in diameter. In addition, the noticeably smaller number of third year cups in proportion to that of any other year (only 6.8 percent of the total) indicates that during the naval-stores year 1932-33 an abnormally small number of virgin cups were hung. During the past two years, however, there has been a noticeably large increase in the number of virgin cups hung.

Naval-stores operators commonly lease a large part of the timber they work for turpentine; but the extent to which they follow this practice differs in different regions of the naval-stores belt. Table 6 shows that in this Unit during the season 1934-35, more than 86 percent of the cups were on leased timber. Of the total number of working cups, 694,000, or 4.8 percent of the total, were handled by the gum-producer-seller and gum-producer-shipper classes. This fact indicates that many a small farmer (more than 300) in the Unit turned his hand toward gum producing as a means of increasing his cash income.

TABLE 6. -- *Number of turpentine operations and working turpentine cups on land classified as owned and leased, by types of operations, season 1934-35.*

Types of operations	Number of operations ¹	Working cups			
		On owned land	On leased land	Total	Percent of total
----- Thousands of cups ² -----					
Operator	86	986	8,469	9,455	64.8
Operator and farmer	7	144	277	421	2.9
Operator and gum-buyer	25	408	3,090	3,498	24.0
Operator and custom-stiller	6	36	455	491	3.4
Operator, gum-buyer, and custom-stiller	2	-	21	21	.1
Gum-producer-seller	325 ³	368 ³	243 ³	611 ³	4.2
Gum-producer-shipper	10 ³	50 ³	33 ³	83 ³	.6
Total	461	1,992	12,588	14,580	100.0
Percent of total		13.7	86.3	100.0	

¹ With the exception of the last two types of operations, these figures represent the number actually visited during July to September 1934 in the still-to-still canvass. Tabular figures for the gum-producer-sellers and gum-producer-shippers indicate the approximate number of operations working during the naval-stores year 1933-34. Corresponding figures for 1934-35 were approximately the same.

² To convert to full number of cups add "000".

³ Estimated from information furnished by still operators.

Table 7 classifies the 4,103,000 first-year cups, shown in table 5, accord-

ing to whether they were hung on front-cupped or back-cupped trees. A large number (nearly 62 percent) of these virgin cups were hung on back-cupped trees; that is, trees on which one or more turpentine faces had been made and worked out in a previous operation. Only 11 percent of the virgin cups were hung on trees less than 9.0 inches in diameter.

TABLE 7. -- *First-year turpentine cups on front-cupped and back-cupped trees, season 1934-35*

Tree diameter 4½ feet from the ground ¹	On front-cupped trees		On back-cupped trees		Total	
<i>Inches</i>	<i>Thousands of cups²</i>	<i>Percent</i>	<i>Thousands of cups²</i>	<i>Percent</i>	<i>Thousands of cups²</i>	<i>Percent</i>
Under 7.0 ³	-	-	-	-	-	-
7.0 - 8.9	244	15.5	203	8.0	447	10.9
9.0 - 10.9	715	45.5	998	39.4	1,713	
11.0 - 12.9	352	22.4	703	27.8	1,055	25.7
13.0 - 14.9	175	11.1	419	16.5	594	14.5
15.0 - 16.9	53	3.4	116	4.6	169	4.1
17.0 - 18.9	9	.6	52	2.1	61	1.5
19.0 and larger	23	1.5	41	1.6	64	1.6
Total	1,571	100.0	2,532	100.0	4,103	100.0
Percent of total	38.3		61.7		100.0	

¹ Corrected to remove the influence of turpentine on tree diameter; calculated from diameters measured at 10 feet from the ground.

² To convert to full number of cups add "000".

³ The number of cups on trees under 7.0 inches in diameter is negligible.

Gum Naval-stores Production 1933-34

The line-plot survey obtained no data on the number of naval-stores operations or their production. The number of naval-stores operators at work during the season 1934-35 was taken in an independent supplementary canvass of stills. The estimate of croppage for that season, shown in table 5, was based primarily on the line-plot survey data, adjusted somewhat as a result of the data obtained in the supplementary canvass. Naval-stores production for the season 1934-35 could not be obtained at the midseason date of the supplementary canvass, but the production for the season 1933-34 was taken. It is summarized in table 8.

It was often possible to confirm the production data by sales records and factors accounts, but it was not possible to check the 1933-34 croppage figures that the operators furnished. Accordingly, the data on average production per crop in naval-stores units for 1933-34 cannot be verified by the Survey. They are presented here for what they may be worth. These yields will appear unusually high to many persons, but they may possibly be explained by the presence of exceptionally thrifty timber stands in this Unit, by the availability of cheap labor, and by favorable weather conditions, which made possible the chipping of an abnormally large number of streaks during the 1933-34 season.

TABLE 8. -- *Naval-stores croppage and production, classified by types of operations, season 1933-34*

Types of operations	Number of operations ¹	Thousands of working cups ²	Production in naval-stores units ³	Average production per crop in naval-stores units ³
Operator	86	8,645	41,790	48.3
Operator and farmer	7	403	1,900	47.1
Operator and gum-buyer	25	3,168	15,470	48.8
Operator and custom-stiller)	8	485	2,380	49.1
Operator, gum-buyer, and) custom-stiller)				
Gum-producer-seleir	325 ⁴	558 ⁴	2,070 ⁴	37.0
Gum-producer-shipper	10 ⁴	75 ⁴	270 ⁴	36.0
Total	461	13,334	63,880	47.9

¹ Tabular figures for the last two types of operations apply to the naval-stores years 1933-34. The number of operations in the other types applies strictly to the naval-stores year 1934-35, but is approximately correct for 1933-34.

² To convert to full number of cups add "000".

³ A naval-stores unit is made up of one 50-gallon barrel of turpentine and three and one-third 500-pound (gross) barrels of rosin.

⁴ Estimated from information furnished by still operators.

Summary

Georgia Survey Unit No. 2 covers an area of nearly 5,586,000 acres, of which 3,020,400 acres, or approximately 54 percent, is forest land. More than two million acres, or approximately 78 percent of the forest area, bears a sufficient quantity of turpentine timber to classify it as naval-stores land. The total number of turpentine trees is more than 120 million; 80 million, or approximately two-thirds of these are round and between 3.0 and 8.9 inches in diameter. The total number of working trees during 1934-35 was 13,695,000; total working cups, 14,580,000; total virgin cups, 4,103,000, an increase of more than a half million over the previous year, and more than three million over 1932-33. One hundred and twenty-six stills are located in the Unit, the bulk of whose crude gum (86.3 percent of the working cups in 1934-35) comes from leased land. The average production per crop in 1933-34 was approximately 48 barrels.

FOREST SURVEY RELEASE* No. 14

June 15, 1935.

SOUTHERN FOREST EXPERIMENT STATION

E. L. Demmon, Director

New Orleans, La.



THE QUANTITY AND STATUS OF NAVAL-STORES TIMBER
IN SURVEY UNIT NO. 1,
SOUTH CAROLINA

By

SOUTHERN FOREST SURVEY STAFF

I. F. Eldredge

Regional Survey Director

* - This is an advance release of Forest Survey data that will be included in complete reports to be published later. This information is subject to correction or amplification as computations proceed.

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THE QUANTITY AND STATUS OF NAVAL-STORES TIMBER

IN SURVEY UNIT NO.1, SOUTH CAROLINA

This release is a brief presentation of the more significant naval-stores data gathered by the Forest Survey in Unit No. 1, South Carolina. The Forest Survey in the South is an activity of the Southern Forest Experiment Station, with headquarters at New Orleans, La. Its primary objects are: (1) to make an inventory of the South's present forest growing stock; (2) to formulate forest-management policies based on timber growth and the estimated future needs for forest products; and (3) to determine the present and potential contribution of the forests and forest industries to the economic welfare of the people of the South. This and other releases of advance survey information are preliminary to the publication of final, complete reports for each survey unit. In the final reports, all phases of the survey data will be shown, and will be correlated with existing and anticipated economic conditions.

The land-use classification, and all data concerning the number, size, and species of trees in this Unit, were computed from information gathered on 6400 one-quarter acre sample plots distributed throughout the area at intervals of 660 feet on parallel compass lines 10 miles apart. Six field crews of three men each, made this line-plot inventory during the period from May to August 1934. Working independently of these line-plot survey crews, other field men, by means of a still-to-still canvass, gathered data on the number, size, and character of naval-stores operations. In this canvass, made during the period from April to June 1934, the field men questioned practically 100 percent of the turpentine-still operators in the Unit.

Land-use Classes

Survey Unit No. 1, which includes twelve counties in the southern part of South Carolina, is shown in figure 1. It lies almost wholly within the Atlantic Coastal Plain, so that its highest altitudes rarely exceed 400 to 500 feet above sea level. For the most part the country is flat or gently rolling, except in the northern extremities of Lexington County where the influence of the Piedmont Plateau is felt. Owing to the area's flat relief and the sluggish nature of its numerous streams, parts of it are poorly drained; and much of this land, in its present condition of inadequate drainage, serves a better economic use in timber production than in agriculture. Its principal rivers are the Savannah, which serves as its southern boundary; the Big Salkehatchie, the Edisto, and the Santee. These flow generally in a southeasterly direction.

From the viewpoint of transportation the Unit is well served. The following railways traverse the area, making all parts of it readily accessible from both Savannah and Charleston: the Seaboard Air Line; Atlantic Coast Line; Southern; Charleston and Western Carolina; and Hampton and Branchville. A number of streams suitable for barge traffic penetrate the lower part of the Unit, while hard-surfaced roads are well distributed throughout the entire area. Probably not over 5 percent of the Unit lies more than 10 miles airline from rail, water, or highway transportation facilities.

The total land area of the Unit, classified in table 1, is approximately 5,186,900 acres, 58 percent of which is forest land. Thirty-six percent is agricultural, and the remainder falls into other nonforest classes. About 32 percent of the forest area occurs in the flatwoods, the low-lying portion of the Coastal Plain adjacent to the Atlantic Ocean; 31 percent is in the rolling uplands, which lie 40 or 50

miles back from the coast; 29 percent is in timbered swamps, bays, and poorly-drained branch heads; and 8 percent occurs in the bottomlands lying along the larger rivers and streams.

TABLE 1. -- *Area¹ classified by major land uses*

Land-use classes	Area in acres	Percent of total area
Forest	2,993,000	57.7
Agricultural:		
In cultivation:		
Old cropland ²	1,441,000	27.8
New cropland ³	6,400	.1
Out of cultivation:		
Idle ⁴	197,700	3.8
Abandoned ⁵	181,600	3.5
Improved pasture ⁶	31,400	.6
Total agricultural	1,858,100	35.8
Other:		
Marsh)		
Waterways)		
Towns and villages)	335,800	6.5
Roads, railroads, etc.)		
Total area	5,186,900	100.0

¹ Exclusive of coastal islands and meanderable water areas.

² Land cultivated at least 5 years and on which a farm crop was raised within 2 years prior to the date of survey.

³ Land converted from forest to cropland within 5 years prior to date of survey.

⁴ Cultivated land that has been idle for 2 years or more, but has not reached the abandoned stage.

⁵ Land once cultivated but showing distinct evidence of having been abandoned for agricultural crop production; no attempt has been made to maintain it as improved pasture.

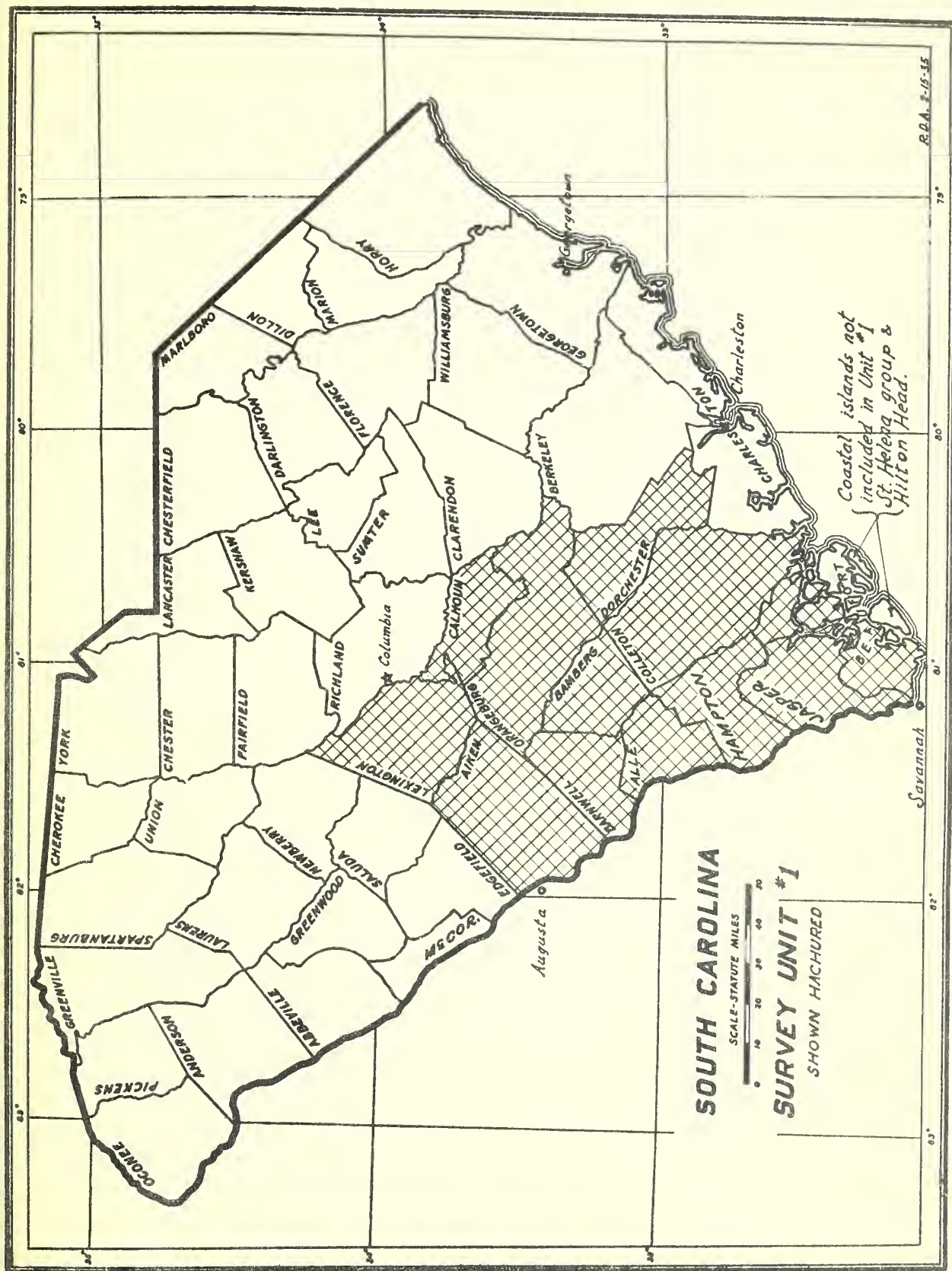
⁶ Cleared land under fence used primarily for grazing; a real attempt has been made to produce and maintain a sod.

Forest Types and Turpentine History

The 2,993,000 acres of forest land in this Unit are classified in table 2 by the major forest types and by turpentine crop history. Turpentine crop histories are defined as follows:

Round crop areas: Areas on which uncupped longleaf and slash pine trees predominate and are found in sufficient quantities to justify future working.

Working crop areas: Areas bearing trees that are now being worked for naval stores.



Idle crop areas: Areas bearing naval-stores trees on which operations were discontinued before their turpentine faces reached a height of five feet. These faces may possibly be worked again.

Worked-out crop areas: Areas bearing previously worked naval-stores trees on which operations were discontinued when the turpentine faces had reached a height of five feet or more. These areas include both crops in which the trees are resting prior to further working on back faces, and crops in which the trees are completely exhausted for naval-stores operations.

Nonturpentine areas: Areas occupied for the most part by nonturpentine species, and on which there are too few turpentine trees to justify working.

Subsequent tables indicate that at present turpentine operations are not as numerous nor as extensive in this Unit, once the heart of the naval-stores belt, as in those units that lie farther south. The nonturpentine acreage, 52 percent of the total forest area in the Unit, is noticeably large. This is a condition characteristic of the northern margin of the naval-stores belt, where loblolly pine has come in heavily and, in a measure, replaced longleaf pine reproduction on cut-over lands. Forty-one percent of the forest area is stocked with nonturpentine pine, principally loblolly. The working crop area occupies at present only 8 percent of the total forest area, but a considerable supply of round timber is suitable for future naval-stores working.

TABLE 2. -- Forest area¹, classified by turpentine crop history and by forest type groups, season 1934-35

Turpentine crop history	Forest type groups designated by predominant species			Total	Percent of total
	Longleaf and slash pine	Loblolly and other nontur- pentine pine	Hardwood		
----- Acres -----					
Round	558,600	307,800	61,900	928,300	31.0
Working	182,500	40,200	11,200	233,900	7.8
Idle	61,100	12,800	2,400	76,300	2.6
Worked-out	149,500	41,800	3,200	194,500	6.5
Nonturpentine area	7,200	821,400	731,400	1,560,000	52.1
Total	958,900	1,224,000	810,100	2,993,000	100.0
Percent of total	32.0	40.9	27.1	100.0	

¹ Exclusive of coastal islands.

Working Turpentine Area

The Unit's working turpentine area, 233,900 acres, listed in table 2 is being worked by seven classes of naval-stores producers. They are defined as follows:

- Operator:** A person who maintains a turpentine still in which he processes the crude gum from his own or leased timber exclusively.
- Operator and farmer:** An operator who spends at least half his time farming.
- Operator and gum-buyer:** A person who, in addition to stilling gum from his own or leased timber, buys crude gum from other producers, processes it, and sells the finished products, turpentine and rosin, in his own name.
- Operator and custom-stiller:** A person who, in addition to stilling gum from his own or leased timber, processes gum for other producers who market the turpentine and rosin in their own names.
- Operator, gum-buyer, and custom-stiller:** An operator who is also a gum-buyer and a custom-stiller.
- Gum-producer-seller:** A person who maintains no still, but works his own or leased timber for crude gum, which he sells to stillers.
- Gum-producer-shipper:** A person who maintains no still, but works his own or leased timber for crude gum which, when custom-stilled, he markets in his own name.

Table 3 shows the owned and leased area that each class of naval-stores producer worked during the 1934-35 season. Nearly 70 percent of the working naval-stores area in the Unit was leased. Small producers, who maintained no stills, cupped 32 percent of the working acreage.

TABLE 3. -- Owned and leased turpentine working acreage,¹ classified by types of naval-stores producers, season 1934-35

Types of naval-stores producers	Gross working acreage			Percent of total
	Owned	Leased	Total	
	----- Acres -----			
Operator	23,900	97,100	121,000	51.7
Operator and farmer	2,300	16,600	18,900	8.1
Operator and gum-buyer	1,200	13,300	14,500	6.2
Operator and custom-stiller	-	-	-	-
Operator, gum-buyer and custom-stiller	500	4,500	5,000	2.1
Gum-producer-seller	40,200 ²	26,900 ²	67,100 ²	28.7
Gum-producer-shipper	3,700 ²	3,700 ²	7,400 ²	3.2
Total	71,800	162,100	233,900	100.0
Percent of total	30.7	69.3	100.0	

¹ Exclusive of coastal islands.

² Estimated from information furnished by still operators.

Turpentine Condition of Trees

Table 4 classifies the turpentine condition of individual longleaf and slash pine trees regardless of the crop history of the stands in which they are found. Turpentine conditions of trees, shown here in 2-inch diameter classes, are defined as:

Round trees: Longleaf and slash pine trees that have never been worked for naval stores.

Working trees: Trees that are now being worked for naval stores.

Idle trees: Trees that have been worked for naval stores in the past, but are not now being worked, although their naval-stores productivity has not been exhausted. Such trees may have one or more future faces.

Worked-out trees: Trees that have been worked until their usefulness as naval-stores producers has been exhausted.

Approximately 45 million, or 71 percent, of the longleaf and slash pine trees in the Unit are round and between 3.0 and 8.9 inches in diameter. These trees form the nucleus from which future naval-stores production must develop; hence excessive cutting or turpentineing of such immature trees, will reduce the growing stock upon which the naval-stores industry must depend.

TABLE 4. -- Longleaf and slash pine trees¹, classified by the diameter and turpentine condition of individual trees, season 1934-35

Tree diameter 4½ feet from the ground ²	Turpentine condition of trees				Total	Percent of total
	Round	Working	Idle	Worked-out		
<i>Inches</i>	<i>Thousands of trees</i> ³					
3.0 - 4.9	20,318	- ⁴	- ⁴	- ⁴	20,318	32.4
5.0 - 6.9	14,692	- ⁴	296	- ⁴	14,988	23.9
7.0 - 8.9	9,744	1,415	862	241	12,262	19.5
9.0 - 10.9	4,346	1,350	932	257	6,885	11.0
11.0 - 12.9	2,376	868	839	267	4,350	6.9
13.0 - 14.9	997	431	511	222	2,161	3.4
15.0 - 16.9	424	154	241	68	887	1.4
17.0 - 18.9	212	67	148	32	459	.7
19.0 and larger	276	58	141	29	504	.8
Total	53,385	4,343	3,970	1,116	62,814	100.0
Percent of total	85.0	6.9	6.3	1.8	100.0	

¹ Exclusive of trees on coastal islands.

² For working, idle, and worked-out trees this diameter is calculated from the diameter measured 10 feet from the ground so as to correct for the influence of turpentineing.

³ To convert to full number of trees add "000".

⁴ The number of trees in these classes is negligible.

Tree diameter 4½ feet from the ground ^{2/}	Years of working			Total
	1st and 2nd years	3rd and 4th years	5th year and up	
Inches	Thousands ^{3/} of cups	Thousands ^{3/} of cups	Thousands ^{3/} of cups	Thousands ^{3/} of cups
Under 7.0 ^{4/}	---	---	---	---
7.0 - 8.9	845	514	119	1,478
9.0 - 10.9	698	482	234	1,414
11.0 - 12.9	450	338	231	1,019
13.0 - 14.9	283	215	190	688
15.0 - 16.9	103	74	55	232
17.0 - 18.9	39	26	29	94
19.0 and larger	32	55	16	103
Total	2,450	1,704	874	5,028
Percent	48.7	33.9	17.4	100.0

¹ Exclusive of cups on trees of coastal islands.

² Calculated from the diameter measured 10 feet from the ground, in order to correct for the influence of turpentine.

³ To convert to full number of cups add "000".

⁴ The number of cups on trees under 7.0 inches in diameter is negligible.

As shown in table 5, on the preceding page, the total number of working turpentine cups in the Unit is 5,028,000. These cups hang on 4,343,000 trees, an average of 1.16 cups per tree. Inasmuch as the number of working cups is relatively small, the Survey's sampling data were insufficient to permit an accurate tabular presentation both by year of working and by diameter of trees. Accordingly, table 5 merely classifies the working cups by diameters of trees and two-year working groups. It indicates that during the past few years the tendency of producers in this Unit has been to cup more intensively the trees under 9.0 inches in diameter.

Table 6, prepared as a supplement to table 5, shows the working cups in the Unit classified only by year of working.

TABLE 6. -- Working turpentine cups¹, classified by year of working, season 1934-35

Year of working	Thousands of cups ²	Percent of total
First	1,107	22.0
Second	1,343	26.7
Third	1,004	20.0
Fourth	700	13.9
Fifth	463	9.2
Sixth and up	411	8.2
Total	5,028	100.0

¹ Exclusive of cups on trees of coastal islands.

² To convert to full number of cups add "000".

Table 7 shows the number of cups that each class of naval-stores producer worked on owned and leased land during the 1934-35 season. The gum-producer-sellers and gum-producer-shippers were significant factors in the production during this season. Approximately 380 of them worked 26 percent of the total number of cups in the Unit, which means that many a small farmer turned his hand to gum producing as a means of increasing his cash income.

Although table 8 does not illustrate the complete data, somewhat more than half of the 1,107,000 first-year cups hung during the 1934-35 season were on front cupped trees; that is, trees that had never before been worked for turpentine. The remainder were on back-cupped trees. Column two of table 8 shows the percentage distribution of cups on front-cupped trees, classified by two-inch diameter classes; column three shows the corresponding percentage distribution of cups on back-cupped trees, also classified by the same diameter classes.

Gum Naval-stores Production 1933-34

Table 9 summarizes the croppage and production for the season 1933-34 by the several classes of naval-stores producers. The production for 1934-35 could not be taken because it was midseason when the survey was made. This statement of 1933-34 croppage and production is based upon the supplementary still-to-still canvass mentioned above. It was often possible to confirm the production data by sales records and factors' accounts, but it was not possible to check the 1933-34 croppage figures that were furnished by individual producers. Accordingly, the data on average production per crop in naval-stores units for 1933-34 cannot be verified by the Survey. They are presented here for what they may be worth.

TABLE 7. -- Turpentine producers and working turpentine cups on owned and leased land¹, classified by types of naval-stores producers, season 1934-35

Types of naval-stores producers	Number of producers ²	Working cups			
		On owned land	On leased land	Total	Percent of total
----- <i>Thousands of cups</i> ³ -----					
Operator	27	588	2,288	2,876	57.2
Operator and farmer	8	55	342	397	7.9
Operator and gum-buyer	6	30	312	342	6.8
Operator and custom- stiller	-	-	-	-	-
Operator, gum-buyer, and custom-stiller	6	10	80	90	1.8
Gum-producer-seller	360 ⁴	714 ⁴	473 ⁴	1,187 ⁴	23.6
Gum-producer-shipper	18 ⁴	66 ⁴	70 ⁴	136 ⁴	2.7
Total	425 ⁵	1,463	3,565	5,028	100.0
Percent of total		29.1	70.9	100.0	

¹ Exclusive of coastal islands.² With the exception of the gum-producer-sellers and gum-producer-shippers, the number of producers shown is the number actually visited from April to June, 1934 in the still-to-still canvass. The number of gum-producer-sellers and gum-producer-shippers is the estimated number working during the naval-stores year 1933-34; the number for 1934-35 is approximately the same.³ To convert to full number of cups add "000".⁴ Estimated from information furnished by still operators.⁵ In addition to the 425 producers making crude gum, there were 4 that stilled gum produced by others, but did not themselves work any timber.TABLE 8. -- Percentage of first-year turpentine cups on front-cupped and back-cupped trees¹, by diameter classes, season 1934-35

Tree diameter 4½ feet from the ground ²	On front-cupped trees	On back-cupped trees
<i>Inches</i>	<i>Percent</i>	<i>Percent</i>
Under 9.0	41.0	22.9
9.0 - 10.9	30.0	25.7
11.0 - 12.9	17.8	23.1
13.0 - 14.9	8.0	17.1
15.0 - 16.9	2.4	7.3
17.0 - 18.9	.8	2.3
19.0 and larger	-	1.6
Total	100.0	100.0

¹ Exclusive of trees on coastal islands.² Calculated from diameters measured at 10 feet from the ground so as to correct for the influence of turpentineing.

TABLE 9. -- *Naval-stores croppage and production¹, classified by types of naval-stores producers, season 1934-35*

Types of naval-stores producers	Number of producers ²	Thousands of working cups ³	Production in naval-stores units ⁴	Average production per crop in naval-stores units ⁴
Operator	27	2,704	10,030	37.1
Operator and farmer	8	345	1,190	34.5
Operator and gum-buyer	6	312	1,090	34.9
Operator and custom-stiller	-	-	-	-
Operator, gum-buyer, and custom-stiller	6	102	330	32.4
Gum-producer-seller	360 ⁵	1,077 ⁵	2,910 ⁵	27.0
Gum-producer-shipper	18 ⁵	122 ⁵	360 ⁵	29.5
Total	425 ⁶	4,662	15,910	34.1

¹ Exclusive of coastal islands.

² The number of gum-producer-sellers and gum-producer-shippers applies to the naval stores years 1933-34. Those of other types of producers apply strictly to the naval-stores year 1934-35, but are approximately correct for 1933-34.

³ To convert to full number of cups add "000".

⁴ A naval-stores unit is made up of one 50-gallon barrel of turpentine and three and one-third 500-pound (gross) barrels of rosin.

⁵ Estimated from information furnished by still operators.

⁶ In addition to the 425 producers making crude gum, there were 4 who stilled gum produced by others, but did not themselves work any timber.

Summary

South Carolina Survey Unit No. 1 covers an area of nearly 5,187,000 acres, of which 2,993,000, or approximately 58 percent, is forest land. Practically 48 percent of the forest acreage bears a sufficient quantity of turpentine timber to classify it as naval-stores land. The total number of turpentine trees is nearly 63 million; more than 44 million, or 71 percent of these, are round and between 3.0 and 8.9 inches in diameter. The total number of working trees during 1934-35 was 4,343,000; total working cups, 5,028,000; total virgin cups, 1,107,000, a decrease of more than 200,000 under the previous naval-stores year. Only 47 stills are located in the Unit. The bulk of the crude gum (70.9 percent of the working cups in 1934-35) comes from leased land. The average production per crop in 1933-34 was approximately 34 barrels.

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SOUTHERN FOREST EXPERIMENT STATION

E. L. Demmon, Director

New Orleans, La.

PULPING AND NONPULPING CORDWOOD VOLUME
IN SURVEY UNIT NO. 1,
TEXAS

By

SOUTHERN FOREST SURVEY STAFF

I. F. Eldredge

Regional Survey Director

* - This is an advance release of Forest Survey data that will be included in complete reports to be published later. This information is subject to correction or amplification as computations proceed.

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PULPING AND NONPULPING CORDWOOD VOLUME

IN SURVEY UNIT NO. 1, TEXAS

This report presents advance information on the volume and character of cordwood in Texas Survey Unit No. 1, an area of nearly ten million acres. The Unit, shown in figure 1, includes all of seventeen counties in the southeastern part of the State. It forms a part of the two natural geographic divisions of the State known as the East Texas Timber Country and the Gulf Coast Prairie. Its surface relief, similar to the rest of the Atlantic Coastal Plain, is characterized by rolling or undulating terrain. Rising gradually from a flat plain in the coastal prairies, the Unit's topography in the northern part attains an elevation of 300 to 600 feet above sea level. Except in the coastal prairies the area, generally speaking, is well drained. The Angelina, Brazos, Trinity, Neches, and Sabine Rivers, and their numerous tributaries, flow through it in a southeasterly direction toward the Gulf of Mexico.

More than three-fourths of the forest area of the Unit occurs in rolling uplands and flatwoods, the remainder being found in river bottoms, swamps, bays, and branch heads.

Four large railroad systems, the Southern Pacific, Missouri Pacific, Texas and Pacific, and Western Pacific, as well as a number of lesser lines, provide ample rail transportation facilities in the Unit. In addition, it is well served with hard-surfaced state and federal highways and graded county roads. Deep water shipping facilities are also at hand in Houston, Galveston, Beaumont, and Port Arthur.

The estimates of land area and wood volume given in this report are based on data gathered from September 1934 to March 1935 by the Forest Survey, a part of the U. S. Forest Service and an activity of the Southern Forest Experiment Station, with headquarters at New Orleans, La. These estimates are preliminary and subject to correction and modification when final computations are completed, but such changes are not likely to be extensive or important.

Three-man crews of specially trained timber estimators made the inventory by measuring the timber and recording the forest and land-use conditions on 12,528 one-quarter-acre sample plots. These plots, located at intervals of 660 feet on parallel compass lines ten miles apart, give an adequate picture of all the land area in the Unit.

In presenting this estimate of timber suitable for conversion into pulpwood, the Forest Survey has not taken into account the prior claims of other forest industries. These must be considered before any planned expansion of the pulpwood industry in this Unit is undertaken. Moreover, the future timber supply must be safeguarded by building up an ample growing stock. The lumber industry of the future, for example, must depend largely upon the growth of young trees now below saw-timber size; hence too widespread a use at present of trees in the 6- to 14-inch diameter classes for pulpwood would seriously jeopardize the future of the lumber industry. Other wood-using industries, similarly, are dependent upon the perpetuation of the forest, which means that the growing stock must be adequately and continuously maintained for the benefit of all.

As soon as survey data covering the growth, drain, and economic aspects of the forest have been analyzed and interpreted, a basis will have been established for determining the relative volumes of pulpwood, saw timber, and other forest products that this Unit can perpetually produce. Basic policies that can be used as guides in the effective management of the forests of this Unit will eventually be published as a part of a comprehensive, detailed report.

Land Area

Table 1 classifies the land area of the Unit by major land-use classes, among which productive forest area is by far the most important. The very low percentage of area that is now in cultivation (13 percent), after a century of settlement, indicates that most of the land is better suited to other uses. The tabular figures, showing that the land is going out of cultivation more rapidly than it is being converted to crop land, substantiate this fact. The relatively large area of improved pasture in the Unit (12 percent of the total) is also significant. Much of this pasture land is found in the natural prairies of the southern counties, Harris, Liberty, Jefferson, and Orange, where large unbroken tracts of land have been taken over by the cattle industry. Fenced and uncultivated, these tracts are virtually treeless.

TABLE 1 -- Area¹ classified by major land uses

Land-use classes	Area in acres	Percent of total area
Forest:		
Productive	6,589,500	66.8
Nonproductive ²	11,700	.1
Total forest	6,601,200	66.9
Agricultural:		
In cultivation:		
Old crop land ³	1,258,700	12.8
New crop land ⁴	16,400	.2
Out of cultivation:		
Idle ⁵	169,300	1.7
Abandoned ⁶	82,700	.8
Improved pasture ⁷	1,194,700	12.1
Total agricultural	2,721,800	27.6
Other:		
Prairie)		
Marsh)		
Waterways)	540,800	5.5
Towns and villages)		
Roads, railroads, etc.)		
Total area	9,863,800	100.0

¹ Does not include meanderable water area.

² Nonproductive forest land is forest area that has not the qualities essential for the growth of commercial timber species.

³ Land cultivated at least five years and on which a farm crop was raised within two years prior to the date of survey.

⁴ Land converted from forest to crop land within five years prior to survey date.

⁵ Cultivated land that has been idle for two years or more, but has not reached the abandoned stage.

⁶ Land once cultivated but showing distinct evidence of having been abandoned for agricultural crop production; no attempt has been made to maintain it as improved pasture.

⁷ Cleared or open land under fence used primarily for grazing; a real attempt has been made to produce and maintain a sod.

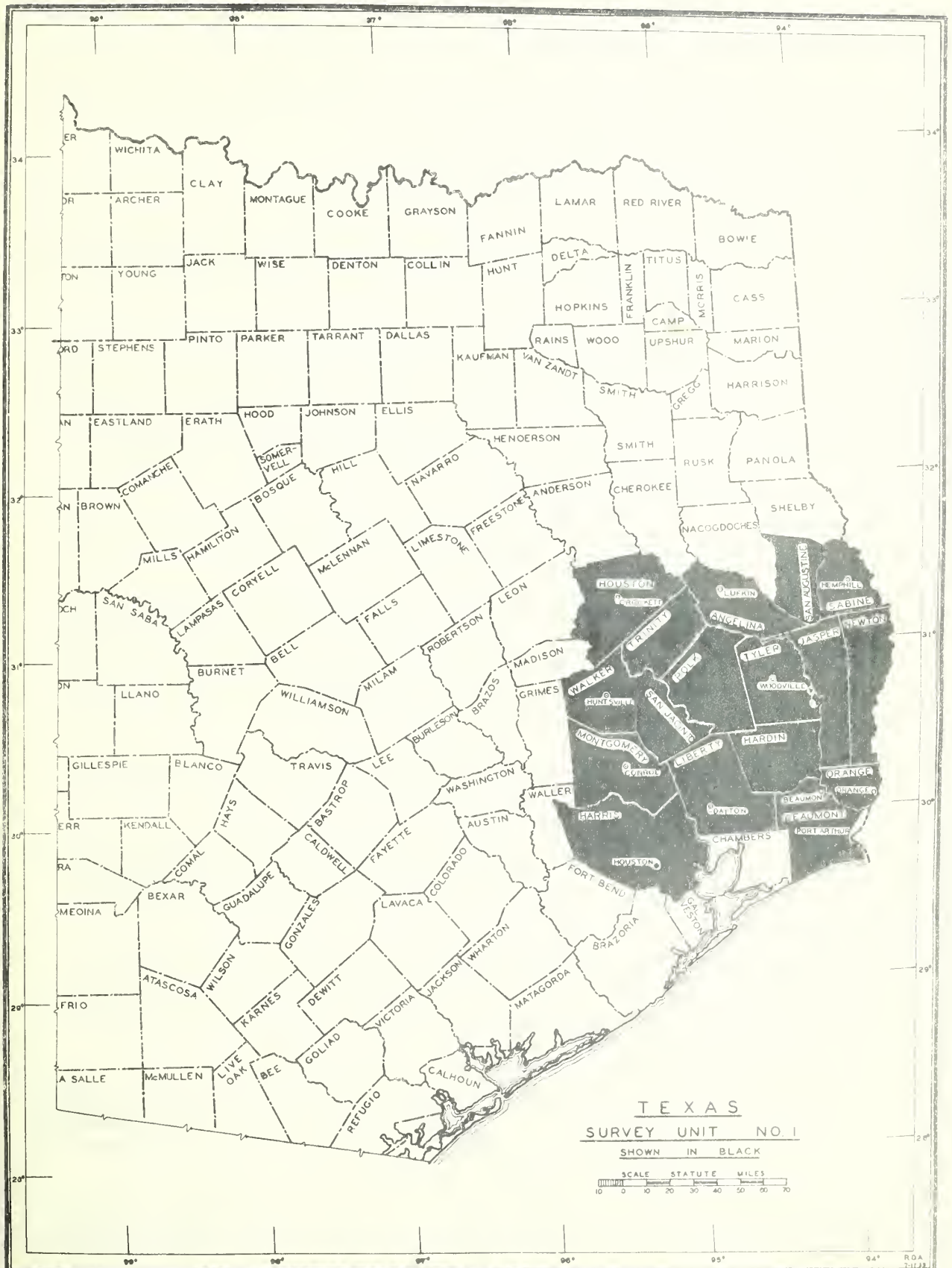


FIGURE 1. -- Geographical location of Survey Unit No. 1, Texas.

Under the system of sampling used in the collection of survey data, items which are of infrequent occurrence and relatively small in quantity cannot be determined with as high a degree of accuracy as is obtainable for items which occur more frequently and in substantially greater quantities. Small tabular figures, therefore, are to be taken as showing, not the exact magnitudes of the items involved, but their relative magnitudes in comparison with those of other items.

Forest Area

The productive forest area of this Unit totals 6,589,500 acres. Table 2 classifies this area by forest conditions and forest type groups. Forest conditions are defined as follows:

Old growth:	Stands composed predominantly of saw-log-sized trees that have the characteristics of the original mature trees found in the region. ("Saw-log-sized" signifies a minimum diameter of 13.0 inches outside of bark at breast height in the hardwood species, 9.0 inches in the pine species).
Uncut:	Old-growth stands from which less than 10 percent of the volume has been cut.
Partly-cut:	Old-growth stands from which 10 percent or more of the volume has been cut, but in which the remaining volume per acre in saw-log-sized trees is at the rate of at least 1,000 board feet of hardwood or hardwood and pine mixed, or 600 board feet of pine.
Second growth:	Stands that have succeeded the original old growth as a result of forest cutting or other causes.
Saw-log size uncut:	Second-growth stands from which less than 10 percent of the saw-log-sized trees have been cut, and in which the volume per acre is at the rate of at least 600 board feet.
Saw-log size partly-cut:	Second-growth stands from which 10 percent or more of the saw-log-sized trees have been cut, but in which the remaining volume per acre is at the rate of at least 400 board feet.
Under saw-log size uncut:	Second-growth stands in which the volume per acre of saw-log-sized timber is at the rate of less than 600 board feet. Less than 10 percent of the trees under saw-log size have been cut.
Under saw-log size partly-cut:	Second-growth stands in which the volume per acre of saw-log sized timber is at the rate of less than 400 board feet. Ten percent or more of the trees under saw-log size have been cut.

Clear-cut:

Cut-over stands in which the volume per acre in saw-log-sized trees is at the rate of less than 1000 board feet of hardwood or hardwood and pine mixed, or less than 600 board feet of pine; and in which an insufficient quantity of young growth has come in to classify the stands either as reproduction or as second-growth.

Reproduction:

Areas of young growth bearing seedlings less than one inch in diameter at the rate of more than 80 per acre.

Table 2 indicates that in the productive forest area loblolly and short-leaf pine are gradually taking over areas once characterized by virgin stands of longleaf pine. In the old-growth conditions loblolly and shortleaf pine stands occupy an area which is more than twice as great as the longleaf pine area, but in the second-growth conditions this proportion has increased to seven to one. The geographic distribution of the major forest types in the Unit is shown in the map presented in figure 2.

TABLE 2. -- *Productive forest area by forest conditions and forest type groups*

Forest conditions	Forest type groups designated by predominant species			Total	Percent of total produc- tive forest area
	Longleaf pine	Loblolly and short- leaf pine	Hardwood		
----- Acres -----					
Old-growth:					
Uncut	25,800	154,500	330,100	510,400	7.7
Partly-cut	102,300	120,100	343,400	565,800	8.6
Total	128,100	274,600	673,500	1,076,200	16.3
Second-growth:					
Saw-log size:					
Uncut	174,800	1,883,900	419,800	2,478,500	37.6
Partly-cut	39,700	677,400	172,500	889,600	13.5
Under saw-log size:					
Uncut	286,400	1,005,100	352,700	1,644,200	25.0
Partly-cut	10,900	42,900	28,100	81,900	1.2
Total	511,800	3,609,300	973,100	5,094,200	77.3
Clear-cut ¹	195,100	17,200	3,100	215,400	3.3
Reproduction	93,600	64,800	45,300	203,700	3.1
Total productive forest area	928,600	3,965,900	1,695,000	6,589,500	100.0
Percent of total pro- ductive forest area	14.1	60.2	25.7	100.0	

¹ This includes a relatively small area in the fire-killed condition.

Volume Estimate

The volume estimate for this Unit is expressed in standard stacked cords, 4 x 4 x 8 feet, containing 90 cubic feet of pine wood (including bark), and 80 cubic feet of hardwood (including bark). This estimate covers only the stemwood 4.0 inches or larger in diameter in all live, sound trees whose diameter outside of bark at breast height is at least 5.0 inches. It therefore disregards altogether all trees less than 5.0 inches in diameter at breast height, and excludes all stemwood less than 4.0 inches in diameter outside of bark, as well as all limbwood. No deduction was made for woods cull---that part of the tree that would be left in the woods because of rot, fire-scar, crook, bad knots, or other defects. While final computation of woods cull has not been made, it is believed that the deduction will be between three percent and six percent in cubic volume.

Although Texas Survey Unit No. 1 is within the natural range of longleaf pine, very few turpentine operations are carried on there. No natural slash pine whatever is found in this region, and the ratio between the longleaf pine area and the total pine area is small and gradually diminishing. Thus the few longleaf pine trees that have been or are being worked for naval stores are not sufficiently numerous to be brought into the tabular classification in tables 3 and 4.

Table 3 shows the total cordwood volume in the Unit, classified by tree species groups, diameter classes, and forest type groups. The importance of loblolly and shortleaf pine, which constitute 50.2 percent of the total cordwood volume, is at once apparent. Longleaf pine, in contrast, makes up only 4.3 percent of the total cordwood volume. Considering only species suitable for the manufacture of pulp, the pines make up 77 percent of the total in the Unit. Nearly two-thirds of the pine volume is in trees less than 13 inches in diameter, a size most suitable for pulpwood production. Red gum, with 51 percent of the total volume in pulping hardwoods, is the most abundant species in that group. Pulping hardwood trees less than 13 inches in diameter comprise more than half the total pulping hardwood volume.

Significant data from table 3, showing the relationship between cordwood volumes in the various tree-diameter classes, are illustrated in figure 3. It is seen here that in all species groups the future supply of wood is increasing. For example, the volume in shortleaf and loblolly trees 20 inches and over in diameter is 3,834,000 cords; whereas in the 14- to 18-inch diameter class the volume is more than eleven million cords; and in the 10- to 12-inch diameter class it is still larger, more than fifteen million cords. A corresponding increase, though less striking, is noticeable in the diameter classes of all the other tree species groups.

Notwithstanding the timber volume shown in table 3 to be suitable for pulpwood production, no attempt is made here to estimate what part of it will presently be available for use as pulpwood. Among the factors governing such an estimate are: the prior claims of established industries, the accessibility of the timber stands, and the provision for reproduction and future growing stock. Trees in the 6-, 8-, 10-, and 12-inch diameter classes comprise 60 percent of the total cordage in the pulping species. These young trees are not being extensively utilized at present, but the extent to which they can be converted into pulpwood must necessarily be influenced by the demands of other forest products industries. Thrifty of growth, they serve as a nucleus for future timber crops on which various wood-using industries must depend. If properly managed, particularly to the extent of periodical thinnings, these young stands should furnish a continual supply of pulpwood and other forest products.

MAJOR FOREST TYPES SURVEY UNIT NO. 1 TEXAS

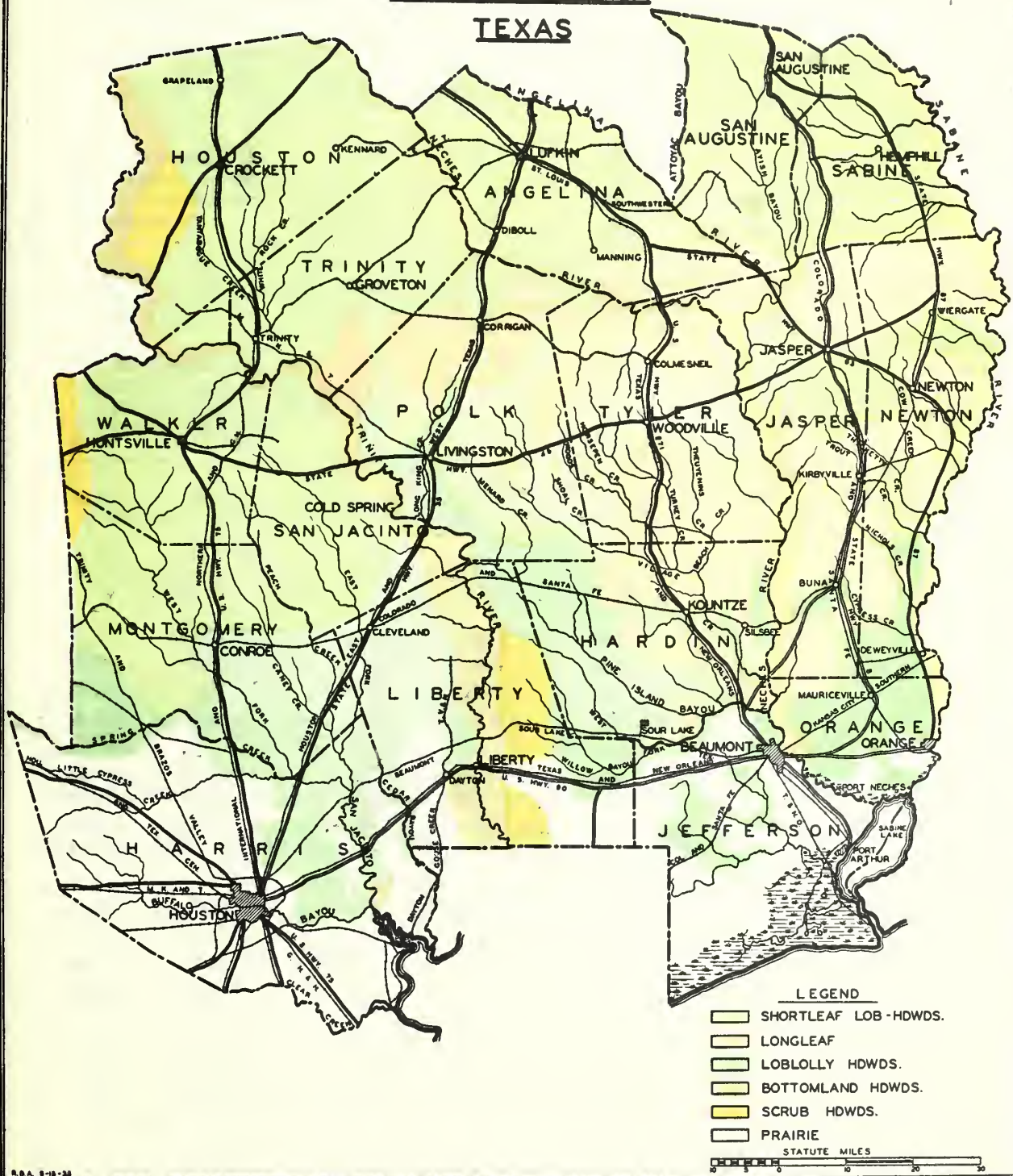


TABLE 3. -- Cordwood volume¹ in pine and hardwood species groups, by tree diameter classes and forest type groups

Tree species groups	Tree diameter classes ²	Forest type groups designated by predominant species			Total	Percent of total volume
		Longleaf pine	Loblolly and short-leaf pine	Hardwood		
<i>Inches</i>		<i>----- Thousands of cords ³ -----</i>				
Pulping species:						
Longleaf pine	6" - 8"	553	63	5	621	.8
	10" - 12"	1,077	75	5	1,157	1.4
	14" - 18"	1,115	52	3	1,170	1.4
	20" & over	593	17	-	610	.7
Total longleaf pine		3,338	207	13	3,558	4.3
Loblolly and short-leaf pine						
Longleaf pine	6" - 8"	337	10,810	613	11,760	14.1
	10" - 12"	411	14,327	343	15,081	18.1
	14" - 18"	313	10,718	117	11,148	13.4
	20" & over	100	3,690	44	3,834	4.6
Total loblolly and shortleaf pine		1,161	39,545	1,117	41,823	50.2
Total pine		4,499	39,752	1,130	45,381	54.5
Pulping hard-woods ⁴						
Longleaf pine	6" - 8"	68	1,590	1,192	2,850	3.4
	10" - 12"	55	2,018	1,860	3,933	4.7
	14" - 18"	34	1,693	2,018	3,745	4.5
	20" & over	4	644	2,139	2,787	3.4
Total pulping hardwoods		161	5,945	7,209	13,315	16.0
Total pulping species		4,660	45,697	8,339	58,696	70.5
Nonpulping hard-woods ⁵						
Longleaf pine	6" - 8"	195	3,197	2,315	5,707	6.8
	10" - 12"	68	3,607	3,447	7,122	8.6
	14" - 18"	46	2,731	3,788	6,565	7.9
	20" & over	24	1,277	3,894	5,195	6.2
Total nonpulping hardwood		333	10,812	13,444	24,589	29.5
Total all species		4,993	56,509	21,783	83,285	100.0
Percent of total volume		6.0	67.8	26.2	100.0	

¹ These are gross volumes; woods cull has not been deducted. It is believed that final computations will indicate deductions of between three percent and six percent for woods cull. (Other footnotes continued on following page).

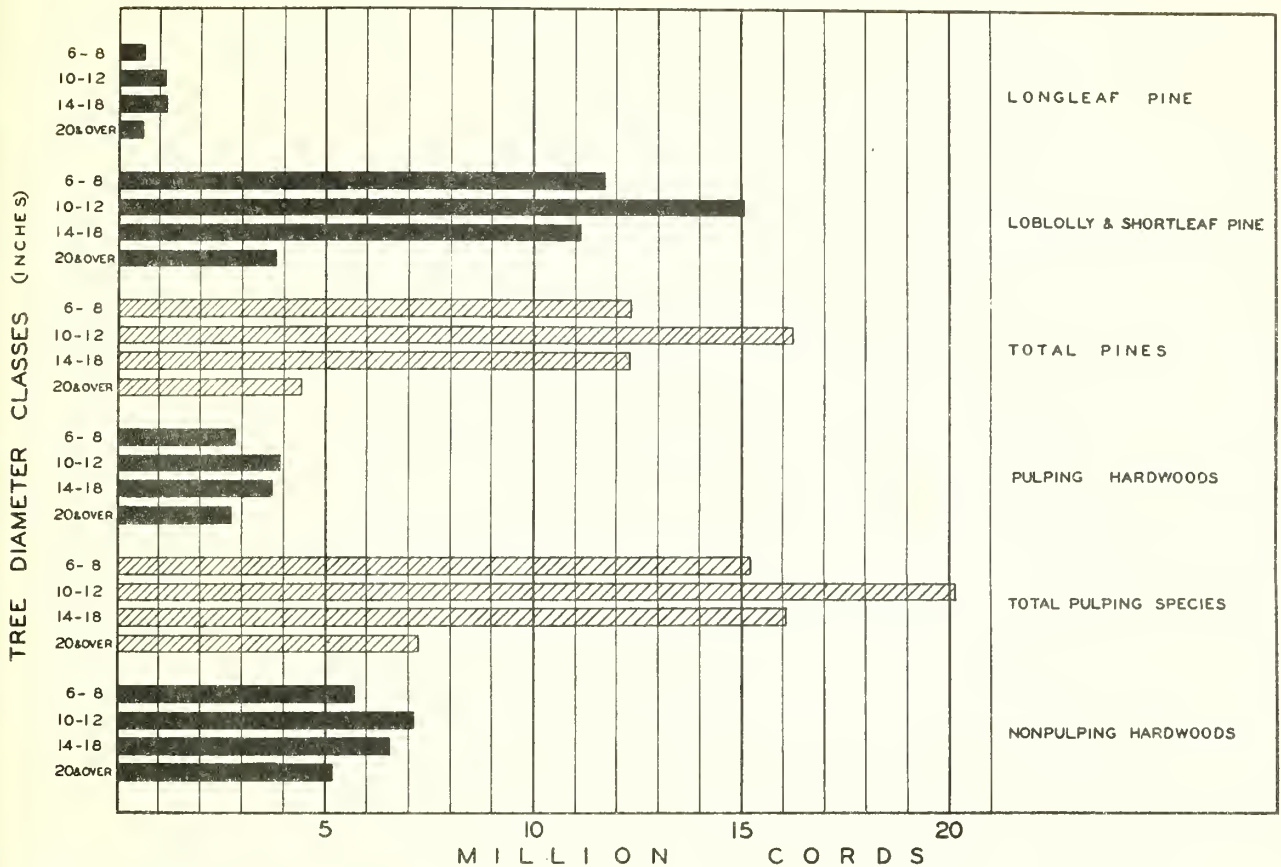


FIGURE 3. -- Classification of cordwood volume by species groups and tree-diameter classes

Table 4 classifies the cordwood volume for the average acre by species groups and tree-diameter classes. This volume for the average acre is a theoretical figure derived by dividing the total volume for the Unit by the productive forest acreage. The table shows, on the average acre, a volume of 12.64 cords of wood (without deduction for woods cull) of which nearly three-fourths is in pulping species. In trees under 13 inches in diameter, the pines alone contribute 4.34 cords per acre, while the pulping hardwoods furnish another cord per acre in trees of the same diameter classes.

Whether this per-acre volume of wood in pulping species will ultimately be given over to the manufacture of pulp, lumber, or other forest products, will depend on the size and quality of the individual trees and on the existing demand for each product.

(Footnotes continued from page 8)

² Diameters at breast height ($4\frac{1}{2}$ feet from the ground). Trees ranging from 5.0 inches to 8.9 inches in diameter outside of bark are placed in the 6" - 8" class; corresponding limits apply to the other diameter classes.

³ To convert to full number of cords add "000".

⁴ Gum, basswood, bay, magnolia, maple, and willow.

⁵ Cypress, oak, hickory, ash, beech, elm, hackberry, holly, and persimmon.

TABLE 4. -- Cordwood volume¹ on the average acre of productive forest land, by pulping and non-pulping species groups and tree diameter classes

Tree species groups	Tree diameter classes ²								Total all diameter classes	
	6" - 8"		10" - 12"		14" - 18"		20" & over			
	Cords	% of total	Cords	% of total	Cords	% of total	Cords	% of total	Cords	% of total
Pulping species:										
Longleaf pine.	.09	.7	.17	1.4	.18	1.4	.10	.8	.54	4.3
Loblolly and shortleaf pine	1.79	14.2	2.29	18.0	1.69	13.4	.58	4.6	6.35	50.2
Total pine	1.88	14.9	2.46	19.4	1.87	14.8	.68	5.4	6.89	54.5
Hardwood ³	.43	3.4	.60	4.8	.57	4.5	.42	3.3	2.02	16.0
Total pulping	2.31	18.3	3.06	24.2	2.44	19.3	1.10	8.7	8.91	70.5
Nonpulping										
hardwood ⁴	.87	6.9	1.08	8.6	.99	7.8	.79	6.2	3.73	29.5
Total all species	3.18	25.2	4.14	32.8	3.43	27.1	1.89	14.9	12.64	100.0

¹ These are gross volumes; woods cull has not been deducted. It is believed that final computations will indicate deductions of between three percent and six percent for woods cull.

² Diameters measured at breast height (4-1/2 feet from the ground). Trees ranging from 5.0 inches to 8.9 inches in diameter outside of bark are placed in the 6"-8" class; corresponding limits apply to the other diameter classes.

³ Gum, basswood, bay, magnolia, maple, and willow.

⁴ Cypress, oak, hickory, ash, beech, elm, hackberry, holly, and persimmon.

Summary

Texas Survey Unit No. 1 covers an area of nearly ten million acres. Its topography is that of a gently rolling plain. Two-thirds of the total land area, or approximately 6,601,200 acres, is forest land. Nearly three-fourths of this area bears mixed pine stands of longleaf, shortleaf, and loblolly. The total cordwood volume of the Unit exceeds 83 million cords, of which 70 percent is in pulping species. Shortleaf and loblolly pine make up half the total cordwood volume. Considering all species, trees less than 13 inches in diameter aggregate more than 48 million cords, or nearly 58 percent of the total cordwood volume in the Unit. The average acre of productive forest land bears nearly thirteen gross cords of wood, of which seven cords are in pine species, two cords in pulping hardwoods, and four cords in nonpulping hardwoods. The Unit is well served by railroad lines and highways and is accessible to deep water shipping ports.

A13,27

FOREST SURVEY RELEASE* No. 16

October 18, 1935.

SOUTHERN FOREST EXPERIMENT STATION

E. L. Demmon, Director

New Orleans, La.



PULPING AND NONPULPING CORDWOOD VOLUME
IN THE SOUTHWEST ALABAMA SURVEY AREA

By

SOUTHERN FOREST SURVEY STAFF

I. F. Eldredge

Regional Survey Director

* - This is an advance release of Forest Survey data that will be included in complete reports to be published later. This information is subject to correction or amplification as computations proceed.

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PULPING AND NONPULPING CORDWOOD VOLUME

IN THE SOUTHWEST ALABAMA SURVEY AREA

This report deals with the volume and character of cordwood in an area that embraces twelve counties in southwestern Alabama. This area, shown in figure 1, covers 8,119,000 acres. Although the region lies wholly within the Gulf Coastal Plain, its topographic features vary markedly. The broad, flat areas commonly found in the South Atlantic and Gulf Coast region occur to only a limited extent along the coasts of Baldwin and Mobile Counties. Adjoining is a broad belt of forested rolling uplands extending northward to the Black Prairie Belt in Sumpter and Morengo Counties. These highlands reach their greatest elevation, 350-400 feet, in Choctaw, Clark and Monroe counties where they are locally known as "mountains". Through this rolling hill country and draining the greater portion of it flow the two main water courses of the region, the Tombigbee and Alabama rivers. The two valleys join at the southern end of Clark County to form a wide bottom land, the deltas of the Mobile and Tensas Rivers. These rivers flow south through alluvial low land averaging ten miles in width to Mobile Bay, a distance of about forty miles.

Five major trunk line railroads, with terminal facilities in Mobile, traverse the Southwest Alabama area. They are: The Gulf, Mobile and Northern; Mobile and Ohio; Louisville and Nashville; Southern; and the Alabama, Tennessee and Northern. Another large system, the St. Louis-San Francisco, also functions in the area, with its terminal, however, at Pensacola, Fla. In addition to these, at least seven smaller railroads also operate in the area, thus making it one of the best sections in the South with respect to railway transportation facilities. The Mobile, Tombigbee, and Alabama Rivers are used extensively for barge transportation of coal from the Birmingham coal fields, and for the movement of pulpwood, logs, and other forest products. Mobile has excellent state-owned docks and other deep water shipping facilities, and is located on the Intercoastal Canal.

The tabular figures on land area and wood volume presented in this report are based on data gathered by the Forest Survey between August 1934 and June 1935. They are preliminary estimates only and are subject to correction or modification when final computations are completed; these changes, however, are not likely to be extensive or important. The Forest Survey, an activity of the Southern Forest Experiment Station, maintains a large field and office force for the purpose of securing and analyzing data on the South's timber stands. In the Southwest Alabama area, three-man crews of specially trained timber estimators measured the timber and recorded the forest and land-use conditions on a series of more than 10,000 one-quarter-acre sample plots systematically established at intervals of 660 feet on parallel compass lines ten miles apart. The Forest Survey has also accumulated further data covering the growth, the use, and the industrial aspects of the forest in this area. As soon as these data have been analyzed and interpreted, a basis will have been established for determining the relative volumes of pulpwood, sawtimber, and other forest products that the area can perpetually produce. These findings will be published as part of a comprehensive report on the area.

In the present cordwood release the Forest Survey cannot attempt to qualify the extent to which the wood volume of this area should be used for pulp. The prior claims of other forest industries on wood as a raw material must be considered before any planned expansion of the pulpwood industry is undertaken. Moreover, the future timber supply must be safeguarded by building up an ample growing stock. The lumber industry of the future, as well as other wood-using industries, must depend largely upon the growth of young trees. If all the trees between 6 and 14 inches in diameter

were cut for pulpwood now, the future industrial development of this area would be jeopardized.

Land Area

Among the major land-use classes, the area devoted to forests is the most extensive; 70.6 percent of the land surface is in some stage of forest growth. Nearly three-fourths of the forest area is in the rolling uplands; the remainder is in swamps, river bottoms, and flatwoods. The flatwoods, however, account for only four percent of the total productive forest area. The area of nonproductive forest is strikingly low. Although nearly 20 percent of this survey area is in cultivation, it is evident from table 1 that land is going out of cultivation more rapidly than new land is being cleared for cultivation.

TABLE 1. -- Area ¹ classified by major land uses

Land-use classes	Area in acres	Percent of total area
Forest:		
Productive	5,729,700	70.6
Nonproductive ²	2,300	neg.
Total forest	5,732,000	70.6
Agricultural:		
In cultivation:		
Old cropland ³	1,548,800	19.1
New cropland ⁴	23,800	.3
Out of cultivation:		
Idle ⁵	166,600	2.0
Abandoned ⁶	135,300	1.7
Improved pasture ⁷	247,500	3.0
Total agricultural	2,122,000	26.1
Other:		
Prairie)		
Marsh)		
Waterways)	265,100	3.3
Towns and villages)		
Roads, railroads, etc.)		
Total area	8,119,100	100.0

¹ Does not include meanderable water area.

² Nonproductive forest land is forest area that has not the qualities essential for the growth of commercial timber species.

³ Land cultivated at least five years and on which a farm crop was raised within two years prior to the date of survey.

⁴ Land converted from forest to cropland within five years prior to survey date.

⁵ Cultivated land that has been idle for two years or more, but has not reached the abandoned stage.

⁶ Land once cultivated but showing distinct evidence of having been abandoned for agricultural crop production; no attempt has been made to maintain it as improved pasture.

⁷ Cleared or open land under fence used primarily for grazing; a real attempt has been made to produce and maintain a sod.

Under the system of sampling used in the collection of survey data, items that are of infrequent occurrence and relatively small in quantity cannot be determined with as high a degree of accuracy as is obtainable for items that occur more frequently and in substantially greater quantities. Small tabular figures, therefore, are to be taken as showing, not the exact magnitudes of the items involved, but their relative magnitudes in comparison with those of other items.

Forest Area

The extent of productive forest in this area is approximately 5,729,700 acres. Table 2 classifies this forest area by forest conditions and forest type groups. Forest conditions are defined as follows:

Old growth:	Stands composed predominantly of saw-log-sized trees that have the characteristics of the original mature trees found in the region. ("Saw-log-sized" signifies a minimum diameter of 13.0 inches outside of bark at breast height in the hardwood species, 9.0 inches in the pine species).
Uncut:	Old-growth stands from which less than 10 percent of the volume has been cut.
Partly-cut:	Old-growth stands from which 10 percent or more of the volume has been cut, but in which the remaining volume per acre in saw-log-sized trees is at the rate of at least 1,000 board feet of hardwood or hardwood and pine mixed, or 600 board feet of pine.
Second growth:	Stands that have succeeded the original old growth as a result of forest cutting or other causes.
Saw-log size Uncut:	Second-growth stands from which less than 10 percent of the saw-log-sized trees have been cut, and in which the volume per acre is at the rate of at least 600 board feet.
Partly-cut:	Second-growth stands from which 10 percent or more of the saw-log-sized trees have been cut, but in which the remaining volume per acre is at the rate of at least 400 board feet.
Under saw-log size Uncut:	Second-growth stands in which the volume per acre of saw-log-sized timber is at the rate of less than 600 board feet. Less than 10 percent of the trees under saw-log size have been cut.
Partly-cut:	Second-growth stands in which the volume per acre of saw-log sized timber is at the rate of less than 400 board feet. Ten percent or more of the trees under saw-log size have been cut.

Clear cut: Old-growth and second-growth stands that have been cut over and in which an insufficient quantity of young growth has come in to classify the stands either as second growth or as reproduction.

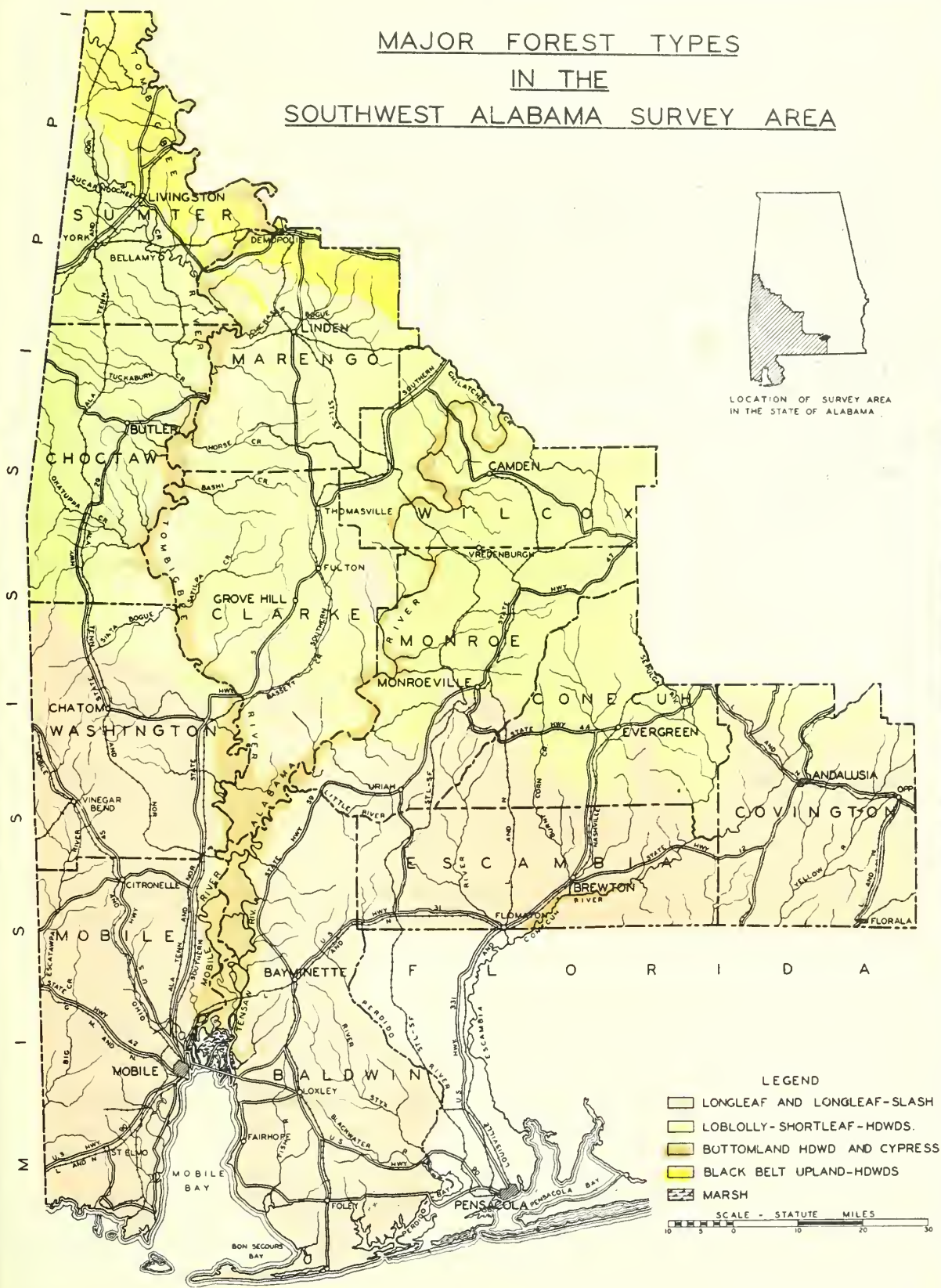
Reproduction: Areas of young growth bearing seedlings less than one inch in diameter at the rate of more than 80 per acre.

Table 2 shows that second-growth timber stands occupy over 70 percent of the forest area in all three major type groups. Seventeen percent of the forest area is still in old-growth timber, the largest proportion of which is in the hardwood types. The second-growth pines, which are almost equally divided between the two major pine types, occupy more than half the total acreage in the forest area. Loblolly and shortleaf pine stands, however, are slowly taking over areas that were formerly occupied by virgin stands of longleaf pine timber. Only 6 percent of the entire forest area has been cut over and has not as yet restocked; this condition is found mainly in the longleaf and slash pine types. Figure 1 maps the geographic distribution and extent of the major forest types.

TABLE 2. -- Productive forest area by forest conditions and forest type groups

Forest conditions	Forest type groups designated by predominant species			Total	Percent of total produc- tive forest area
	Longleaf and slash pine	Loblolly and short- leaf pine	Hardwood		
----- Acres -----					
Old-growth:					
Uncut	78,500	50,200	124,900	253,600	4.4
Partly-cut	342,600	90,500	305,700	738,800	12.9
Total	421,100	140,700	430,600	992,400	17.3
Second-growth:					
Saw-log size:					
Uncut	472,600	707,800	210,300	1,390,700	24.3
Partly-cut	74,400	250,200	67,800	392,400	6.8
Under saw-log size:					
Uncut	968,500	647,000	521,200	2,136,700	37.3
Partly-cut	62,400	32,200	20,100	114,700	2.0
Total	1,577,900	1,637,200	819,400	4,034,500	70.4
Clear-cut	359,600	4,600	2,400	366,600	6.4
Reproduction	241,500	67,000	27,700	336,200	5.9
Total productive forest area	2,600,100	1,849,500	1,280,100	5,729,700	100.0
Percent of total pro- ductive forest area	45.4	32.3	22.3	100.0	

MAJOR FOREST TYPES IN THE SOUTHWEST ALABAMA SURVEY AREA



ROA 10-4-35

SOUTHERN FOREST EXPERIMENT STATION - NEW ORLEANS - LA

FIGURE 1. -- Geographical distribution of major forest types

Volume Estimate

Estimates of wood volume are expressed in standards cords, 4 x 4 x 8 feet, containing 90 cubic feet of pine wood (including bark) and 80 cubic feet of hardwood (including bark). These estimates cover only the stemwood 4.0 inches or larger in diameter in all live, sound trees, the outside-of-bark diameter of which is at least 5.0 inches at breast height. The estimates therefore disregard altogether all trees less than 5.0 inches in diameter at breast height, and exclude all stemwood less than 4.0 inches in diameter outside of bark, as well as all limbwood. No deduction was made for woods cull--that part of the tree that would be left in the woods because of rot, fire-scar, crook, bad knots, or other defects. While final computation of woods cull has been not made, it is believed that the deduction will be between three and six percent in cubic volume.

Although much of the Southwest Alabama survey area is within the natural range of longleaf and slash pines, it is only on the fringe of the present active naval stores belt, and fewer turpentine operations are carried on there than in areas farther east. The turpentine pine forests of this area, which make up nearly one-fourth of the total cordwood volume, therefore offer a good source for naval stores. The Forest Survey is in no position to state definitely at present what part of the volume may be required for naval stores and what part may be used exclusively for pulp. Such apportionment must await the further analysis of naval stores and pulpwood demands in this area and will appear in subsequent Survey publications.

The several classes of turpentine pines, as distinguished from nonturpentine pines and hardwoods, are explained by the following definitions:

Turpentine pines:	Longleaf and slash pine trees that have never been
Round:	worked for naval stores; that is, no cups have been hung nor faces made for the production of turpentine and rosin.
Working and idle:	Longleaf and slash pine trees that either are being worked for naval stores at present, or are in a temporary period of rest.
Worked-out:	Longleaf and slash pine trees on which as many faces have been worked as the trees will stand. These trees have served their purpose in the production of naval stores and are available for other uses.
Nonturpentine pines:	Loblolly, shortleaf, pond, sand, and spruce pines. These are not used in the production of naval stores.
Pulping hardwoods:	Hardwood species that can be used in the manufacture of paper. They include the gums, bays, maples, poplars, and magnolia.
Nonpulping hardwoods:	Hardwood species that are not generally considered of value for the production of paper, such as oak, beech, elm, hackberry, hickory, ash, and cypress.

Table 3 classifies the total cordwood volume in the area by tree-species groups and forest type groups. The importance of the loblolly and shortleaf pine types, which account for 43 percent of the total cordwood volume, is at once apparent. Since this

same type group occupies only 32 percent of the total forest area, its cordwood volume per acre is above the average. In contrast, the longleaf and slash pine type, which occupies 45 percent of the productive forest area, bears less than 30 percent of the cordwood volume. The combined pine types comprise approximately 80 percent of the total cordwood volume of pulping species.

TABLE 3. -- Cordwood volume¹ in pulping and nonpulping species groups by forest type groups

Tree species groups	Forest type groups designated by predominant species			Total	Percent of total volume
	Longleaf and slash pine	Loblolly and short- leaf pine	Hardwood		

-----Thousands of cords ²-----

Pulping species:					
Turpentine pines: ³					
Round	7,744	421	69	8,234	16.6
Working and idle	3,073	55	19	3,147	6.3
Worked-out	487	11	8	506	1.0
Nonturpentine pines: ⁴	682	15,013	476	16,171	32.4
Total pines	11,986	15,500	572	28,058	56.3
Hardwoods ⁵	1,789	3,088	6,844	11,721	23.4
Total pulping	13,775	18,588	7,416	39,779	79.7
Nonpulping hardwoods ⁶	1,164	2,851	6,092	10,107	20.3
Total all species	14,939	21,439	13,508	49,886	100.0
Percent of total volume	29.9	43.0	27.1	100.0	

¹ Gross volume; woods cull has not been deducted. It is believed that final computations will indicate deductions of between 3 and 6 percent for woods cull.

² To convert to full number of cords add "000".

³ Longleaf and slash pines.

⁴ Loblolly, shortleaf, sand and spruce pines, cedar.

⁵ Gum, bay, yellow poplar, magnolia, maple, and associated minor species.

⁶ Cypress, oak, hickory, beech, ash, elm, hackberry, and associated minor species.

Tables 4 and 5 indicate to some extent the status of wood volume in relation to its use for pulpwood. The volumes shown in table 4 are those in pulping species for which the naval stores industry has no use; the trees either have been worked out and abandoned for further operations, or they are of species not used for naval stores. Table 5 shows the wood volume in (1) trees that are not subject to be cut in the immediate future either because they are being worked for naval stores now, or because they are likely to be so worked before being released for cutting; and in (2) tree species not suited for the production of pulp.

TABLE 4. -- Cordwood volume¹ in worked-out turpentine pine, nonturpentine pine, and pulping hardwood species, by tree diameter classes and forest type groups

Tree species groups	Tree diameter classes ²	Forest type groups designated by predominant species			Total	Percent of total volume
		Longleaf and slash pine	Loblolly and short-leaf pine	Hardwood		
<i>Inches</i> ³		<i>-----Thousands of cords</i> ⁴ <i>-----</i>				
Worked-out turpentine pines ⁵	6" - 8"	45	1	-	46	.2
	10" - 12"	176	2	2	180	.6
	14" - 18"	219	8	6	233	.8
	20" & over	47	-	-	47	.2
Total worked-out turpentine pines		487	11	8	506	1.8
Nonturpentine pines ⁶	6" - 8"	187	3,341	160	3,688	13.0
	10" - 12"	227	4,646	141	5,014	17.6
	14" - 18"	203	4,423	111	4,737	16.7
	20" & over	65	2,603	64	2,732	9.6
Total nonturpentine pines		682	15,013	476	16,171	56.9
Pulping hardwoods ⁷	6" - 8"	703	856	1,306	2,865	10.1
	10" - 12"	633	995	1,670	3,298	11.6
	14" - 18"	362	923	2,180	3,465	12.2
	20" & over	91	314	1,688	2,093	7.4
Total pulping hardwoods		1,789	3,088	6,844	11,721	41.3
Total		2,958	18,112	7,328	28,398	100.0
Percent of total volume		10.4	63.8	25.8	100.0	

¹ Gross volume; woods cull has not been deducted. It is believed that final computations will indicate deductions of between 3 and 6 percent for woods cull.

² Nonturpentine pines and hardwoods were measured at 4-1/2 feet from the ground. Worked-out turpentine pines were measured above the turpentine-butt section, 10 feet from the ground.

³ Trees ranging from 5.0 to 8.9 inches in diameter outside of bark are placed in the 6" - 8" class; corresponding limits apply to other diameter classes.

⁴ To convert to full number of cords add "000".

⁵ Longleaf and slash pines.

⁶ Loblolly, shortleaf, sand and spruce pines, cedar.

⁷ Gum, bay, yellow poplar, magnolia, maple, and associated minor species.

Table 4 shows that the area contains only a small volume of cordwood in worked-out turpentine pine trees, an indication that turpentine there has not as yet become a very extensive industry. The volume in round turpentine trees, as seen in table

5, is by contrast significantly large, which should make possible in the next few years an increased development in the naval stores industry. Table 4 also shows that most of the volume in nonturpentine trees is found in the 10- to 18-inch diameter classes. These trees can be made to support a continuous lumber industry in the area.

TABLE 5. -- Cordwood volume¹ in round, working and idle turpentine pine, and in nonpulping hardwood species, by tree diameter classes and forest type groups

Tree species groups	Tree diameter classes ²	Forest type groups designated by predominant species			Total	Percent of total volume
		Longleaf and slash pine	Loblolly and short-leaf pine	Hardwood		
		<i>Inches</i> ³ ----- <i>Thousands of cords</i> ⁴ -----				
Turpentine pines: ⁵						
Round	6" - 8"	2,762	89	25	2,876	13.4
	10" - 12"	2,692	123	19	2,834	13.2
	14" - 18"	1,697	133	17	1,847	8.6
	20" & over	593	76	8	677	3.2
Total		7,744	421	69	8,234	38.4
Working and idle						
	6" - 8"	463	4	3	470	2.2
	10" - 12"	1,245	22	8	1,275	5.9
	14" - 18"	1,185	24	8	1,217	5.6
	20" & over	180	5	-	185	.9
Total		3,073	55	19	3,147	14.6
Nonpulping hardwoods ⁶						
	6" - 8"	666	1,084	1,254	3,004	14.0
	10" - 12"	276	741	1,255	2,272	10.6
	14" - 18"	152	671	1,700	2,523	11.7
	20" & over	70	355	1,883	2,308	10.7
Total		1,164	2,851	6,092	10,107	47.0
Total cordwood		11,981	3,327	6,180	21,488	100.0
Percent of total volume		55.7	15.5	28.8	100.0	

¹ Gross volume; woods cull has not been deducted. It is believed that final computations will indicate deductions of between 3 and 6 percent for woods cull.

² Round turpentine pines and hardwoods were measured at 4-1/2 feet from the ground. Working and idle turpentine pines were measured above the turpentine-butt setion, 10 feet from the ground.

³ Trees ranging from 5.0 to 8.9 inches in diameter outside of bark are placed in the 6" - 8" diameter class; corresponding limits apply to other diameter classes.

⁴ To convert to full number of cords add "000".

⁵ Longleaf and slash pines.

⁶ Cypress, oak, hickory, beech, ash, elm, hackberry, and associated minor species.

An integration of the lumber, naval stores, and pulp industries seems possible in this area because 76 percent of the wood volume that could be used for pulp or lumber is of species that cannot be used for naval stores, while the timber abandoned annually by the naval stores industry is also available for pulpwood and lumber. According to figures in tables 4 and 5, trees in the 6- to 12-inch diameter classes comprise 56 percent of the total cordage. They are growing rapidly and serve as a nucleus for the future timber crops on which the various wood-using industries must depend. If properly managed and protected, they should furnish an increasing supply of timber for pulpwood, lumber, and naval stores.

The relationship between cordwood volumes in the several tree-diameter classes is illustrated in figure 2. The chart shows that in most species groups the volume of wood is greater in the 10- to 12-inch classes than it is in the 14- to 18-inch classes; and that in the latter classes it is in turn greater than that of the 20-inch and over classes. These facts promise increasing crops of timber in the future, provided that the small trees are not prematurely removed from the stand.

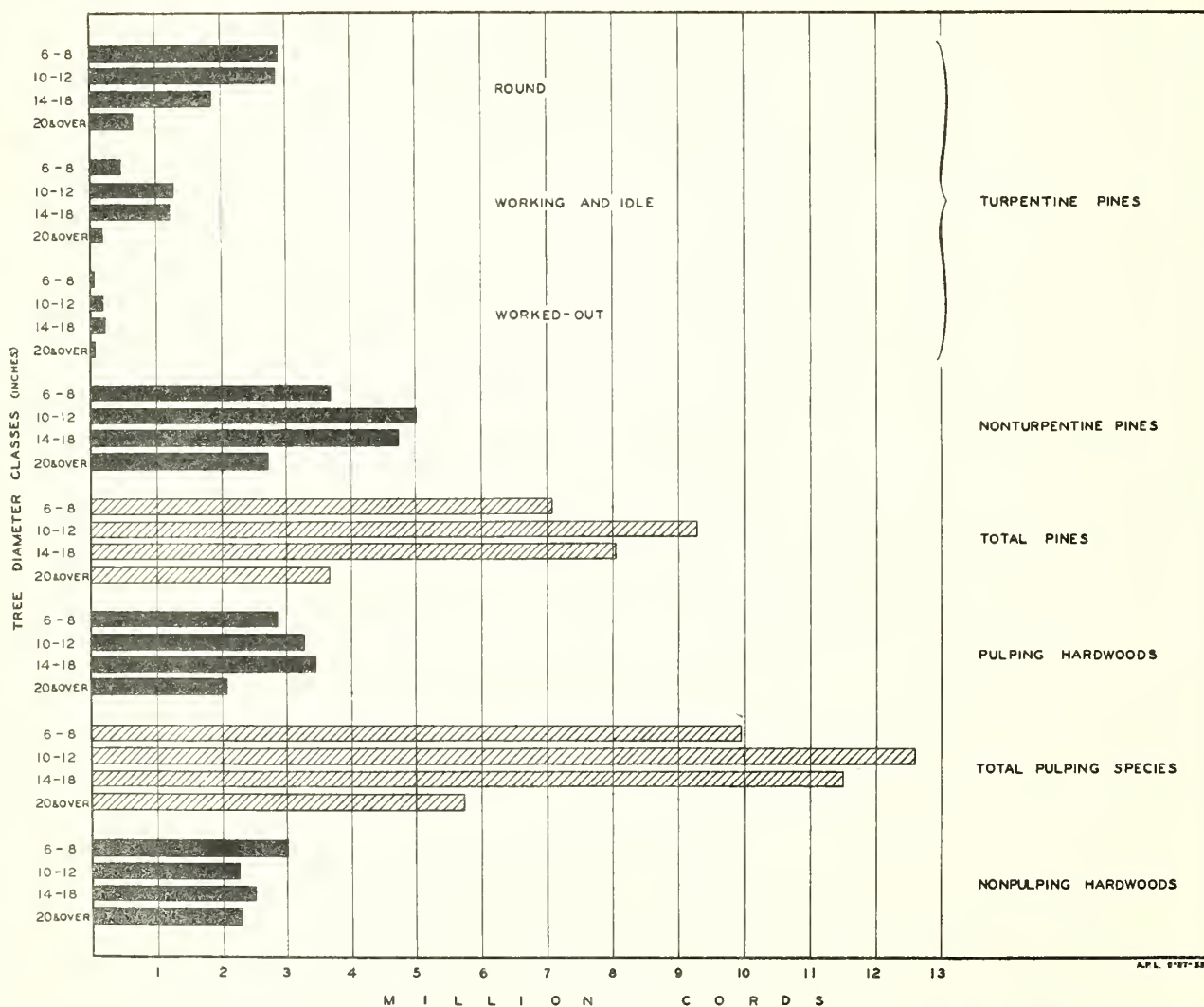


FIGURE 2. -- Classification of cordwood volume by species groups and tree-diameter classes. Round turpentine pines, nonturpentine pines, and hardwoods were measured from 4-1/2 feet above the ground. Working and idle turpentine pines were measured from the turpentine-butt section, 10 feet above the ground. Trees ranging from 5.0" - 8.9" in diameter outside of bark are placed in the 6" - 8" class; corresponding limits apply to the other diameter classes.

Table 6 classifies the cordwood volume for the average acre by species groups and tree-diameter classes. This average-acre volume is a theoretical figure derived

TABLE 6. -- Cordwood volume¹ on the average acre of productive forest land by pulping and non-pulping species groups and tree diameter classes²

Tree species groups	Tree diameters in inches ³								Total all diameter classes	
	6" - 8"		10" - 12"		14" - 18"		20" & over			
	Cords	% of total	Cords	% of total	Cords	% of total	Cords	% of total	Cords	% of total
Pulping:										
Turpentine pine: ⁴										
Round	.50	5.8	.49	5.6	.33	3.8	.12	1.4	1.44	16.6
Working and idle	.08	.9	.23	2.7	.21	2.4	.03	.3	.55	6.3
Worked-out	.01	.1	.03	.3	.04	.5	.01	.1	.09	1.0
Nonturpentine pine ⁵	.64	7.3	.87	10.0	.83	9.5	.48	5.6	2.82	32.4
Total pine	1.23	14.1	1.62	18.6	1.41	16.2	.64	7.4	4.90	56.3
Hardwood ⁶	.50	5.7	.58	6.7	.60	6.9	.36	4.1	2.04	23.4
Total pulping	1.73	19.8	2.20	25.3	2.01	23.1	1.00	11.5	6.94	79.7
Nonpulping hardwood ⁷	.53	6.1	.40	4.6	.44	5.0	.40	4.6	1.77	20.3
Total all species	2.26	25.9	2.60	29.9	2.45	28.1	1.40	16.1	8.71	100.0

¹ Gross volume; woods cull has not been deducted. It is believed that final computations will indicate deductions of between 3 and 6 percent for woods cull.

² The 5,729,700 acres of productive forest area were used in finding the average acre.

³ Round turpentine pines, nonturpentine pines and hardwoods, were measured at 4-1/2 feet from the ground. Working and idle and worked-out turpentine pines were measured above the turpentine-butt section, 10 feet from the ground. Trees ranging from 5.0 to 8.9 inches in diameter outside of bark are placed in the 6" - 8" diameter class; corresponding limits apply to other diameter classes.

⁴ Longleaf and slash pines.

⁵ Loblolly, shortleaf, sand and spruce pines, cedar.

⁶ Gum, bay, yellow poplar, magnolia, maple, and associated minor species.

⁷ Cypress, oak, hickory, beech, ash, elm, hackberry, and associated minor species.

by dividing the total volume for the area by the productive forest acreage. The table shows a volume of 8.71 cords of wood (without deduction for woods cull) on the average acre, of which nearly 80 percent is in pulping species. The pines alone contribute nearly 3 cords per acre from trees less than 13 inches in diameter, while the pulping hardwoods furnish another cord per acre from trees of the same diameter classes.

Summary

The extent of the Southwest Alabama survey area is over 8 million acres. Its surface relief is rolling to hilly and is well drained by numerous rivers and streams. More than 70 percent of the land area, or approximately 5,729,700 acres, is forest land. Mixed pine stands of longleaf, slash, loblolly, and shortleaf species occupy 78 percent of the forest area. The total cordwood volume is approximately 50 million cords, of which nearly 40 million are in pulping species. Loblolly and shortleaf pine account for 40 percent of the volume in pulping cordwood. Trees of pulping species under 13 inches in diameter aggregate 23 million cords, or over half the total pulping cordage. The average acre of productive forest area bears nearly 9 cords of wood, of which 5 are in pine species, 2 in pulping hardwoods, and 2 in nonpulping hardwoods.

The present existence in this area of lumber mills that operate on a continuous production basis, the possible future expansion in the wood pulp industry, and the probable increase in the scale of naval stores operation in the near future, afford an excellent opportunity, and also suggest the need, for introducing a high degree of integration among the major wood-using industries in order that all may operate upon a sustained-yield basis.



Errata

Page 6, line 10: Read "woods cull has not been made".

Page 10, line 14: Read "increasing".

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STATISTICS ON GUM NAVAL STORES PRODUCTION

By

SOUTHERN FOREST SURVEY STAFF

I. F. Eldredge

Regional Survey Director

* - This is an advance release of Forest Survey data that will be included in complete reports to be published later. This information is subject to correction or amplification as computations proceed.

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STATISTICS ON GUM NAVAL STORES PRODUCTION

The survey of the gum naval stores situation and prospects in the South, now being made by the U. S. Forest Service as a part of the National Forest Survey, falls into two parts: (1) an inventory of the longleaf and slash pine timber resources, and (2) an investigation of gum naval stores operations and production. The inventory of the timber supply is being made by specially trained parties of timber estimators, who, by the end of June 1936, will have covered the entire longleaf-slash pine forest from South Carolina to Texas, inclusive. The study of gum naval stores producers should also be complete by the end of June. Data for this study are obtained by visiting and personally interviewing the processors at their turpentine stills, and by referring to the records of naval stores factors.

During the spring and summer of 1934, the Forest Service obtained information from practically all the turpentine processors¹ in what might be termed the "active" naval stores belt. The belt surveyed is shown on the map (Fig. 1) on page 3. It does not include all the longleaf-slash pine region, but embraces the part within which 96 percent of the gum naval stores processors are located. The number and approximate distribution of processors by counties in the active belt, based upon the location of the timber worked, are shown by dots. No effort is made to show the actual locations of the stills or orchards within the counties. The approximate locations of stills reported to be operating outside the active belt are shown on the map by means of crosses.

Except for the acreage figures given in Table 1 on page 2, all data in this release are based solely on the still canvass made during the spring and summer of 1934. This information is being published now, even though the survey has not been completed, because of its interest to the industry at this time. When the entire region has been surveyed, a full and complete report will be prepared, combining both the timber inventory and the naval stores production study.

Since the turpentine still canvass was made during the midst of the 1934-35 crop season, when production data for that season were incomplete, all figures on production are those for the preceding season, 1933-34. Although many still operators had inadequate records, relying largely on memory to supply the desired information, it was possible to check a great deal of the production data against factors' accounts. There has been no way, however, to check the information received as to the number of crops worked during the season 1933-34. All data concerning the number of gum producers without stills and the number of their crops, are survey estimates based on information obtained from the processors who stilled the gum for them.

AREA AND TURPENTINE WORKING STATUS OF ACTIVE NAVAL STORES BELT, SEASON 1934-35

Table 1 shows that the active naval stores belt (as here defined) occupies a land area of 65 million acres, nearly three-fourths of which is productive forest land. The nonproductive forest land shown in the table is forest

¹ As used throughout this release, the term "processor" includes only those who maintain turpentine stills.

area that has not the qualities essential for the growth of commercial timber species. The productive forest area can be divided into several classes on the basis of its turpentine working status. These classes are defined as follows:

Area in round timber.--Area bearing uncupped longleaf and slash pine trees in sufficient quantity to justify future working.

Area in working crops.--Area bearing trees that are now being worked for naval stores.

Area in resting and worked-out crops.--Area bearing previously-worked naval stores trees, on which operations are not presently active. This area includes both crops in which the trees are resting prior to further working, and crops in which the trees are completely exhausted for naval stores operations.

Area in nonturpentine timber.--Area occupied for the most part by nonturpentine species, and on which there are too few turpentine trees to justify working.

TABLE 1. -- Total acreage¹ of each survey area, and productive forest acreage classified as to turpentine working status, season 1934-35

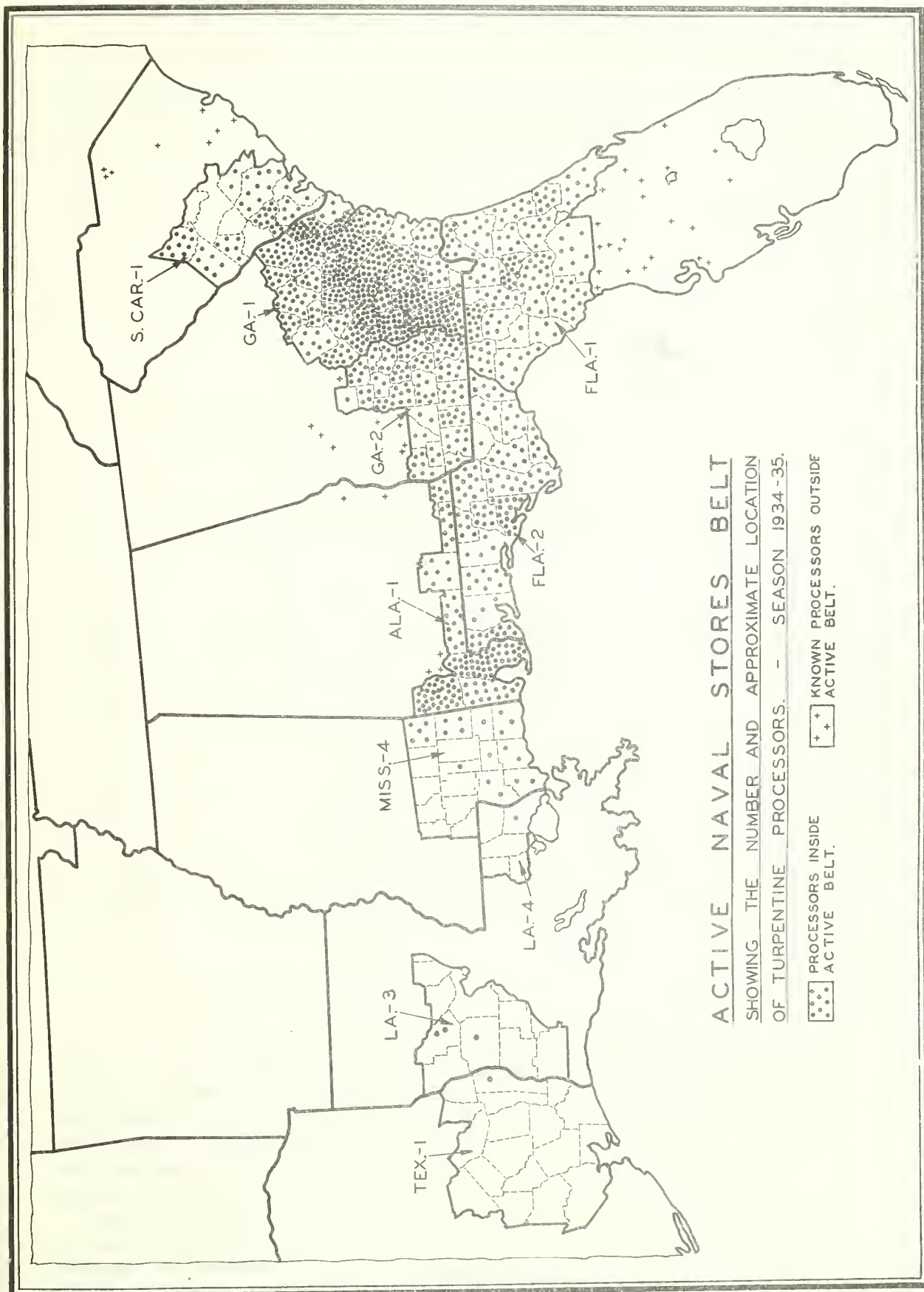
Survey areas	Productive forest area by turpentine working status					Non-productive forest area	Non-forest area	Total area	Percent of total acreage all areas
	Area in round timber	Area in working crops	Area in resting and worked-out crops	Area in nonturpentine timber	Total productive forest area				
----- Acres -----									
South Carolina #1 ^{2/}	928,300	233,900	270,800	1,560,000	2,993,000	-	2,193,900	5,186,900	7.9
Georgia #1 ^{3/}	867,800	3,065,800	1,670,300	1,452,300	7,056,200	-	2,655,000	9,711,200	14.8
Georgia #2	653,500	854,000	849,900	656,600	3,014,000	6,400	2,565,500	5,585,900	8.5
Florida #1 ^{4/}	1,941,100	1,381,300	1,867,800	2,107,500	7,297,700	81,200	2,136,700	9,515,600	14.5
Florida #2 and Alabama #1	3,541,400	1,510,000	2,022,400	2,237,300	9,311,100	21,200	2,475,700	11,808,000	18.0
Louisiana #4 and Miss. #4	3,174,600	236,300	300,700	2,703,100	6,414,700	800	1,665,800	8,081,300	12.4
Total area east of Mississippi River	11,106,700	7,281,300	6,981,900	10,716,800	36,086,700	109,600	13,692,600	49,888,900	76.1
Percent of total area east of Mississippi River	22.2	14.6	14.0	21.5	72.3	.2	27.5	100.0	
Louisiana #3 and Texas #1	-----	3,189,800	-----	7,960,800	11,150,600	13,300	4,503,000	15,666,900	23.9
Total all areas	-----	28,559,700	-----	18,677,600	47,237,300	122,900	18,195,600	65,555,800	100.0
Percent of total acreage all areas	-----	43.5	-----	28.5	72.0	.2	27.8	100.0	

¹ No meanderable waters included.

² S.C. #1 - Does not include coastal islands of Beaufort County, 91,200 acres.

³ Ga. #1 - Does not include Okefenokee Swamp, 412,100 acres, and strip along the coast which contains coastal islands and salt marshes, 384,200 acres.

⁴ Fla. #1 - Does not include Ocala National Forest, 263,000 acres.



SOUTHERN FOREST EXPERIMENT STATION-NEW ORLEANS. LA.

RDA11-22-35

FIGURE 1

TURPENTINE PROCESSORS, SEASON 1934-35

Table 2 lists the types and number of turpentine processors found in each survey area. As stated above, the total of 1,110 represents as nearly as possible a 100 percent canvass of the active naval stores belt. Twenty-three processors included in this total revived inactive places or started anew in the season 1934-35; seven were active in 1933-34, but probably were shut down in 1934-35. Georgia Area #1, the greatest center of production activity, contains nearly half the total processors in the belt surveyed. The two Georgia areas, together with Florida #1, contain nearly three-fourths.

TABLE 2. -- *Turpentine processors, season 1934-35*

Survey areas	Types of turpentine processors			Total processors	Percent of total number
	Gum producers		Those who do not produce gum, but still for others		
	Those who still their own gum only	Those who still their own and others' gum			
----- <i>Number</i> -----					
S. Carolina #1	35	12	4	51	4.6
Georgia #1	182	307	13	502	45.2
Georgia #2	93	33	1	127	11.4
Florida #1	161	9	-	170	15.3
Florida #2	81	31	1	113	10.2
Alabama #1	45	73	3	121	10.9
Mississippi #4 &)					
Louisiana #4)	9	11	2	22	2.0
Louisiana #3 &)					
Texas #1)	4	-	-	4	.4
Total	610	476	24	1,110	100.0
Percent of total number	54.9	42.9	2.2	100.0	

GUM PRODUCERS WITHOUT STILLS, SEASON 1933-34

The growing agricultural depression in recent years has had its effect upon the naval stores industry. Many small farmers are now turning to the production of gum as a means of augmenting their cash income. Gum producers of this class own no stills; at best, they work a very small area. They either sell their gum outright to a local stiller, or have it stilled and then sell the turpentine and rosin. For the surveyed belt as a whole, the average gum producer of this class worked only about 2,000 cups during the 1933-34 season.

Table 3 shows the extent to which this practice has developed, particularly in Georgia Area #1, where more than 8,000 small producers are located. Alabama #1 has more than a thousand of them. Florida #1, however, with only 30, furnishes a notable contrast.

Since it was not practicable to make a canvass of this class of producers, the figures given in Table 3 are estimates that the Forest Survey has made from information furnished by processors who stilled the gum during the 1933-34 season. Similar estimates for the 1934-35 season are not available, but there are strong indications that both the number and importance of small producers are increasing.

TABLE 3. -- *Gum producers without stills, season 1933-34*

Survey areas	Types of gum producers without stills		Total	Percent of total number
	Those who sell their gum	Those who have their gum stilled, and sell the turpentine and rosin		
----- <i>Number</i> -----				
S. Carolina #1	360	20	380	3.4
Georgia #1	7,850	610	8,460	75.2
Georgia #2	330	10	340	3.0
Florida #1	20	10	30	.3
Florida #2	350	30	380	3.4
Alabama #1	1,050	100	1,150	10.2
Mississippi #4 &)				
Louisiana #4)	510	Negligible	510	4.5
Louisiana #3 &)				
Texas #1)	-	-	-	-
Total	10,470	780	11,250	100.0
Percent of total number	93.1	6.9	100.0	

Chart #1, on page 13, shows graphically the following data contained in Tables 2 and 3, respectively: (1) The percent of the belt's total processors located in each survey area; and (2) the percent of the belt's total gum producers without stills located in each survey area.

WORKING TURPENTINE CROPS, SEASON 1933-34

Table 4 presents an estimate of the working turpentine crops in the active naval stores belt during the 1933-34 season. The processors' crops were reported by the still operators. The crops listed for the gum producers without stills were estimated from information furnished by processors who stilled the gum. The Survey had no means of checking these figures, but judging them according to production data that were checked with factors' accounts, they are thought to be relatively accurate.

The concentration of work in Southeast Georgia is due mainly to the presence there of second-growth timber, which was of a size and age to attract the industry when the last of the large stands of old-growth pine were worked out in Mississippi, Louisiana, and Texas. It seems likely that as the supply

of available timber in Georgia is reduced by this concentration of working, opportunity for such operations as may be crowded out will be found to the southward and westward.

TABLE 4. -- Working turpentine crops, season 1933-34, classified by types of crop operators

Survey areas	Types of turpentine crop operators				Total	Percent of total crops
	Turpentine processors		Gum producers without stills			
	Those who still their own gum only	Those who still their own and others' gum	Those who sell their gum	Those who have their gum stilled and sell the turpentine & rosin		
----- Crops of ten thousand cups ¹ -----						
S. C. #1	310	40	110	10	470	3.9
Ga. #1	1,710	2,040	1,060	540	5,350	44.9
Ga. #2	900	370	50	10	1,330	11.2
Fla. #1	1,810	60	10	40	1,920	16.1
Fla. #2	820	270	30	40	1,160	9.7
Ala. #1	490	500	210	80	1,280	10.7
Miss. #4)						
& La. #4)	150	110	90	10	360	3.0
La. #3 &)						
Tex. #1)	60	-	-	-	60	.5
Total	6,250	3,390	1,560	730	11,930	100.0
Percent of total crops	52.4	28.4	13.1	6.1	100.0	

¹ Figures rounded to nearest 10 crops.

Chart #3 on page 13 shows graphically the following data: (1) the percent of the total operations made up by each type of processors and gum producers without stills (as obtained from Tables 2 and 3); and (2) the percent of the total 1933-34 crops worked by each group (as given in Table 4).

NAVAL STORES PRODUCTION, SEASON 1933-34

The gum naval stores production during the 1933-34 season, as reported by still operators, is classified in Table 5 according to the three major types of turpentine processors. The production indicated for each group is the total stilled by them, regardless of the gum's source; it includes production from bought gum and from gum stilled on a commission basis for small producers without stills. Practically all gum, regardless of who gathered it, passed through turpentine stills in the 1933-34 season. Hence the processors' reports include the whole production for that season except a very small amount of gum that went directly into industry in the raw condition. Since then, methods have been developed for treating gum for shipment to plants outside the belt, and a

market has been established for raw gum that does not pass through the hands of southern stillers.

Less than four percent of the production during the 1933-34 season was made in Mississippi, Louisiana, and Texas, three states in the western territory, where thirteen years previously the percentage had been, according to Gamble's *Naval Stores Year Book*, five times as great.

TABLE 5. -- *Naval stores production, season 1933-34, classified by types of turpentine processors*

Survey areas	Types of turpentine processors			Total	Percent of total production
	Those who still their own gum only	Those who still their own and others' gum	Those who do not produce gum, but still for others		
----- Naval stores units ¹ -----					
S. Carolina #1	11,330	3,020	1,560	15,910	3.3
Georgia #1	76,340	141,150	5,830	223,320	45.7
Georgia #2	43,700	19,560	620	63,880	13.1
Florida #1	77,580	4,030	-	81,610	16.7
Florida #2	27,570	11,330	380	39,280	8.0
Alabama #1	20,900	25,470	380	46,750	9.6
Mississippi #4 &)					
Louisiana #4)	7,250	6,030	420	13,700	2.8
Louisiana #3 &)					
Texas #1)	3,710	-	-	3,710	.8
Total	268,380	210,590	9,190	488,160	100.0
Percent of total production	55.0	43.1	1.9	100.0	

¹ Figures rounded to nearest ten units. A naval stores unit is made up of one 50-gallon barrel of turpentine and three and one-third 500-pound (gross) barrels of rosin.

Chart #2 on page 13 shows graphically the following data contained in Tables 4 and 5: (1) percent of the total 1933-34 crops worked in each survey area; and (2) percent of the total 1933-34 production processed in each survey area.

SIZE OF TURPENTINE STILLING OPERATIONS, SEASON 1933-34

Table 6 classifies the turpentine processors in each survey area according to their production of naval stores during the 1933-34 season. They are classified on the basis of the total production reported to the Survey, including that from bought gum and from gum stillled on a commission basis for small producers without stills. The table also shows the percent of the total production in each area and in the whole belt that was made by each size class of processors. Thus, in the entire region, half the processors made from 151 to 450 naval stores units each. As a group, they processed one-third of the total output for the belt.

TABLE 6. -- Turpentine processors, classified by amount of gum naval stores production, season 1933-34; and the proportion of the 1933-34 production made by each class. *

Stilling production per processor, season, 1933-34	Survey areas																	Total	
	South Carolina #1		Georgia				Florida				Alabama #1		Mississippi #4 and Louisiana #4				Louisiana #3 and Texas #1		
			#1		#2		#1		#2										
			Opera- tions	Propor- tion of total produc- tion in area	Opera- tions	Propor- tion of total produc- tion in area	Opera- tions	Propor- tion of total produc- tion in area	Opera- tions	Propor- tion of total produc- tion in area			Opera- tions	Propor- tion of total produc- tion in area					
N.S.Units $\frac{1}{0.2}$	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	Propor- tion of total produc- tion in area
1 - 150	1	-	9	-	1	-	3	-	5	-	4	-	-	-	-	-	23	2.1	-
151 - 300	12	7.0	78	3.2	10	1.6	13	1.9	18	4.7	30	5.9	3	2.0	-	-	164	14.8	3.2
301 - 450	16	22.4	135	13.9	22	7.8	47	14.1	38	22.2	34	16.4	5	7.6	-	-	297	26.7	14.0
451 - 600	11	26.1	108	18.3	32	18.8	46	20.7	28	26.5	26	21.1	2	5.5	1	11.3	254	22.9	19.5
601 - 750	6	20.2	69	16.8	31	24.8	25	15.8	8	10.5	10	11.5	3	10.6	1	15.7	153	13.8	16.6
751 - 900	3	12.9	36	11.1	11	11.8	12	9.6	5	8.7	6	8.7	2	10.0	-	-	75	6.7	10.4
901 - 1050	1	4.7	22	8.1	8	10.3	4	3.9	4	8.0	3	5.2	2	11.7	-	-	44	4.0	7.3
1051 - 1200	-	-	17	7.6	6	8.8	9	10.7	4	9.8	3	6.2	1	6.7	-	-	40	3.6	8.0
1201 - 1350	1	6.7	2	1.0	2	3.5	4	5.6	1	2.8	1	2.5	2	16.5	1	31.2	14	1.3	3.3
1351 - 1500	-	-	8	4.6	1	1.9	2	3.0	1	3.2	-	-	1	9.5	-	-	13	1.2	3.4
over - 1500	-	-	5	3.3	-	-	1	1.7	1	3.6	-	-	-	-	-	-	7	.6	2.1
	-	-	13	12.1	3	10.7	4	13.0	-	-	4	22.5	1	19.9	1	41.8	26	2.3	12.2
Total	51	100.0	502	100.0	127	100.0	170	100.0	113	100.0	121	100.0	22	100.0	4	100.0	1110	100.0	100.0

* Chart #4 on page 13 presents graphically the percent of the total processors in each size class and the percent of the total 1933-34 production stilled by each class, (as given in the last 2 columns above).

1 A naval stores unit is made up of one 50-gallon barrel of turpentine and three and one-third 500-pound (gross) barrels of rosin.

2 Processors inactive in 1933-34, probably active in 1934-35.

AVERAGE SIZE AND YIELD OF TURPENTINE ORCHARDS, SEASON 1933-34

Table 6 on the preceding page, indicates the size of the processors' 1933-34 stilling operations. Table 7 gives the average size of their timber-working operations. It shows, for the processors in each survey area who worked crops during the 1933-34 season, the average number of turpentine crops they worked and the amount of naval stores they produced therefrom. (Production from bought gum and from gum stillled on a commission basis is not included). Thus in Georgia Area #2, the average processor worked 10 crops during the 1933-34 season, from which he produced 496 naval stores units. For the surveyed belt as a whole, the average processor worked 9 crops and produced 385 units therefrom. The season 1933-34 was one of favorable labor and weather conditions generally throughout the region, and the production shown is probably higher than for the usual season.

Table 7 also indicates the average yield per crop and the average number of streaks worked by the processors during the 1933-34 season. In the two Georgia areas and in Florida Area #1 an average of 35 streaks was worked. An average of 34 streaks was worked in Alabama, Mississippi, Louisiana, and Texas. These figures, (35 and 34) are in contrast to 32 streaks, which is usually considered a good season's work. In the past few years there has been a growing tendency towards winter streaking.

TABLE 7. -- Average number of turpentine crops worked and yield therefrom for processors with woods operations¹, season 1933-34

Survey areas	Average number of crops worked	Average naval stores production from crops worked	Average yield per crop	Average number of streaks
	<i>Crops of 10,000 cups</i>	<i>Naval stores units²</i>	<i>Naval stores units²</i>	<i>Streaks</i>
S. Carolina #1	7.9	287	36	33
Georgia #1	7.8	342	44	35
Georgia #2	10.2	496	49	35
Florida #1	11.2	479	43	35
Florida #2	10.1	343	34	31
Alabama #1	8.7	336	39	34
Mississippi #4 &)				
Louisiana #4)	13.0	563	43	34
Louisiana #3 &)				
Texas #1)	15.8	928	59	34
Averages for total belt	9.1	385	42	34

¹First two classes of processors in Table 2, page 4, who worked crops during 1933-34 season.

²A naval stores unit is made up of one 50-gallon barrel of turpentine and three and one-third 500-pound (gross) barrels of rosin.

PROPORTION OF CROPS OWNED AND LEASED BY PROCESSORS,
SEASON 1934-35

The practice of leasing timberland for turpentine is clearly brought out in Table 8, which shows, for the processors who worked crops during the 1934-35 season, the proportion of crops that were owned and the proportion that were leased. In Georgia Area #2, scarcely more than one-tenth of the crops were on owned land. Even in Georgia #1 and Alabama #1, where large individual holdings are located, 65 percent of the crops are on leased land. Taking the naval stores territory as a whole, nearly three-fourths of the crops are on leased land.

Forest Survey figures have been compiled, showing that in the total area owned by the average processor, 39.8 percent is working, 43.2 percent is resting or reserved, and the remaining 17 percent is classed as nonturpentine area.

TABLE 8. -- *Proportion of turpentine crops owned and leased by processors with woods operations¹, 1934-35*

Survey areas	Owmed crops	Leased crops	Total
----- Percent -----			
S. Carolina #1	18.5	81.5	100.0
Georgia #1	35.3	64.7	100.0
Georgia #2	11.3	88.7	100.0
Florida #1	22.2	77.8	100.0
Florida #2	20.9	79.1	100.0
Alabama #1	35.0	65.0	100.0
Mississippi #4 &)			
Louisiana #4)	20.4	79.6	100.0
Louisiana #3 &)			
Texas #1)	16.1	83.9	100.0
Averages for			
total region	26.9	73.1	100.0

¹ First two classes of processors in Table 2, page 4.

STYLE OF STILLs AND STILLING METHODS USED,
SEASON 1934-35

As noted in Table 2, the Survey found 1,110 gum-turpentine processors in the "active" naval stores belt. Data on the style of still setting and the stilling method used were obtained from all but nine. Of the 1,101 from whom data were obtained, some reported joint ownership of stills, while others reported ownership of more than one still, bringing the total number owned by the group up to 1,160. As used here, the term "still" is synonymous with "kettle". Thus if a man had two stills under one shed, each one was counted separately, and the setting and stilling method of each was considered independent of the other.

On the basis of the setting, the stills were placed in three broad classes, defined as follows:

- Government style:* Stills built strictly according to Bureau of Chemistry and Soils specifications and under their supervision.
- Semi-govt. style:* Stills having many of the improved features prescribed by the Bureau of Chemistry and Soils, but not built strictly according to their specifications and under their supervision.
- Old-style:* Stills of usual construction, lacking generally the features of modern development.

Within all three styles of setting there is considerable variation in construction features. Table 9 classifies the 1160 stills, reported by the 1101 processors, according to the three styles.

TABLE 9. -- Number of turpentine stills by style of still setting, season 1934-35

Survey areas	Style of still setting			Total	Percent of total
	Old	Semi-government	Government		
----- <i>Number of stills</i> -----					
S. Carolina #1	44	7	1	52	4.5
Georgia #1	368	58	93	519	44.8
Georgia #2	108	11	13	132	11.4
Florida #1	130	11	38	179	15.4
Florida #2	96	5	14	115	9.9
Alabama #1	119	5	4	128	11.0
Mississippi #4 &)					
Louisiana #4)	21	-	7	28	2.4
Louisiana #3 &)					
Texas #1)	3	2	2	7	.6
Total	889	99	172	1,160	100.0
Percent of total	76.7	8.5	14.8	100.0	

On the basis of the stilling method used, the stills were placed in two classes, defined as follows:

<i>Sound method:</i>	The stilling process is controlled chiefly by sound. Some of these stills are equipped with non-recording thermometers as a supplement.
<i>Recording-thermometer method:</i>	The stilling process is governed chiefly by a recording thermometer. Sound or bottle and chart may be used as a supplement.

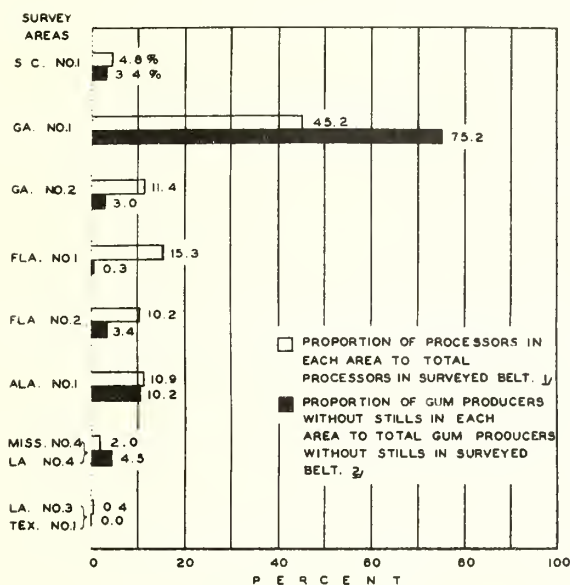
Table 10 classifies the 1160 stills reported by the 1101 processors according to the two stilling methods. Whereas the modern type of still, equipped with a recording thermometer, is slowly but steadily supplanting the old method of regulating the process by the sound at the tail pipe, the old sound method is still used on 80 percent of the stills.

TABLE 10. -- *Number of turpentine stills by stilling method used, season 1934-35*

Survey areas	Stilling method		Total	Percent of total
	Sound	Recording thermometer		
----- Number of stills -----				
S. Carolina #1	49	3	52	4.5
Georgia #1	409	110	519	44.8
Georgia #2	93	39	132	11.4
Florida #1	133	46	179	15.4
Florida #2	99	16	115	9.9
Alabama #1	108	20	128	11.0
Mississippi #4 &)				
Louisiana #4)	14	14	28	2.4
Louisiana #3 &)				
Texas #1)	-	7	7	.6
Total	905	255	1,160	100.0
Percent of total	78.0	22.0	100.0	

CHART NO. 1

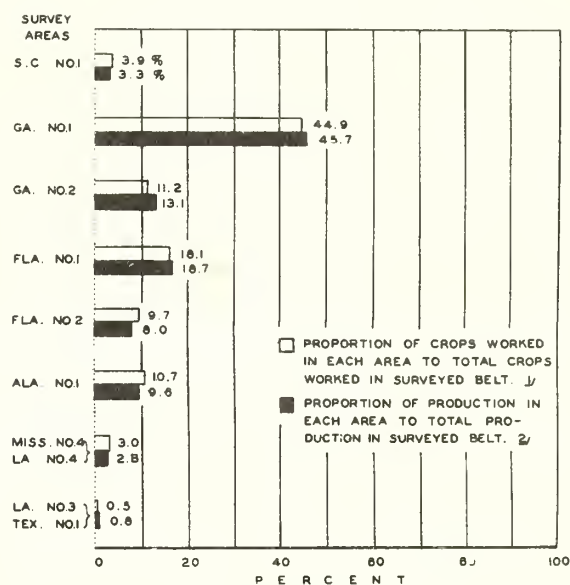
DISTRIBUTION THROUGHOUT THE SURVEYED BELT OF
THE TURPENTINE PROCESSORS, SEASON 1934-35, AND
THE GUM PRODUCERS WITHOUT STILL, SEASON 1933-34



1/ FOR ACTUAL NUMBER OF PROCESSORS, SEE TABLE 2, PAGE 4.
2/ FOR ACTUAL NUMBER OF GUM PRODUCERS WITHOUT STILL
SEE TABLE 3, PAGE 5.

CHART NO. 2

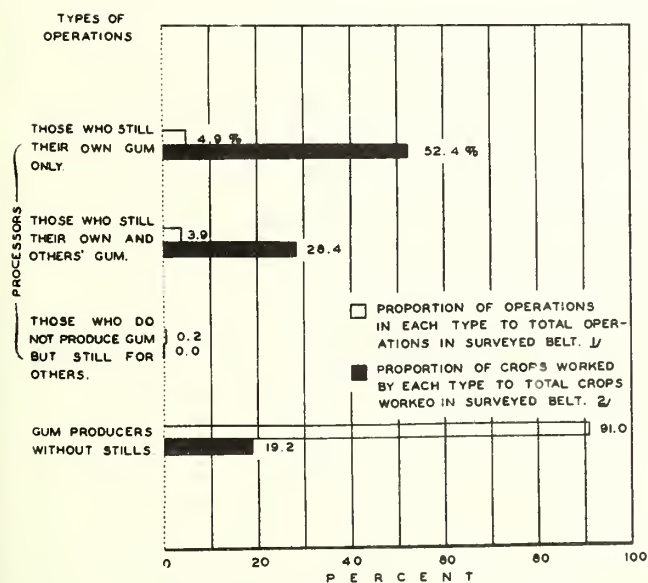
DISTRIBUTION THROUGHOUT THE SURVEYED BELT OF
THE TURPENTINE CROPS AND THE PRODUCTION,
SEASON 1933-34



1/ FOR ACTUAL NUMBER OF CROPS, SEE TABLE 4, PAGE 6.
2/ FOR ACTUAL PRODUCTION, SEE TABLE 5, PAGE 7.

CHART NO. 3

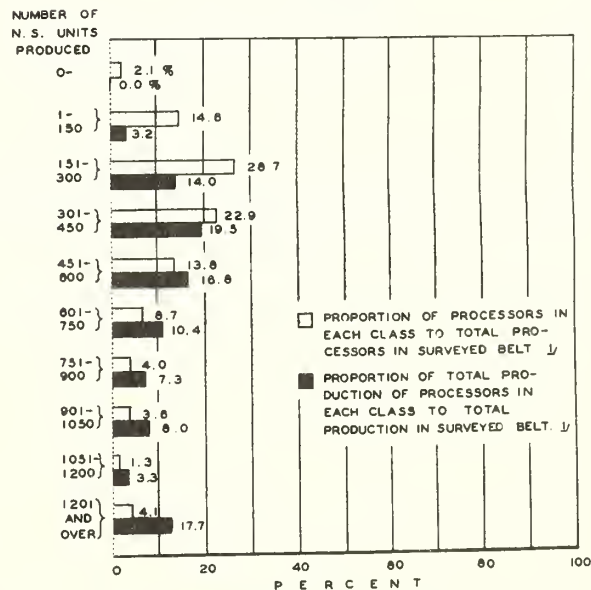
CLASSIFICATION OF TURPENTINE OPERATIONS
AND 1933-34 CROPS BY TYPES OF OPERATIONS.



1/ FOR ACTUAL NUMBER OF OPERATIONS, SEE TABLES 2 AND 3,
PAGES 4 AND 5.
2/ FOR ACTUAL NUMBER OF CROPS, SEE TABLE 4, PAGE 6.

CHART NO. 4

CLASSIFICATION OF PROCESSORS, SEASON 1934-35
BY QUANTITY OF PRODUCTION, SEASON 1933-34 AND
PROPORTION OF TOTAL PRODUCTION MADE BY
EACH CLASS



1/ FOR ACTUAL NUMBER OF PROCESSORS AND PRODUCTION,
SEE TABLE 6, PAGE 8.

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February 10, 1936.

SOUTHERN FOREST EXPERIMENT STATION

E. L. Demmon, Director

New Orleans, La.



PULPING AND NONPULPING CORDWOOD VOLUME
IN THE LONGLEAF PINE REGION OF
MISSISSIPPI & EAST LOUISIANA

By

SOUTHERN FOREST SURVEY STAFF

I. F. Eldredge

Regional Survey Director

* - This is an advance release of Forest Survey data that will be included in complete reports to be published later. This information is subject to correction or amplification as computations proceed.

FOREWORD

The nation-wide Forest Survey, being made by the United States Forest Service, was authorized by the McSweeney-McNary Forest Research Act of 1928. Its five-fold object is: (1) to make an inventory of the present supply of timber and other forest products, (2) to ascertain the rate at which this supply is being increased through growth, (3) to determine the rate at which this supply is being diminished through industrial and local use, windfall, fire, and disease, (4) to determine the present requirement and the probable future trend in the requirement for timber and other forest products, and (5) to correlate these findings with existing and anticipated economic conditions in order that policies can be formulated for the effective use of land suitable for forest production.

In the South, the Forest Survey functions as an activity of the Southern Forest Experiment Station at New Orleans, La.

Southern Forest Survey Staff

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PULPING AND NONPULPING CORDWOOD VOLUME

IN THE LONGLEAF PINE REGION OF

MISSISSIPPI & EAST LOUISIANA

The longleaf pine region of Mississippi and east Louisiana, as shown on the map (Fig. 1, page 5), extends eastward and northward from Lake Pontchartrain, and includes five parishes in Louisiana and seventeen counties in southeastern Mississippi. The Louisiana portion of the area comprises Forest Survey Unit #4 in Louisiana, the Mississippi portion Unit #4 in Mississippi.

In the southern part along the tidewater the terrain is marked by marshy, sea-level lowlands, and sandy flatwoods. These merge into rolling uplands that become higher and more broken toward the north, where elevations of four to five hundred feet are common. Gently rolling to moderately hilly uplands characterize the topography in 68 percent of the area; flatwoods occupy 11 percent; and swamps, bays, ponds, and river bottoms the remainder. The Pearl, Pascagoula, and Amite Rivers, and numerous lesser streams flowing southward, furnish adequate drainage for the area.

Only a small part of the region is in agricultural use; by far the greatest part is forest land, most of it second-growth. Approximately 500,000 acres have been acquired or are in course of acquisition within federal forest purchase areas.

There are five major trunk line railroads operating in the area: the Louisville and Nashville; the Southern; the Illinois Central; the Gulf, Mobile, and Northern; and the Mobile and Ohio. Four or five smaller railroads also traverse parts of the region, and there are numerous hard-surfaced and gravelled highways. Probably less than 5 percent of the area lies more than 10 miles from railroads or improved roads. New Orleans, Gulfport, and Mobile, which have deep water shipping facilities, are connected by rail and highway with all parts of the area and are within 250 miles travel of any part of it.

The information presented in this release is based on data that the Forest Survey gathered between August, 1934 and March, 1935. Specially trained timber cruisers measured the timber and recorded the forest and land-use conditions on more than 10,000 quarter-acre plots systematically located at intervals of 660 feet on parallel compass lines 10 miles apart. The preliminary estimates presented here are subject to correction or modification as analyses proceed. Such changes, if necessary, however, will probably be neither extensive nor basic.

The Forest Survey is not attempting in this release to analyze the extent to which the wood volume of the area should be used for pulp. In such an analysis it would have to consider the prior claims of other forest industries, and the building up of an ample growing stock to safeguard the future timber supply. The Survey has gathered data on the growth, use, and industrial aspects of the forests in the region. In interpreting these data it will attempt to determine the relative volumes of pulpwood, sawtimber, and other forest products that the area can perpetually produce, and will publish such findings as it makes as part of a more comprehensive report.

LAND AREA

Table 1 classifies the total area of 8 million acres in the region by major classes of land use. The forest area of nearly 6½ million acres makes up by far the most extensive part of the region, including nearly 80 percent of the total acreage. In contrast, only 18 percent, or less than 1½ million acres, are cleared for agricultural use.

TABLE 1. -- Area ¹ classified by major land uses

Land-use classes	Area in acres	Percent of total area
Forest	6,414,700	79.4
Agricultural:		
In cultivation:		
Old cropland ²	1,152,200	14.3
New cropland ³	19,100	.2
Out of cultivation:		
Idle ⁴	85,600	1.1
Abandoned ⁵	92,100	1.1
Improved pasture ⁶	72,000	.9
Total agricultural	1,421,000	17.6
Other:		
Marsh)		
Waterways)		
Towns and villages)	245,600	3.0
Roads, railroads, etc.)		
Total area	8,081,300	100.0

¹ Does not include meanderable water area.

² Land cultivated more than five years and on which a farm crop was raised within two years prior to date of survey.

³ Land converted from forest to cropland within five years prior to date of survey.

⁴ Cultivated land that has been idle for two years or more, but has not reached the abandoned stage.

⁵ Land once cultivated but showing distinct evidence of having been abandoned for agricultural crop production; no attempt has been made to maintain it as improved pasture.

⁶ Cleared or open land under fence used primarily for grazing; an attempt has been made to maintain a sod.

In the presentation of these survey data, it is to be noted that owing to the sampling method used in collecting them, usually the greater the number of plots recorded in any given classification the more accurate are the data for that classification. Hence classes that are of infrequent occurrence and relatively small in quantity cannot generally be determined with as high a degree of accuracy as is ob-

tainable for classes that occur more frequently and in substantially greater quantities. Small tabular figures are to be taken as showing, not the exact magnitude of the classes involved, but their relative magnitude in comparison with that of other classes.

FOREST AREA

Table 2 classifies the forest area of nearly 6½ million acres by forest conditions and forest type groups. The forest type groups are designated in the table by their predominant species. Forest conditions are defined as follows:

<i>Old growth:</i>	Stands composed predominantly of saw-log-size trees that have the characteristics of the original mature trees found in the region. ("Saw-log-size" signifies a minimum diameter of 13.0 inches outside of bark at breast height in the hardwood species, 9.0 inches in the pine species).
<i>Uncut:</i>	Old-growth stands from which less than 10 percent of the volume has been cut.
<i>Partly-cut:</i>	Old-growth stands from which 10 percent or more of the volume has been cut but in which the remaining volume per acre in old-growth saw-log-size trees is at the rate of at least 1,000 board feet of hardwood or hardwood and pine mixed, or 600 board feet of pine.
<i>Second growth:</i>	Stands that have succeeded the original old growth as a result of forest cutting or other causes.
<i>Saw-log size:</i>	Second-growth stands from which less than 10 percent of the saw-log-size trees have been cut, and in which the remaining volume per acre in saw-log-size trees is at the rate of at least 600 board feet.
<i>Uncut:</i>	
<i>Partly-cut:</i>	Second-growth stands from which 10 percent or more of the saw-log-size trees have been cut, but in which the remaining volume per acre in saw-log-size trees is at the rate of at least 400 board feet.
<i>Under saw-log size:</i>	Second-growth stands composed predominantly of under saw-log-size trees, less than 10 percent of which have been cut. The volume of saw-log-size timber present is at the rate of less than 600 board feet per acre.
<i>Uncut:</i>	
<i>Partly-cut:</i>	Second-growth stands composed predominantly of under saw-log-size trees, 10 percent or more of which have been cut. The volume of saw-log-size timber present is at the rate of less than 600 board feet per acre.

- Reproduction:* Areas not falling into any of the previous classifications, and bearing seedlings less than one inch in diameter at the rate of 80 or more per acre.
- Clear-cut:* Cut-over areas in which an insufficient quantity of young growth has come in to classify them either as second growth or as reproduction.

Table 2 indicates that over 60 percent of the forest area supports second growth, 12 percent is stocked with young seedlings, and 14 percent is clear-cut area not yet restocked. Only 13 percent of the forest area is old growth, and most of this is partly-cut.

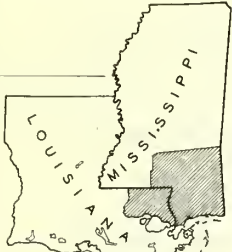
Although the longleaf and slash pine types actually occupy but 53 percent of the forest area, they predominate throughout approximately two-thirds of the region. (See map, page 5)

TABLE 2. -- Forest area by forest conditions and forest type groups

Forest conditions	Forest type groups designated by predominant species			Total	Percent of total forest area
	Longleaf and slash pine	Loblolly and short- leaf pine	Hardwood		
----- Acres -----					
Old growth:					
Uncut	43,300	28,400	157,000	228,700	3.6
Partly-cut	228,900	77,300	286,900	593,100	9.2
Total old growth	272,200	105,700	443,900	821,800	12.8
Second growth:					
Saw-log size:					
Uncut	322,200	746,900	196,200	1,265,300	19.7
Partly-cut	106,100	130,400	42,100	278,600	4.3
Under saw-log size:					
Uncut	1,168,800	629,100	505,800	2,303,700	35.9
Partly-cut	41,700	24,900	20,200	86,800	1.4
Total second growth	1,638,800	1,531,300	764,300	3,934,400	61.3
Reproduction	632,400	60,100	64,400	756,900	11.8
Clear-cut	865,700	23,400	12,500	901,600	14.1
Total all conditions	3,409,100	1,720,500	1,285,100	6,414,700	100.0
Percent of total forest area	53.2	26.8	20.0	100.0	

MAJOR FOREST TYPES IN THE LONGLEAF PINE REGION OF MISSISSIPPI & EAST LOUISIANA

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LOCATION OF SURVEY AREA
IN MISSISSIPPI & LOUISIANA

FOREST TYPES

- LONGLEAF-SLASH
- LOBLOLLY-SHORTLEAF-HDWDS.
- BOTTOMLAND HDWD & CYPRESS
- MARSH



SOUTHERN FOREST EXPERIMENT STATION - NEW ORLEANS LA

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FIGURE 1.

VOLUME ESTIMATE

Table 3 classifies the cordwood estimate for the area by forest type groups and by tree species groups and diameter classes. The forest type groups are designated in the table by their predominant species. The tree species groups are as follows:

<i>Turpentine pines:</i>	Longleaf and slash pine, the two species that are worked for turpentine.
<i>Nonturpentine pines:</i>	Loblolly, shortleaf, and spruce pines---species not worked for turpentine.
<i>Pulping hardwoods:</i>	Gum, bay, poplar, maple, magnolia, and associated minor species---generally considered of value for the production of paper pulp.
<i>Nonpulping hardwoods:</i>	Cypress, oak, hickory, beech, ash, elm, hackberry, and associated minor species---not generally considered of value for the production of paper pulp.

This volume estimate is based upon a conversion of the cubic-foot volume of the timber (including bark) into standard cords 4 x 4 x 8 feet, by using a factor of 90 cubic feet for pine and 80 cubic feet for hardwood. It covers all live trees 5.0 inches or over in diameter, except sound and rotten culls, and includes only the stemwood down to a 4.0 inch diameter limit for the pines and to the top of the last saw-log for the hardwoods. This estimate, therefore, disregards altogether the sound and rotten culls, the sound trees less than 5.0 inches in diameter, all limbwood, and the stemwood less than 4.0 inches in diameter in the pines and above the last saw-log in the hardwoods. No deduction was made for woods cull -- that part of the tree that would be left in the woods because of rot, fire-scar, crook, bad knots, or other defects. (The diameter measurement of the trees was taken $4\frac{1}{2}$ feet from the ground, except on the turpented trees, on which it was taken 10 feet from the ground.)

Table 3 indicates that 80 percent of the total volume is in pulping species: 17 percent in the turpentine pines, 30 percent in the nonturpentine pines, and 33 percent in the pulping hardwoods.

Three-fourths of the turpentine pine volume shown is in trees that have never been worked. By far the greater part of the longleaf and slash pine volume, therefore, is in trees with additional turpentering possibilities. Although fewer turpentine operations are carried on in this region than in areas farther east, the area is within the active naval stores belt and is subject to more extensive naval stores utilization.

TABLE 3. -- Cordwood volume of pulping and nonpulping species

Tree species groups	Tree diameter classes ¹	Forest type groups designated by predominant species			Total	Percent of total volume
		Longleaf and slash pine	Loblolly and short-leaf pine	Hardwood		
<i>Inches ----- Thousands of cords ² -----</i>						
Pulping Species:						
Turpentine pines:	6 - 8	1,877	98	13	1,988	4.3
	10 - 12	2,745	145	29	2,919	6.3
	14 - 18	2,067	108	10	2,185	4.7
	20 & over	819	31	7	857	1.8
Total turpentine pines		7,508	382	59	7,949	17.1
Nonturpentine pines:	6 - 8	160	3,115	202	3,477	7.5
	10 - 12	203	4,045	142	4,390	9.5
	14 - 18	126	4,057	136	4,319	9.3
	20 & over	18	1,474	38	1,530	3.3
Total nonturpentine pines		507	12,691	518	13,716	29.6
Total pines		8,015	13,073	577	21,665	46.7
Hardwoods:	6 - 8	753	1,106	1,595	3,454	7.4
	10 - 12	925	1,612	2,347	4,884	10.5
	14 - 18	408	1,112	2,956	4,476	9.7
	20 & over	91	376	2,172	2,639	5.7
Total pulping hardwoods		2,177	4,206	9,070	15,453	33.3
Total pulping species		10,192	17,279	9,647	37,118	80.0
Nonpulping Species:						
Hardwoods:	6 - 8	675	1,137	1,155	2,967	6.4
	10 - 12	314	903	1,141	2,358	5.1
	14 - 18	181	670	1,344	2,195	4.7
	20 & over	35	299	1,400	1,734	3.8
Total nonpulping species		1,205	3,009	5,040	9,254	20.0
Total all species		11,397	20,288	14,687	46,372	100.0
Percent of total volume		24.6	43.7	31.7	100.0	

¹ Diameter measurement of trees taken outside of bark $4\frac{1}{2}$ feet from the ground, except on the turpented pines, on which it was taken 10 feet from the ground. Trees ranging from 5.0 to 8.9 inches in diameter placed in the 6-8 inch class; corresponding limits apply to the other classes.

² To convert to full number of cords add "000".

The cordwood volume on the average acre of forest land is classified in Table 4 by tree species groups and diameter classes. This average acre volume is a theoretical figure derived by dividing the total cordwood volume in each species group and tree diameter class (as given in Table 3) by the forest acreage (as given in Table 2). Table 4 indicates that there is an average of approximately $7\frac{1}{4}$ cords of wood per acre in the forests of this area, over $5\frac{3}{4}$ cords in pulping species and nearly $1\frac{1}{2}$ cords in nonpulping species. The trees in the 6 and 8 inch classes contain nearly 2 cords of wood per acre, and those in the 10 and 12 inch classes over $2\frac{1}{4}$ cords.

TABLE 4. -- Cordwood volume of pulping and nonpulping species on the average acre of forest land

Tree species groups	Tree diameter classes in inches				Total all diameter classes
	6 - 8	10 - 12	14 - 18	20 & over	
----- Cords -----					
Pulping species:					
Turpentine pines	.31	.46	.34	.13	1.24
Nonturpentine pines	.54	.68	.68	.24	2.14
Total pines	.85	1.14	1.02	.37	3.38
Hardwoods	.54	.76	.70	.41	2.41
Total pulping species	1.39	1.90	1.72	.78	5.79
Nonpulping species:					
Hardwoods	.46	.37	.34	.27	1.44
Total all species	1.85	2.27	2.06	1.05	7.23

SUMMARY

The longleaf pine region of Mississippi and east Louisiana contains an area of 8 million acres. Its topography, for the most part rolling, varies from low marshes and sandy flatwoods in the southern part to rolling uplands four to five hundred feet high in the northern part. Approximately 80 percent of the area is forest land, over 60 percent of which bears second-growth timber, and 12 percent reproduction. Eighty percent of the forest area supports pine types.

The total wood volume estimated for the region is 46 million cords. Eighty percent is in pulping species, both pine and hardwood, and 20 percent is in nonpulping hardwoods. Longleaf and slash, the two turpentine pines, contain more than one-fifth of the volume in pulping species. On the average the forests in the region bear $7\frac{1}{4}$ cords of wood per acre.

Plans for future wood pulp operations in the area should consider the integration of the wood pulp industry with the naval stores, lumber, and other wood-using industries. Pulp mills located at Mobile, Ala., Mossport and Laurel, Miss., and Bogalusa, Louisiana, with an aggregate annual capacity of 440,000 cords, are now drawing about half of their material from the resources in this area.

The estimate of the cordwood volume in the region, by tree species groups and diameter classes (Table 3, page 7), is presented graphically in Figure 2.

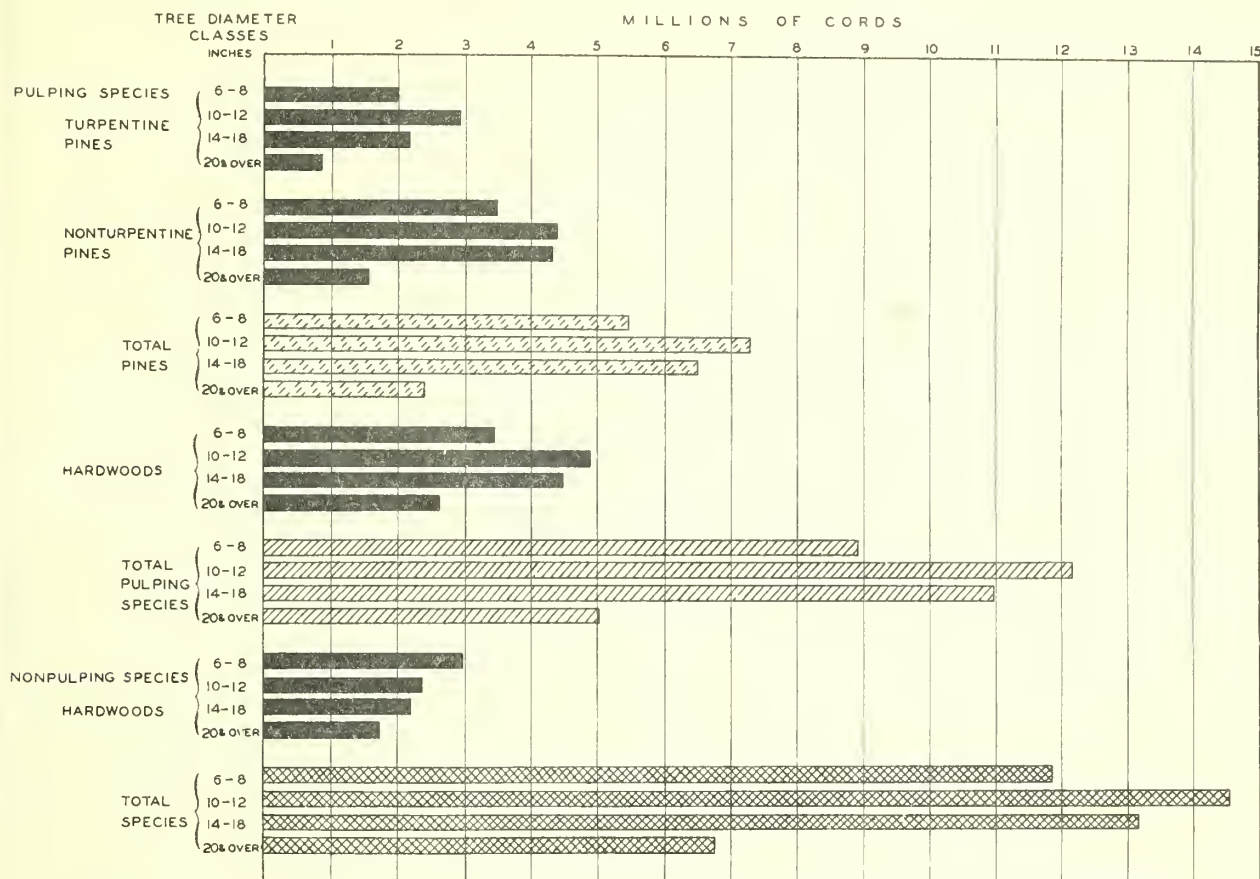


FIG. 2 - CORDWOOD VOLUME OF PULPING AND NONPULPING SPECIES. (SEE TABLE 3, PAGE 7)

A19.22

April 30, 1936.

SOUTHERN FOREST EXPERIMENT STATION

E. L. Demmon, Director

New Orleans, La.



PULPING AND NONPULPING CORDWOOD VOLUME
IN SURVEY UNIT NO. 2
FLORIDA

By

SOUTHERN FOREST SURVEY STAFF

I. F. Eldredge

Regional Survey Director

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P. R. Wheeler	Computing Chief
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PULPING AND NONPULPING CORDWOOD VOLUME
IN SURVEY UNIT NO. 2,
FLORIDA

This release covers all west Florida, that narrow arm of the state which extends 250 miles westward from the Aucilla River to the Perdido. Averaging 65 miles in width, the area borders the Gulf of Mexico along its entire southern front. Along the coast, the terrain is characterized by sandy flatwoods and marshy sea-level lowlands; this belt, ranging from 1 to 50 miles in width, occupies about one-half the total area of the unit. Behind the coastal strip lies a rolling, well drained, and for the most part, sandy surface with elevations reaching 300 feet above sea-level.

The principal drainage of the area is southward to the Gulf through rivers that originate in Georgia and Alabama to the north. Among the main streams are the Aucilla, Ochlockonee, Apalachicola, Choctawhatchee, Escambia, and Perdido Rivers. So far as the transportation of pulpwood is concerned, all these rivers are navigable for at least half their length through the unit; the Apalachicola and the Choctawhatchee are navigable throughout their length in the unit and for a distance in states to the north. Pensacola, Panama City, and Port St. Joe have port facilities for ocean-going vessels, and there are several undeveloped harbors. Except for a short distance between Choctawhatchee Bay and West Bay, the Intra-coastal Waterway system is complete along the entire coast.

The Louisville and Nashville, and the Seaboard Air Line together traverse the unit from east to west. The Atlantic Coast line and the St. Louis and San Francisco tap the area at the east and west ends respectively. These roads are supplemented by several smaller common carriers and logging railroads running from the coast to the interior. Slightly over 1000 miles of hard surfaced highways connect the principal cities and towns.

Information presented in this release is based on data gathered in the spring and summer of 1934 by the Forest Survey. Specially trained cruisers measured the timber and recorded the forest and land-use conditions on nearly 9,000 quarter acre sample plots systematically located at intervals of 660 feet on parallel compass lines 10 miles apart run entirely across the area from east to west. The preliminary estimates presented here are subject to revision later in the final report. If any changes are made, however, they will probably be neither extensive nor basic.

While estimates are given here of the volume of cordwood in species suitable for pulp making, no effort is made to show what part of this resource is available for conversion into pulp. The present growing stock must continue to supply raw materials for existing wood-using industries. From every angle of sound regional economy, use of the resource should be based upon: (1) The sustained-yield capacity of the growing stock; (2) the maintenance, with room for reasonable expansion, of existing industries; and (3) an integration of utilization such that wood products find their highest uses in industry. In the final and complete unit report an analysis and interpretation of the resource situation will be undertaken.

LAND AREA

The unit has an unusually large proportion of forest land, as shown by the area figures for the different land-use classes in Table I; nearly 83% of the area is forest land. Less than one-tenth of the land area is in cultivation. During the past 5 years, eighteen times as much agricultural land was abandoned, to revert to forest, as forest land was cleared for agricultural use.

TABLE 1. -- Area¹ classified by major land uses

Land-use classes	Area in acres	Percent of total area
Forest:		
Productive	6,017,500	82.6
Nonproductive ²	17,700	.2
Total forest	6,035,200	82.8
Agricultural:		
In cultivation:		
Old cropland ³	695,700	9.5
New cropland ⁴	4,200	.1
Out of cultivation:		
Idle ⁵	145,200	2.0
Abandoned ⁶	74,300	1.0
Improved pasture ⁷	37,200	.5
Total agricultural	956,600	13.1
Other:		
Prairie)		
Marsh)		
Waterways)	295,200	4.1
Towns and villages)		
Roads, railroads, etc.)		
Total area	7,287,000 ⁸	100.0

¹ Does not include meanderable water area.

² Nonproductive forest land is forest area that has not the qualities essential for the growth of commercial timber species.

³ Land cultivated more than five years and on which a farm crop was raised within two years prior to the date of survey.

⁴ Land converted from forest to cropland within five years prior to survey date.

⁵ Cultivated land that has been idle for two years or more, but has not reached the abandoned stage.

⁶ Land once cultivated but showing distinct evidence of having been abandoned for agricultural crop production; no attempt has been made to maintain it as improved pasture.

⁷ Cleared or open land under fence used primarily for grazing; a real attempt has been made to maintain a sod.

⁸ Including approximately 600,000 acres that have been acquired or are in the course of acquisition within Federal forest purchase areas.

In the presentation of these survey data, it is to be noted that owing to the sampling method used in collecting them, usually the greater the area or volume in any given classification the more accurate are the data for that classification. Classes that are of infrequent occurrence and relatively small in quantity cannot generally be determined with as high a degree of accuracy as is obtainable for classes that occur more frequently and in substantially greater quantities. Small tabular figures are to be taken as showing, not the exact magnitude of the classes involved, but their relative magnitude in comparison with that of other classes.

FOREST AREA

Table 2 classifies the forest area of 6 million acres by forest conditions and forest type groups. The forest type groups are designated in the table by their predominant species. Forest conditions are defined as follows:

<i>Old growth:</i>	Stands composed predominantly of sawlog-size trees that have the characteristics of the original mature trees found in the region. ("Sawlog size" signifies a minimum diameter of 13.0 inches outside of bark at breast height in the hardwood species, 9.0 inches in the pine species).
<i>Uncut:</i>	Old-growth stands from which less than 10 percent of the volume has been cut.
<i>Partly-cut:</i>	Old-growth stands from which 10 percent or more of the volume has been cut but in which the remaining volume per acre in old-growth sawlog-size trees is at the rate of at least 1,000 board feet of hardwood, or hardwood and pine mixed, or 600 board feet of pine.
<i>Second growth:</i>	Stands that have succeeded the original old growth as a result of forest cutting or other causes.
<i>Sawlog size:</i>	Second-growth stands from which less than 10 percent of the sawlog-size trees have been cut, and in which the remaining volume per acre in sawlog-size trees is at the rate of at least 600 board feet.
<i>Uncut:</i>	
<i>Partly-cut:</i>	Second-growth stands from which 10 percent or more of the sawlog-size trees have been cut, but in which the remaining volume per acre in sawlog-size trees is at the rate of at least 400 board feet.
<i>Under sawlog size:</i>	Second-growth stands composed predominantly of under sawlog-size trees, less than 10 percent of which have been cut. The volume of sawlog-size timber present is at the rate of less than 600 board feet per acre.
<i>Uncut:</i>	
<i>Partly-cut:</i>	Second-growth stands composed predominantly of under sawlog-size trees, 10 percent or more of which have been cut. The volume of sawlog-size timber present is at the rate of less than 600 board feet per acre.

Reproduction: Areas not falling into any of the previous classifications, and bearing seedlings less than one inch in diameter at the rate of 80 or more per acre.

Clear-cut: Cut-over areas in which an insufficient quantity of young growth has come in to classify them either as second growth or as reproduction.

After several decades of cutting, only 17 percent of the forest area is in old-growth timber, as shown in table 2. The saw-log size stands, including both old and second growth, are found on 31.6 percent of the forest area; while under-sawlog-size stands and reproduction cover 53.8 percent. The effects of clear-cutting and fire have been so severe on 14.6 percent of the forest area that no natural reforestation has as yet taken place. Turpentine pines, longleaf and slash, predominate on 4,122,000 acres; the other pines, mainly loblolly and shortleaf, on 509,100; and the hardwoods on 1,386,400 acres. Hardwoods occupy a larger area of old growth forest than do either of the pine types. About 44% of the forest area is in gently rolling to moderately hilly uplands; 30% in flat woods; 22% in swamps, bays, ponds and branch heads; and 4% in river bottoms.

TABLE 2. -- Productive forest area by forest conditions and forest type groups

Forest conditions	Forest type groups designated by predominant species			Total	Percent of total produc- tive forest area
	Longleaf and slash pine	Loblolly and short- leaf pine	Hardwood		
Old growth:					
Uncut	148,500	32,100	181,600	362,200	6.0
Partly cut	283,700	44,800	319,100	647,600	10.8
Total old growth	432,200	76,900	500,700	1,009,800	16.8
Second growth:					
Sawlog size:					
Uncut	524,300	157,900	83,600	765,800	12.7
Partly cut	70,100	47,200	11,900	129,200	2.1
Under sawlog size:					
Uncut	1,655,600	166,400	653,500	2,475,500	41.2
Partly cut	41,400	1,700	5,900	49,000	.8
Total second growth	2,291,400	373,200	754,900	3,419,500	56.8
Reproduction	552,300	44,700	113,900	710,900	11.8
Clear-cut and fire-killed	846,100	14,300	16,900	877,300	14.6
Total all conditions	4,122,000	509,100	1,386,400	6,017,500	100.0
Percent of total pro- ductive forest area	68.5	8.5	23.0	100.0	

VOLUME ESTIMATE

Table 3 classifies the cordwood volume estimate for the area by forest type groups and by tree species groups and diameter classes. The forest type groups are designated in the table by their predominant species. The tree species groups are as follows:

Turpentine pines:	Longleaf and slash pine, the two species that are worked for turpentine.
Nonturpentine pines:	Loblolly, shortleaf, pond and spruce pines--species not worked for turpentine.
Pulping hardwoods:	Gum, bay, poplar, maple, magnolia, and associated minor species--generally considered of value for the production of paper pulp.
Nonpulping hardwoods:	Cypress, oak, hickory, pecan, ash, and associated minor species--not generally considered of value for the production of paper pulp.

This volume estimate is based upon a conversion of the cubic-foot volume of the timber (including bark) into standard cords 4 x 4 x 8 feet, by using a factor of 90 cubic feet for pine and cypress and 80 cubic feet for hardwood. It covers all live trees 5.0 inches or over in diameter, except sound and rotten culls, and includes only the stemwood to a variable top diameter (with 4.0 inches as a minimum), except for the sawtimber-size cypress and hardwoods, for which only the sawlog portion of the trees is included. This estimate, therefore, disregards altogether the sound and rotten culls, the sound trees less than 5.0 inches in diameter, all limbwood, the stemwood less than 4.0 inches in diameter in the pines and the small cypress and hardwoods, and the stemwood above the last sawlog in the sawtimber-size cypress and hardwoods. No deduction was made for woods cull-- that part of the tree that would be left in the woods because of rot, fire scar, crook, bad knots, or other defects. The diameter measurement of the trees was taken 4½ feet from the ground, except on the turpentine trees, on which it was taken 10 feet from the ground. For the turpentine trees the volume given excludes the 8-foot butt section that bears the turpentine scar. The turpented trees include the longleaf and slash pines being worked at present, or temporarily idle or worked-out, as opposed to the round trees that have never been worked for naval stores.

The forest stand of the unit, converted to cordwood measurement, contains 32,292,000 standard cords, or an average of more than 5 cords per forest acre. Of this, the pulping species make up 24,982,000 cords, an average of more than 4 cords per forest acre. About 35 percent of the total volume is in turpentine pines, 12 percent in the nonturpentine pines, and 30 percent in the pulping hardwoods.

Of the total 11,355,000 cords of wood in turpentine pines, round trees contain 6,450,000 cords; working or temporarily idle trees, 3,516,000 cords; and worked-out trees, 1,389,000 cords. Much of the worked-out timber is unsuitable for uses other than pulping.

TABLE 3. -- Cordwood volume of pulping and nonpulping species

Tree Species Groups	Tree diameter classes ¹	Forest type groups designated by predominant species			Total	Percent of total volume
		Longleaf and slash pine	loblolly and short-leaf pine	Hardwood		
		<i>Inches</i>	<i>Thousands of cords</i> ²			
Pulping species:						
Turpentine pines:	6 - 8	3,896	52	55	4,003	12.4
	10 - 12	4,262	66	64	4,392	13.6
	14 - 18	2,443	83	26	2,552	7.9
	20 & over	363	26	19	408	1.3
Total turpentine pines		10,964	227	164	11,355	35.2
Nonturpentine pines:	6 - 8	85	602	45	732	2.3
	10 - 12	138	949	53	1,140	3.5
	14 - 18	154	1,196	60	1,410	4.4
	20 & over	29	679	42	750	2.3
Total nonturpentine pines		406	3,426	200	4,032	12.5
Total pines		11,370	3,653	364	15,387	47.7
Hardwoods:	6 - 8	528	276	1,676	2,480	7.7
	10 - 12	317	354	2,445	3,116	9.7
	14 - 18	107	185	2,368	2,660	8.2
	20 & over	27	62	1,250	1,339	4.1
Total Pulping hardwoods		979	877	7,739	9,595	29.7
Total Pulping Species		12,349	4,530	8,103	24,982	77.4
Nonpulping species:						
Hardwoods:	6 - 8	605	200	1,448	2,253	7.1
	10 - 12	374	165	1,292	1,831	5.7
	14 - 18	202	141	1,444	1,787	5.5
	20 & over	150	61	1,228	1,439	4.5
Total nonpulping species		1,331	567	5,412	7,310	22.6
Total All Species		13,680	5,097	13,515	32,292	100.0
Percent of total volume		42.4	15.8	41.8	100.0	

¹ Diameter measurement of trees taken outside of bark $4\frac{1}{2}$ feet from the ground, except on the turpentine pines on which it was taken 10 feet from the ground. Trees ranging from 5.0 to 5.9 inches in diameter placed in the 6-8 inch class; corresponding limits apply to the other classes.

² To convert to full number of cords add "000".

The estimate of the region's cordwood volume, by tree species groups and diameter classes (Table 3 on page 5) is presented graphically in Figure 2.

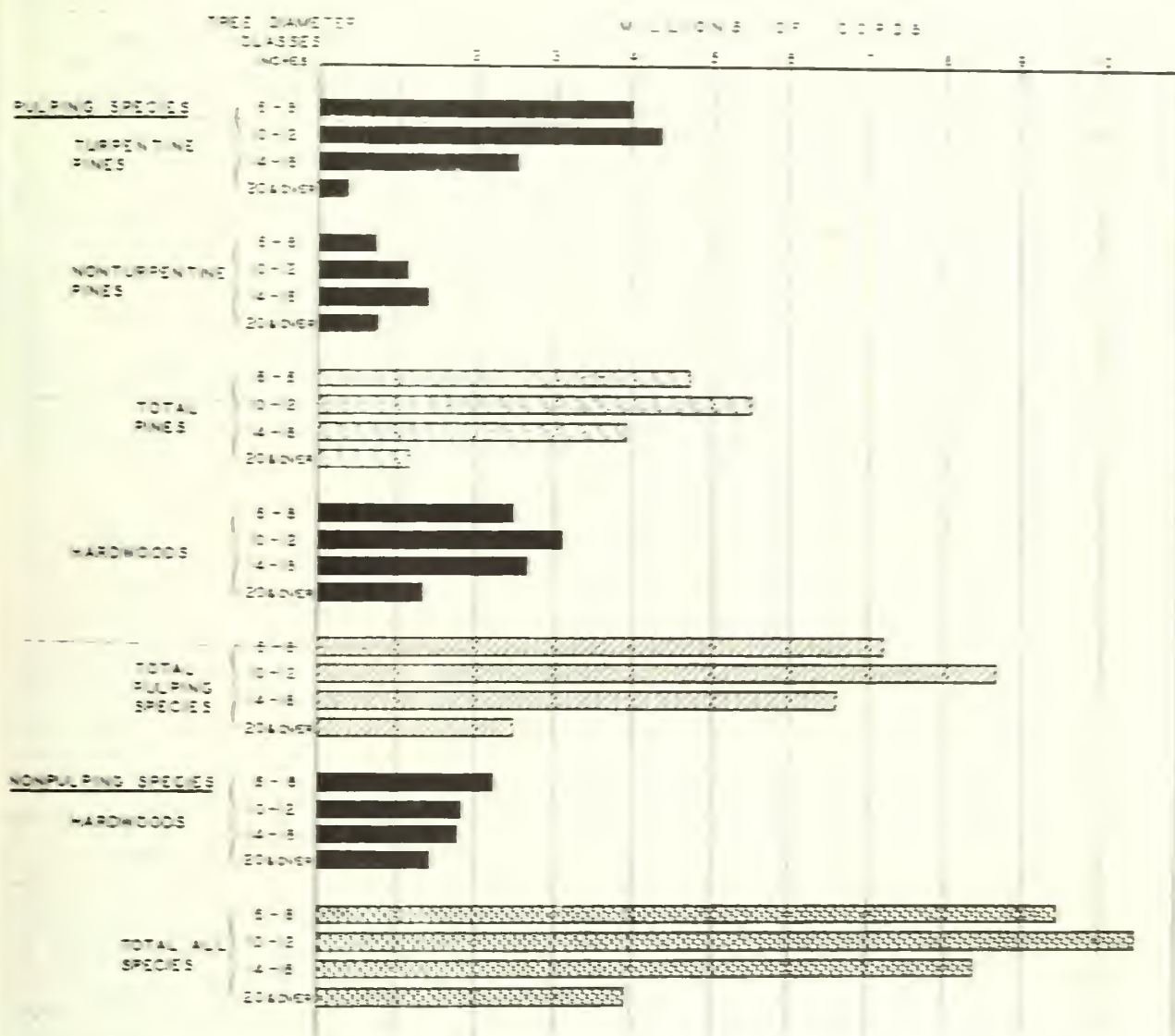


FIG. 2-CORDWOOD VOLUME OF PULPING AND NONPULPING SPECIES (SEE TABLE 3 PAGE 5)

In west Florida, the stand, including all species and sizes, averages 5.37 cords per acre, as indicated in table 4. This and other average stand-per-acre figures given below were obtained by dividing the volume figures in cords (given in table 3) by the total productive forest acreage in the region.

TABLE 4. -- *Cordwood volume of pulping and nonpulping species on the average acre of forest land*

Tree species groups	Tree diameter classes in inches				Total all diameter classes
	6 - 8	10 - 12	14 - 18	20 & over	
----- Cords -----					
Pulping species:					
Turpentine pines	.67	.73	.42	.07	1.89
Nonturpentine pines	.12	.19	.24	.12	.67
Total pines	.79	.92	.66	.19	2.56
Hardwoods	.41	.52	.44	.22	1.59
Total pulping species	1.20	1.44	1.10	.41	4.15
Nonpulping species:					
Hardwoods	.38	.30	.30	.24	1.22
Total all species	1.58	1.74	1.40	.65	5.37

SUMMARY

West Florida comprises an area of 7 million acres, of which 6 million are forest land. The longleaf and slash pine types cover a greater part of this area than all other types combined. Old growth stands make up 17 percent of the forest area; second growth, 57 percent; reproduction, 12 percent; and clear-cut and fire-killed, 14 percent. The area contains more than 32 million cords in all species, 25 million of which are in pulping species. Of the volume in pulping species, 63 percent is in trees 12" and smaller.

There are now established in this Unit 113 naval stores processors, 29 large and 157 small sawmills, and one large sulphate pulp mill, all of which depend upon the forest resources of the area. It seems obvious that from the standpoint of a continuing supply of raw material for the several industries involved, as well as of the best use of the growing stock, there is need and opportunity for planned integration in the use of the timber resources of this region.

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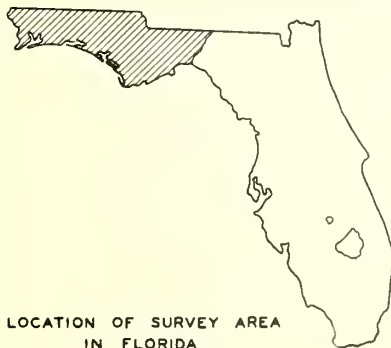
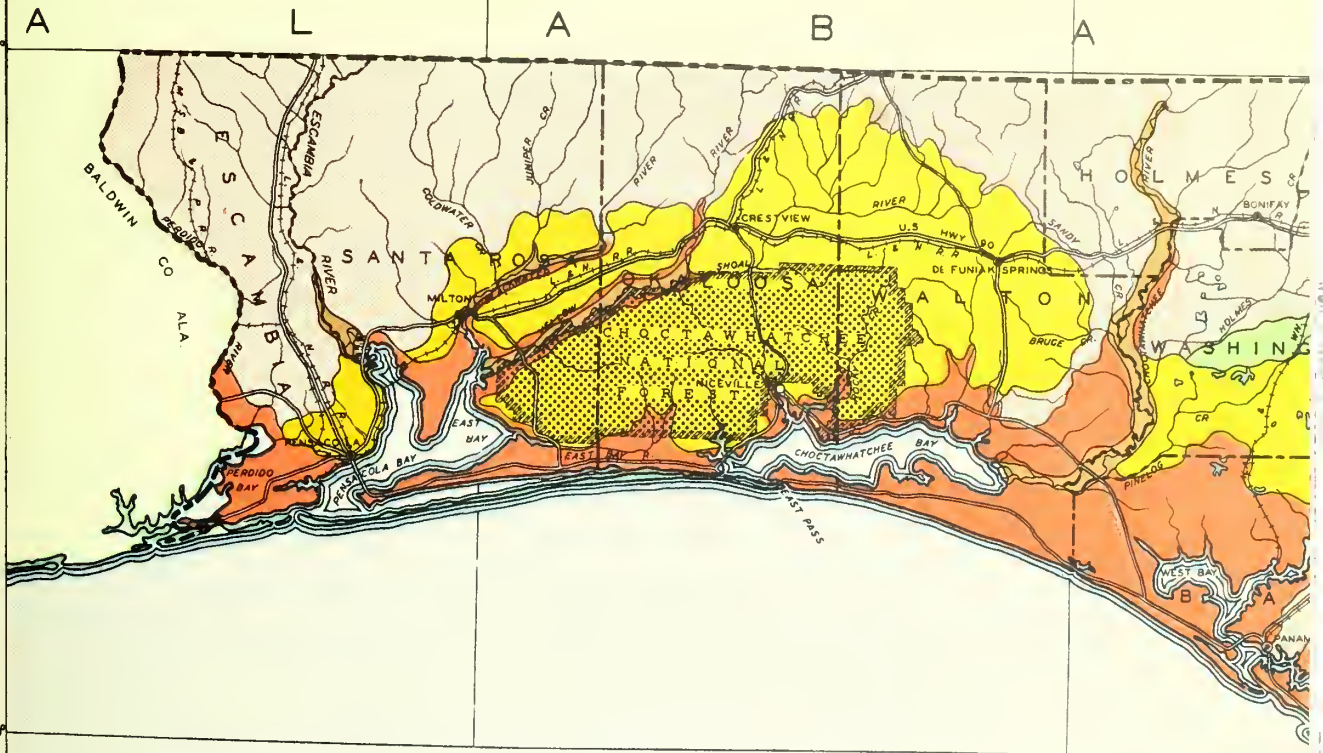
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MAJOR FOREST SURVEY UNIT FLORIDA



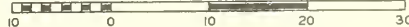
LOCATION OF SURVEY AREA
IN FLORIDA



FOREST TYPES

- BOTTOMLAND HARDWOODS-CYPRESS
- LONGLEAF-SLASH-CYPRESS
- LONGLEAF AND LONGLEAF-SLASH
- LONGLEAF-SCRUB OAK
- LOBLOLLY-HARDWOODS
- MARSH

STATUTE MILES



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LONGLEAF PINE STUMPWOOD SUPPLY
IN FOUR SOUTHEASTERN SURVEY UNITS

By

SOUTHERN FOREST SURVEY STAFF

I. F. Eldredge

Regional Survey Director

* - This is an advance release of Forest Survey data that will be included in complete reports to be published later. This information is subject to correction or amplification as computations proceed.

LONGLEAF PINE STUMPWOOD SUPPLY
IN FOUR SOUTHEASTERN SURVEY UNITS

This release presents advance information on the amount of longleaf pine stumpwood in four Forest Survey Units. The wood referred to is that in the seasoned stumps resulting from the cutting of the longleaf pine of the original forest. These stumps, together with other highly rosin-impregnated wood in the tops and limbs of fallen old-growth longleaf pine, are used in the manufacture of wood turpentine, wood rosin, rosin oils, charcoal and other products.

The units lie in the Coastal Plain region of South Carolina, Georgia and northeast Florida, as shown in Figure 1. Along the Atlantic and Gulf Coasts, the country is characterized by sandy, poorly drained flatwoods that extend from twenty miles inland on the Gulf Coast of Florida to over one hundred miles in southeast Georgia. Behind the coastal strip, the country is higher, gently rolling, and better drained. The flatwoods make up 40 percent of the total area, rolling uplands, 30 percent; swamps, bays and river bottoms, 30 percent.

The area is well served by railroads and an extensive system of hard surfaced highways, graded county roads, and unimproved woods roads. Port facilities are available at Charleston, Savannah, Brunswick, Jacksonville, and Fernandina. Opportunity for barge transportation exists on the larger rivers and the Intercoastal waterway, which passes along the Atlantic Coast.

A steam-solvent wood naval stores plant is at Brunswick, Georgia, and two small destructive-distillation plants are at Allenhurst and Collins, Georgia. Two destructive-distillation plants are at Jacksonville and Gainesville, Florida. The nearest active wood naval stores plants outside of the region are at Pensacola, Florida and Bay Minette, Alabama, both using the steam-solvent process.

The information presented in this release is based on data gathered during 1933 and 1934 by the Southern Forest Survey, an activity of the Southern Forest Experiment Station of the U. S. Forest Service. Trained cruisers measured and recorded forest and land-use conditions on nearly 38,000 quarter-acre sample plots systematically located at intervals of 660 feet on parallel compass lines, 10 miles apart, run entirely across the area from east to west. The preliminary estimates presented here are subject to revision later in the final Survey reports.

In the presentation of these survey data, it is to be noted that owing to the sampling method used in collecting them, usually the greater the area or volume in any given classification the more accurate the data for that classification. Classes that are of infrequent occurrence and are relatively small in quantity cannot generally be determined with as high a degree of accuracy as is obtainable for classes that occur more frequently and in substantially greater quantities.

LAND AREA

The four survey units covered in this release include a land area of approximately 30 million acres, of which over 20 million acres are in some stage of forest growth. In Table 1, the total acreage, the forest acreage, and the non-forest acreage are given for each survey unit.

TABLE 1. — Land area of each survey unit classified according to forest and non-forest area

Units	Total area	Forest area	Non-forest area	Proportion of forest
	----- Acres -----			Percent
South Carolina #1	5,186,900	2,993,000	2,193,900	57.7
Georgia #1 ^{1/}	9,711,200	7,056,200	2,655,000	72.7
Georgia #2	5,585,900	3,020,400	2,565,500	54.1
Florida #1 ^{2/}	9,515,600	7,378,900	2,136,700	77.5
Total	29,999,600	20,448,500	9,551,100	68.2

^{1/} Does not include Okefenokee Swamp and Coastal Islands.

^{2/} Does not include Ocala National Forest.

STUMPWOOD ESTIMATE

In the following tables the amount of merchantable stumpwood in each of the four survey units is given and classified according to the topographic situation in which the stumps occur. The data are further arranged according to the number of stumps per acre. To be merchantable, stumps must be sound, well-seasoned heartwood of longleaf pine in such condition and so located that they can be either pulled by machines or removed with explosives. The amounts given are based upon removal of the stumps by blasting; if the stumps are pulled rather than blasted, the amount of wood recovered per stump is increased by 60 percent. Stump-pulling operations, because of the use of heavy machinery, are at present confined largely to the flatwoods and, even there, only to well blocked-out areas of considerable extent that are accessible to railroad transportation.

In addition to the merchantable stumpwood there is a considerable amount that should be considered as a potential supply. This is found, (1) in sound and seasoned stumps that are so located that large-scale pulling or blasting operations, under current practices, do not seem practicable, (2) in recently-cut stumps from old-growth pine that are not yet sufficiently seasoned, and (3) stumps that will result from the felling of old-growth longleaf pine trees now standing. The estimate of potential stumps, also on a blasting basis, is carried as a footnote under each table.

The greatest amount of stumps is to be found in the Florida unit, and the least in the South Carolina unit. The tonnage per acre also averages highest in the former unit, and lowest in the latter. In Florida Unit No. 1 and Georgia Unit No. 1, the greater part of the stumps are in the flatwoods; in Georgia Unit No. 2, the greater part is in the uplands, and in the South Carolina unit, the supply is about evenly divided between the flatwoods and uplands.

FIGURE 1.

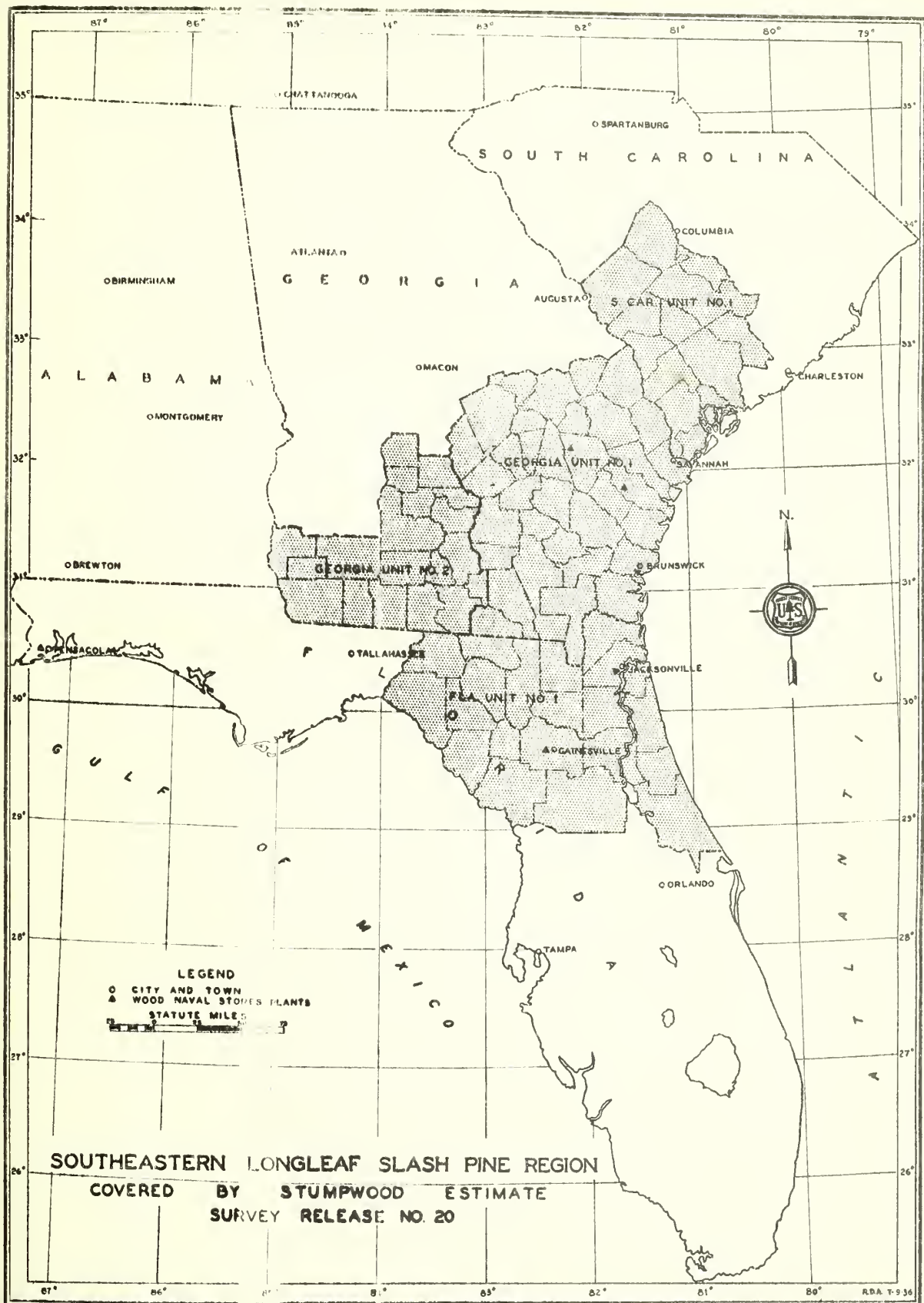


TABLE 2. -- Amount of merchantable stumpwood, Florida Unit No. 1

Stumps per acre	Topographic situation			Total	Percent of total
	Flatwoods	Rolling uplands	Swamps, bays, ponds, etc.		
----- Thousand tons -----					
5 or less	124	78	5	207	1.7
6 - 13	983	629	16	1,628	13.1
14 - 25	2,456	1,031	36	3,523	28.3
26 or over	5,901	1,117	72	7,090	56.9
Total	9,464	2,855	129	12,448	
Percent of total	76.0	23.0	1.0		100.0

Note: Also 3,216,000 tons of potential stumps (blasting basis).

TABLE 3. -- Amount of merchantable stumpwood, Georgia Unit No. 1

Stumps per acre	Topographic situation			Total	Percent of total
	Flatwoods	Rolling uplands	Swamps, bays, ponds, etc.		
----- Thousand tons -----					
5 or less	65	75	7	147	2.7
6 - 13	491	445	23	959	17.5
14 - 25	1,243	669	34	1,946	35.4
26 or over	1,826	552	61	2,439	44.4
Total	3,625	1,741	125	5,491	
Percent of total	66.0	31.7	2.3		100.0

Note: Also 5,645,000 tons of potential stumps (blasting basis).

TABLE 4. -- Amount of merchantable stumpwood, Georgia Unit No. 2

Stumps per acre	Topographic situation			Total	Percent of total
	Flatwoods	Rolling uplands	Swamps, bays, ponds, etc.		
----- Thousand tons -----					
5 or less	22	74	2	98	3.9
6 - 13	112	310	10	432	17.0
14 - 25	195	489	55	739	29.2
26 or over	425	817	24	1,266	49.9
Total	754	1,690	91	2,535	
Percent of total	29.7	66.7	3.6		100.0

Note: Also 2,629,000 tons of potential stumps (blasting basis).

TABLE 5. -- Amount of merchantable stumpwood, South Carolina
Unit No. 1

Stumps per acre	Topographic situation			Total	Percent of total
	Flatwoods	Rolling uplands	Swamps, bays, ponds, etc.		
----- Thousand tons -----					
5 or less	5	12	2	19	3.9
6 - 13	56	61	4	121	24.5
14 - 25	86	92	7	185	37.5
26 or over	96	66	6	168	34.1
Total	243	231	19	493	
Percent of total	49.3	46.9	3.8		100.0

Note: Also 979,000 tons of potential stumps (blasting basis).

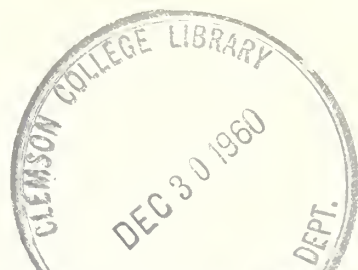
The stumpland area classified as "merchantable" constitutes 41 percent of the forest area of Florida Unit No. 1; 26 percent in Georgia Unit No. 2; 23 percent in Georgia Unit No. 1; and 6 percent in South Carolina Unit No. 1. The greater part of these merchantable areas lie in lightly stocked stands of second-growth pine timber and in clear-cut and in re-stocking areas.

With a present supply of nearly 21 million tons of merchantable stumps, a potential supply of over 9 million tons, and a present annual requirement by existing stump-using plants of only 300-to 350 thousand tons, it is obvious that there are enough stumps to allow a considerable expansion in the production of wood naval stores in this region.

Regardless of the sufficiency of the supply of stumpwood, any considerable expansion of the wood naval stores industry must await a marked increase in the demand for turpentine and rosin. From the standpoint of timber supply in the naval stores belt as a whole, the outlook for gum naval stores production indicates no likelihood of prolonged reduction of output. Unless there is a marked increase in naval stores consumption, both domestic and foreign, a full utilization of available and potential supplies of both turpentine timber and stumpwood would undoubtedly bring about a condition of chronic over-production, and would demoralize both the gum and wood naval stores industries.

NOTE: The volume of stumpwood in old growth trees still standing, referred to in the second paragraph under "Stumpwood estimate" on page two has not been calculated and is not included in the statement of potential tonnage given as footnotes under each table.





ARKANSAS FORESTS



Foreword

This report presents the principal findings of the third Forest Survey of Arkansas, made in 1958-59 by the Southern Forest Experiment Station. Philip R. Wheeler, Chief of the Station's Division of Forest Economics, was in charge.

The survey, which was undertaken as one phase of the nationwide inventory being conducted by the U. S. Forest Service, was designed to provide up-to-date information on the kind, amount, and condition of forest resources; the industries they support; and the possibilities for improving wood production. Comparison with the inventory that was completed in 1951 helps to clarify timber trends.

Generous assistance from public and private organizations made it possible to keep the field work for the new inventory ahead of the schedule that could have been maintained with regular allotted funds. The very material aid of the organizations listed below, and of the individuals in them, is gratefully acknowledged:

Arkansas Forestry Commission

The Crossett Company

International Paper Company

Dierks Forests, Inc.

Brodley-Southern Division of Potlatch Forests, Inc.

Fordyce Lumber Company

Oxon Lumber Company

Deltic Form and Timber Company

Pomeroy and McGowin

ARKANSAS FORESTS

Herbert S. Sternitzke

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE



SOUTHERN FOREST EXPERIMENT STATION
New Orleans, Louisiana

1960

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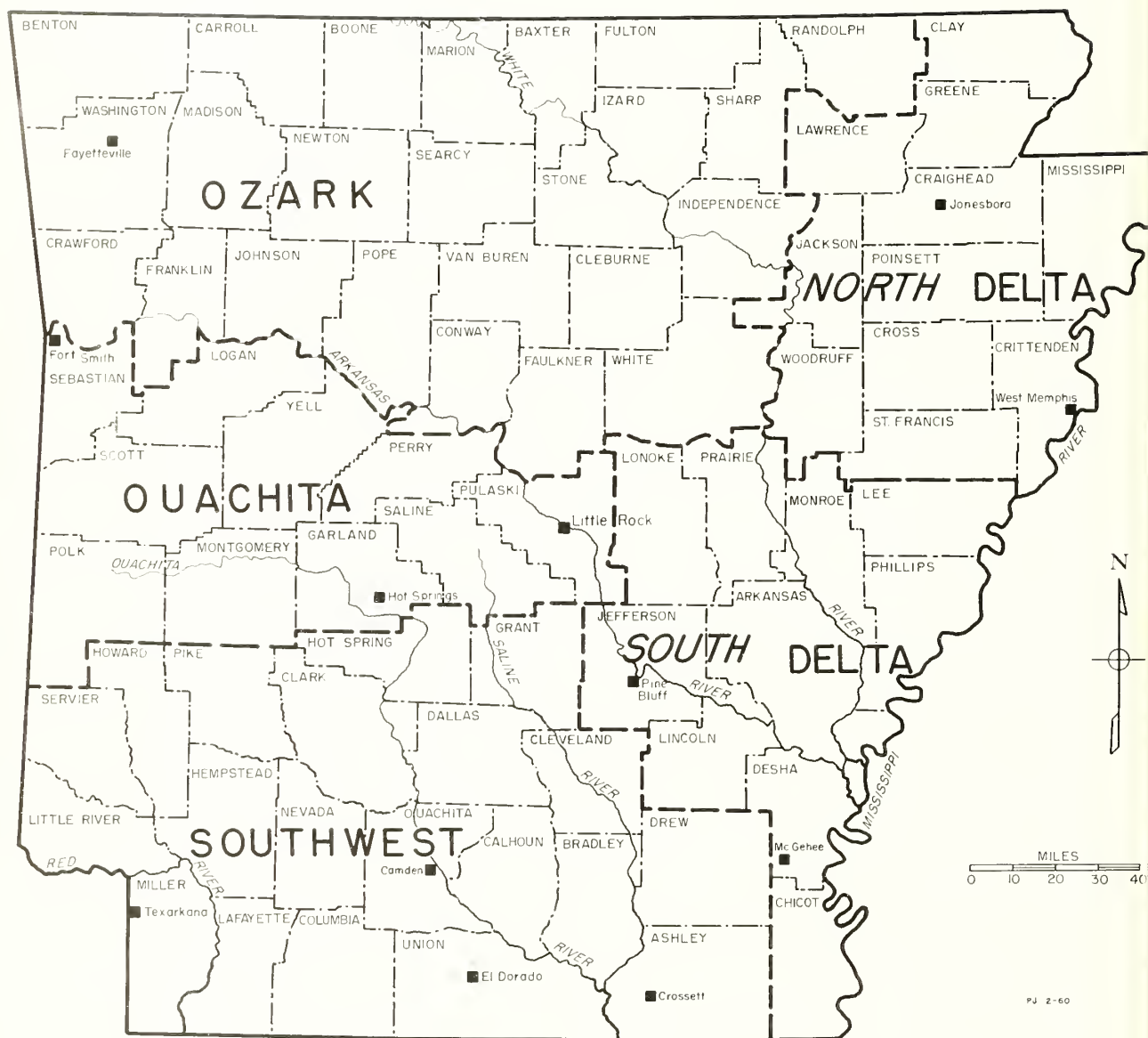


Figure 1. Forest Survey regions in Arkansas.

Timber And Industry In Arkansas Since The Midcentury

Arkansas' forest situation changed markedly during the past decade.

The pulp and paper industry greatly increased its capabilities. Two new multi-million dollar mills were established at Pine Bluff, and existing plants at Camden and Crossett were enlarged (fig. 1). In response to industrial expansion, the total output of pulpwood increased more than twofold—from 604,000 cords in 1950 to 1,524,000 cords in 1959. Additional expansion of the industry within the State and in peripheral areas promises to boost pulpwood production—both pine and hardwood—to new records in the 1960's.

For lumber, the fifties were a period of transition. Small, generally portable, sawmills diminished sharply in number.

Mills cutting in excess of 5 million board feet annually now process two-thirds of the State's lumber.

Such mills may further enlarge their share of the output in the decade ahead.

The lumber industry also developed a new and profitable market for plant residues that were formerly regarded as unavoidable waste. Today over 50 Arkansas sawmills convert slabs and edgings, chiefly pine, into high-quality chips for sale to pulp mills. The equivalent of one in every four cords of pine pulpwood produced in Arkansas is currently derived from chips. Production of chips is expected to continue to increase in the sixties.

Arkansas' veneer industry, which consumes mainly soft-textured hardwoods, dropped to 1 active plants in 1958, as compared to 18 ten years earlier.

With construction of 6 new establishments, pressure-treating plants doubled in number. Paralleling the wood-preserving industry's expansion, production of southern pine poles and siding trended upward.

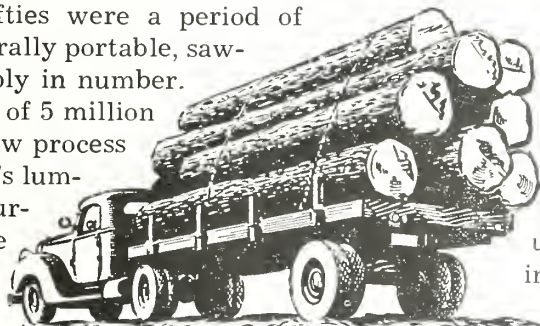
What happened to the forests during the fifties?

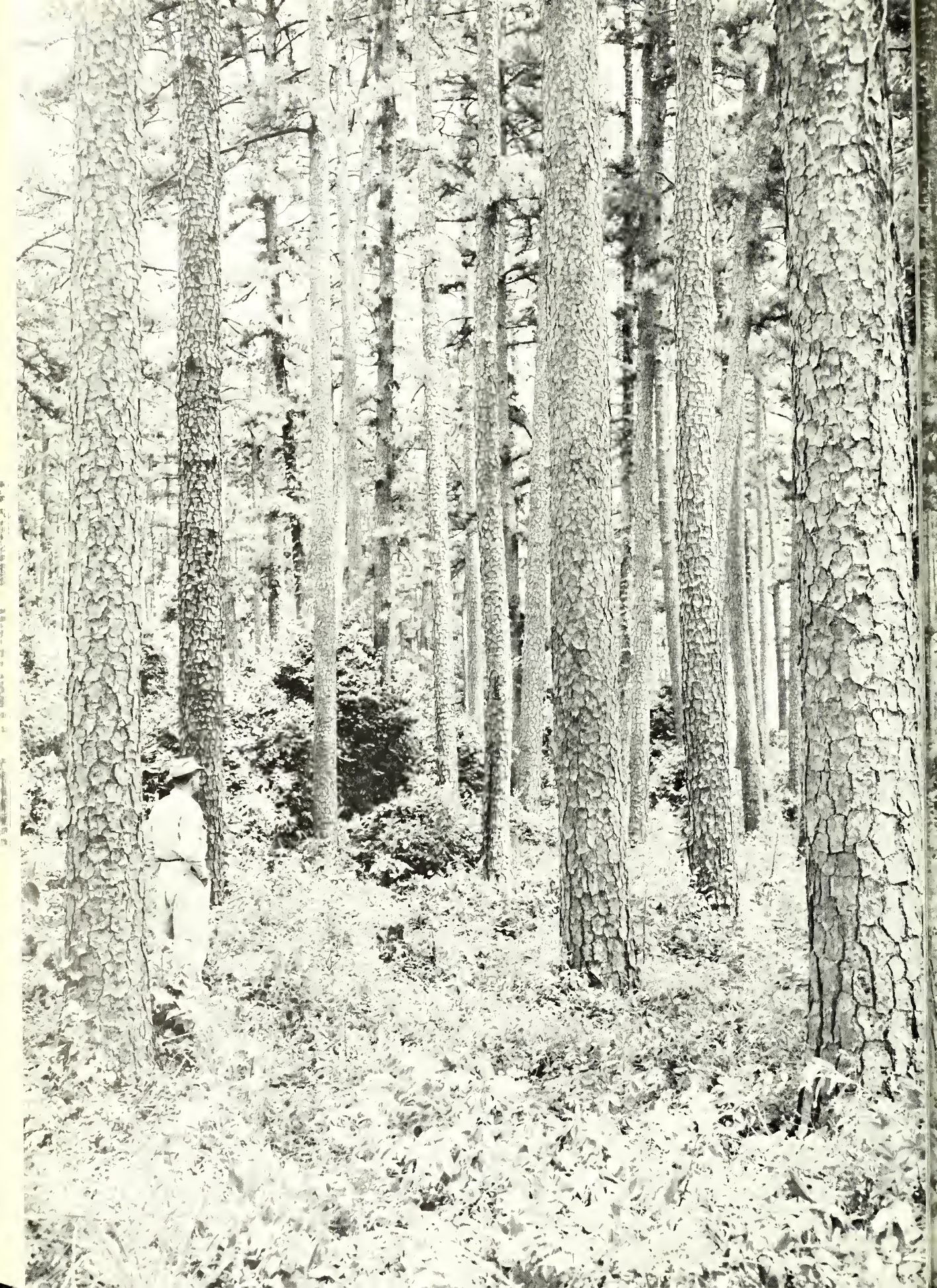
In area, the forests are 7 percent or some 1.4 million acres greater than in 1951. The latest survey shows that they now encompass 62 percent of Arkansas' total land area.

In volume, softwood growing stock (mainly pine) has increased nearly a third, softwood sawtimber has gained 41 percent. These are reversals of earlier trends. While pine increased in the fifties, hardwood inventory diminished 9 percent; the volume of hardwood large enough for sawtimber dropped 19 percent. Excessive cutting and localized land

clearing contributed to the decline of hardwood timber in the bottom-lands. In the uplands, timber stand improvement—that is, noncommercial deadening of unwanted hardwood stems—helped to reduce hardwood volume on areas better suited to growing pine.

Recent forestry gains in Arkansas have largely taken place on public and industrially owned tracts. Together these holdings make up about 7 million acres. Almost 14 million of the 20.8 million forest acres in the State are held by farmers and other private owners not directly connected with wood-using industries. On these holdings especially, there are numerous opportunities for increasing future supplies of timber that can support new industries. Productivity can be substantially improved by restoring pines to several million forest acres where natural seeding appears unlikely; by providing adequate growing space for thrifty timber through cull-tree removal; and, particularly on areas capable of growing industrial hardwood, by cutting practices that will permit a build-up in trees of large size and desirable species.





Forest Land And Timber

TRENDS IN FOREST AREA

More Timberland Available

Land available and suitable for timber production in Arkansas increased by 1.4 million acres during the past decade. Forests now occupy 62 percent, 20.8 million acres, of the State's total land area.

The change in forest area has followed a well-defined pattern. In upland regions, forests have expanded partly as pines have been planted on old fields and partly as abandoned farm land has reverted to forest. This trend is typical of Midsouth States generally. In fact, forest area in the uplands has steadily gained in the Midsouth since at least the middle 1930's, when the first regional timber survey was carried out. At the same time, in the lower Mississippi River Valley—or Delta—clearing and drainage have continued to shrink forest area. In the Arkansas portion of the Delta, for example, commercial forest land decreased 19 percent (838,700 acres) between 1935 and 1950, and has since declined another 7 percent (248,200 acres). Clearing of new land in this fertile alluvial area, however, has been greatly overshadowed by the pronounced increases in forest area outside of the Delta. Overall, present forest area in Arkansas is 7 percent greater than in 1951, when the previous forest inventory was completed.

What about future trends in forest area? Long-range regional studies¹ suggest that expansion of agricultural acreage is probable for areas encompassing Arkansas. If projected increases are realized, the upward trend of forest

acreage in Arkansas may be reversed within the next 15 to 20 years.

Pine Gaining Ground

A second trend evident in Arkansas is the expansion of softwood types in the uplands. Fifty-four percent of the forested upland acreage is in such cover; in 1951 it was 50 percent. Hardwood types of low quality and value are no longer gaining at the expense of softwoods.

The gain in softwood types amounts to almost 1.3 million acres, of which more than 550 thousand acres are in the southwestern region. Here good pine land prevails, the average site index being about 80 feet at age 50. Such sites can grow 500 or more board feet per acre annually, or an equivalent cubic volume of pulpwood, poles, or piling. To the pulp and paper industry, whose use of pine is steadily rising, the expansion of pine area in the southwest represents an especially favorable situation. Given essential fire protection, the added forest acreage will augment the supply of pulpwood-size trees within the next decade or so.

Pine of course is not necessarily a stand component everywhere that softwood types have increased. In the Ozark Highlands, for example, softwood area has risen some 61 percent. Of this, nearly half (289,400 acres) is in the redcedar type. In the northern Ozarks especially, cedar is usually one of the first species to seed-in on old fields. But from the Boston Mountains southward, its occurrence is limited.

Despite the reduction of forest area in the Delta, total acreage of bottom-land hardwoods has not changed appreciably since the previous survey (table 1). On the alluvium west of the Delta, farm land is reverting to forest faster than it is being cleared. The explanation

¹Wooten, H. H., and Anderson, J. R. Agricultural land resources in the United States. U. S. Dept. Agr. Agr. Inform. Bul. 140, 107 pp., illus. 1955. Also see Water resources activities in the United States. U. S. Senate Select Committee on National Water Resources, Committee Print 13, 24 pp., illus. 86th Cong., 2nd Sess.

Table 1. Commercial forest land by forest type (1959) and change since 1951

Region	All types	Change	Softwood ¹	Change	Oak-hickory	Change	Bottom-land hardwood ²	Change
	<i>Thd. acres</i>	<i>Per-cent</i>	<i>Thd. acres</i>	<i>Per-cent</i>	<i>Thd. acres</i>	<i>Per-cent</i>	<i>Thd. acres</i>	<i>Per-cent</i>
Southwest	6,959.7	+10	4,508.6	+14	982.2	- 9	1,468.9	+13
Ouachita	3,552.2	+ 5	2,518.1	+ 5	841.0	+ 4	193.1	+12
Ozark	6,995.9	+14	1,592.5	+61	5,100.6	+ 6	302.8	- 6
Delta	3,249.2	- 7	158.6	+ 7	600.4	-20	2,490.2	- 4
Total	20,757.0	+ 7	8,777.8	+17	7,524.2	+ 1	4,455.0	+ 1

¹ Includes loblolly-shortleaf pine, oak-pine, and cedar types.² Includes oak-gum-cypress and elm-ash-cottonwood types.

is perhaps that these generally smaller bottoms are not so well suited to mechanized agriculture as is the Delta. Some 44 percent of the Statewide acreage of bottom-land hardwood forests is presently outside of the Delta. In view of anticipated development of agricultural land within the Delta, this proportion may rise. Non-Delta bottom-land hardwoods are often strung along the smaller streams rather than in continuous tracts (fig. 2). Generally speaking, the per-acre cost of managing such stands tends to be relatively high.

Stocking Is Improving

Stocking of Arkansas timber stands has improved discernibly since 1951. At that time, about half the forest area was well stocked in the sense that it had at least 70 percent of the number of sound, well-formed trees of any size or combination of sizes needed for full stocking. Today two-thirds is well stocked. The increase amounts to some 4 million acres. The change is largely attributable to improved fire protection. On areas supporting pine, which generally receive the most intensive protection, stocking in small trees is noticeably fuller than in hardwood timber types.

The trend toward heavier stocking is apparently quite general over the State. But improvement is most noteworthy in the Ozarks. The sparse stands that formerly typified this region have been gradually filling in with young trees. As a result, the well-stocked area has doubled.

Contributing to the deficiency of stocking in some areas is an accumulation of outright culls, mainly hardwoods. These trees occupy growing space that might better be used by thrifty, merchantable timber or by seedlings. Although considerable effort is being devoted

to cull-tree removal, especially in softwood types, culls still make up about one-fourth of the basal area in trees over 5.0 inches in diameter.

TRENDS IN TIMBER VOLUME

Pine Up

Softwood volume in Arkansas, virtually all loblolly and shortleaf pine, now is 5.4 billion cubic feet—up 31 percent since 1951 (table 2, fig. 3). This gain, a reversal of earlier trends, is largely associated with ownerships that have long displayed a strong and active interest in forest management.

Table 2. Growing stock volume (1959) and change since 1951

Region	Softwood		Hardwood	
	Volume	Change	Volume	Change
	<i>Million cu. ft.</i>	<i>Per-cent</i>	<i>Million cu. ft.</i>	<i>Per-cent</i>
Southwest	3,384.4	+30	2,353.7	- 8
Ouachita	1,522.6	+39	619.8	-16
Ozark	338.6	+17	1,820.9	+ 3
Delta	171.5	+17	1,819.7	-17
Total	5,417.1	+31	6,614.1	- 9

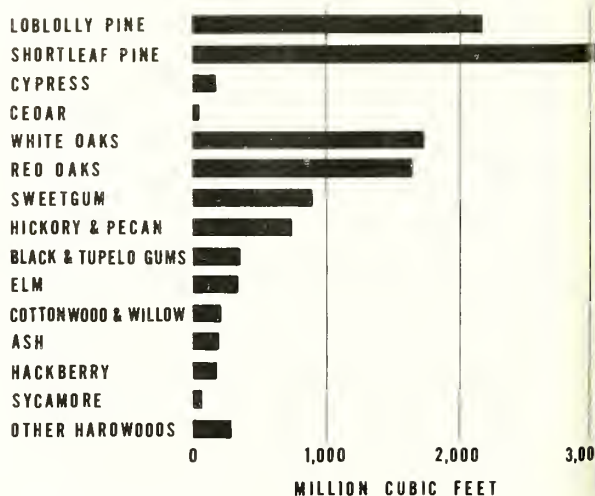


Figure 3. Growing stock by species.

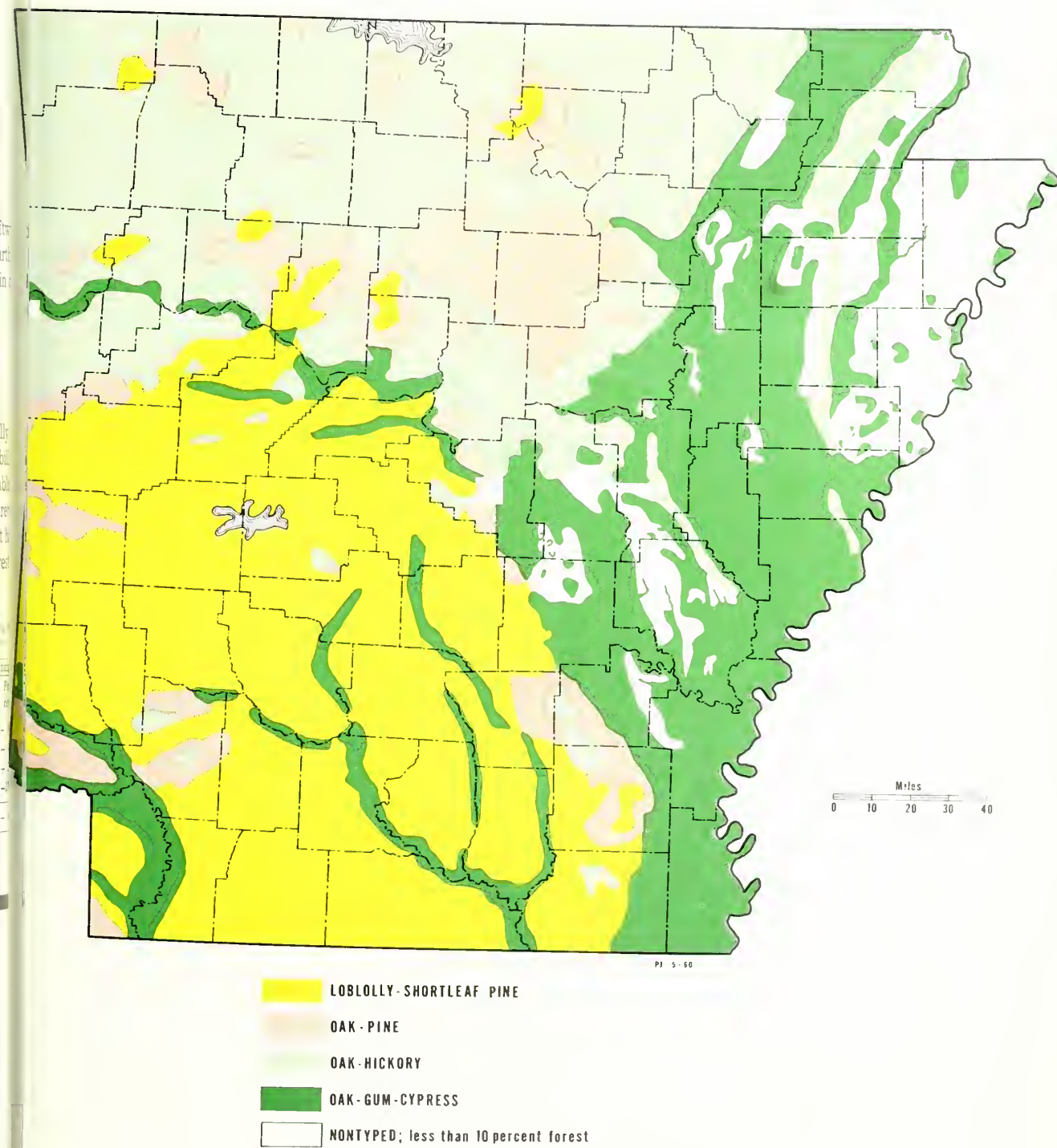


Figure 2. *Major forest types in Arkansas.*

In both the Ouachita and Ozark regions, for example, the softwood accretion has mainly taken place on public lands. Half of the softwood in these two mountainous areas is presently in National Forests. In the southwest, the increase has been chiefly on forest-industry holdings, which make up more than two-fifths of the regional forest acreage. (Public acreage in the southwest is negligible.) This region now contains two-thirds of all pine volume in Arkansas (fig. 4). The rising softwood inventory in the Delta stems from an increase in pine on a small acreage of upland sites; volume of cypress has fallen off.

Changes in softwood tree size between the latest two surveys are summarized in figure 5. Part of the increase in the smallest diameter

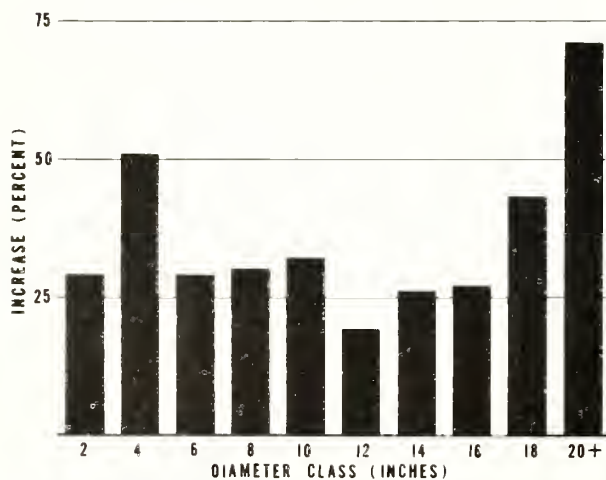


Figure 5. Percentage increase in number of softwood growing stock trees between surveys.

classes is undoubtedly associated with recent expansion of forest acreage in the uplands. But in trees of sawtimber size, which are in heavy demand both for lumber and pulp, the improvement in pine management is clearly evident. It is noteworthy that 80 percent of all softwoods at least 16 inches in diameter are growing on the 7 million forest acres held by timber industries and public agencies. As a result of changes in stand structure, softwood volume increased some 1.3 billion cubic feet, nearly half in trees 16 inches and larger in diameter (fig. 6).

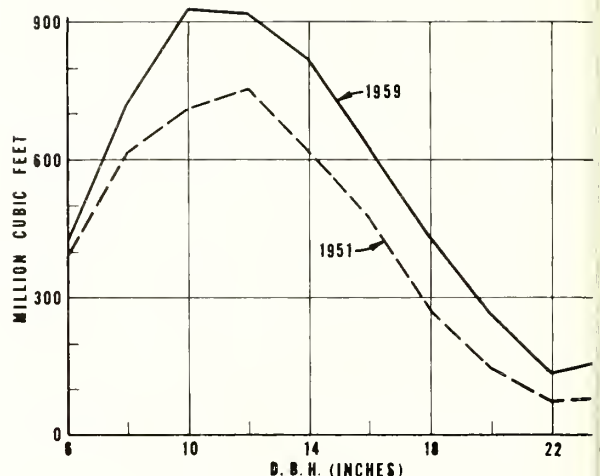


Figure 6. Comparison of softwood growing stock volume by tree diameter, 1951 and 1959.

Statewide, the increase in board-foot volume of softwoods large enough for sawtimber is 19 percent, or 7 billion board feet (table 3). More illuminating, however, are the volume trends charted in figure 7, which are indicative of pine management efforts among the major classes of landowners.

Table 3. Sawtimber volume (1959) and change since 1951

Region	Softwood		Hardwood	
	Volume	Change	Volume	Change
	Million bd. ft.	Per-cent	Million bd. ft.	Per-cent
Southwest	16,359.6	+39	5,773.1	-19
Ouachita	5,851.6	+44	1,214.0	-37
Ozark	1,237.7	+64	4,270.3	-13
Delta	834.7	+25	5,636.8	-16
Total	24,283.6	+41	16,894.2	-19

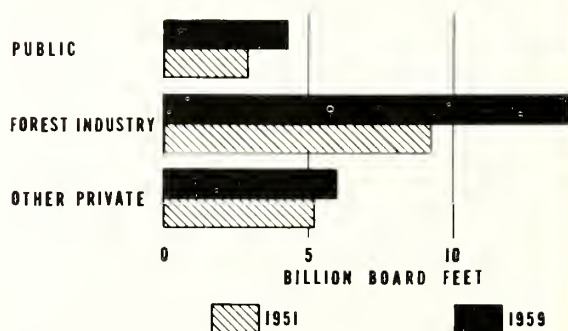


Figure 7. Comparison of softwood sawtimber volume by class of ownership, 1951 and 1959.

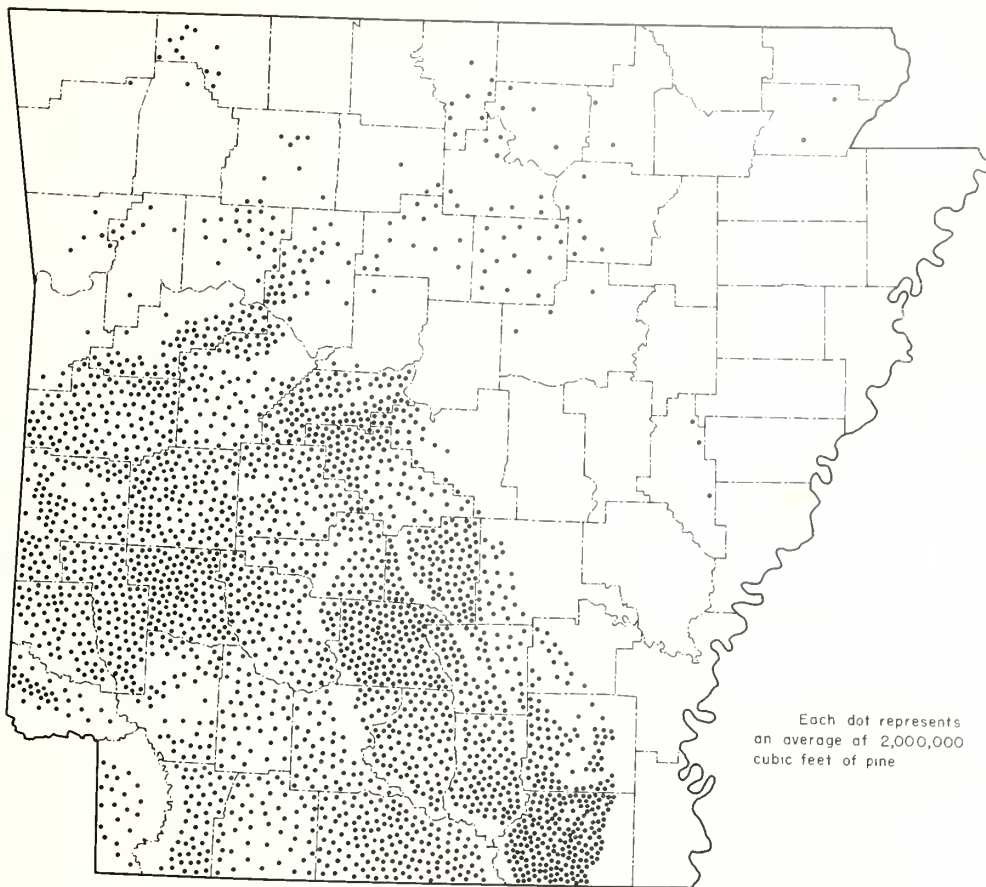


Figure 4. Generalized distribution of pine growing stock in Arkansas.

Slightly less than 3 million acres of commercial forest is publicly held. Most of the privately owned forest land is in comparatively small holdings—chiefly under 500 acres. Of the nearly 14 million forest acres in private ownership not associated with any forest industry, about 6 million is held by farmers.

On both forest-industry and public holdings, volume of softwood sawtimber is some 50 percent greater than in 1951. The improvement in industrial ownership may be attributable in part to forest acquisition during the interwar period. Outside the Delta, for example, forest acreage held by timber-connected industries in Arkansas has increased by 7 percent. Publicly owned forest acreage in Arkansas has decreased slightly. On private ownership other than that held by industry, the gain in softwood sawtimber has been about 16 percent. Although forest acreage in the latter ownership has risen some 10 percent during the past decade, the added area is essentially the result of reversion to forest of old fields.

Another yardstick of management efforts is the extent of cultural operations aimed at reducing growing space occupied by unwanted hardwoods on upland areas better suited to pine. Noncommercial deadening of such hardwoods has been undertaken on some 500,000 acres² annually during the past few years. Of this, about half was on forest industry holdings; the rest was about equally divided between other types of private ownerships and public forests.

“Hardwood control” covers several distinct operations. The most common is the deadening of individual stems that are overtopping natural pine seedlings. Thus, the full impact of recent hardwood deadening upon the pine inventory may not be realized for 10 or 15 years, or until many of the newly released seedlings have attained growing-stock size. The latest control practice is the use of mechanical blowers to apply silvicultural mists to small unwanted

² Does not include acreage on which this work was limited exclusively to trees under 5.0 inches in d.b.h.

hardwoods. Control of surplus small hardwoods on pine sites by treating individual stems is slow and costly because of the great numbers per acre. Mists appear to offer a less expensive and effective means of controlling small hardwoods in many situations.

Hardwood Down

Most growing stock in Arkansas—55 percent of the total—is hardwood. The 6.6 billion cubic feet of hardwood is 9 percent less than at the time of the previous inventory. Nearly three-fifths of the net reduction was upland hardwood.

In the southwest and Ouachitas, the leading pine-producing regions, upland hardwood volume diminished 13 and 17 percent. Available data suggest that an average of 22 million cubic feet of hardwood growing stock were killed annually in cultural operations alone over the past several years in these areas. This volume is equal to about one-third of the regions' annual cut of industrial hardwood.

Although most of Arkansas' hardwood volume is spread across the uplands, the sawlog component is equally divided between the bottom-lands and uplands. It will be noted from figure 8 that the number of hardwood saw-

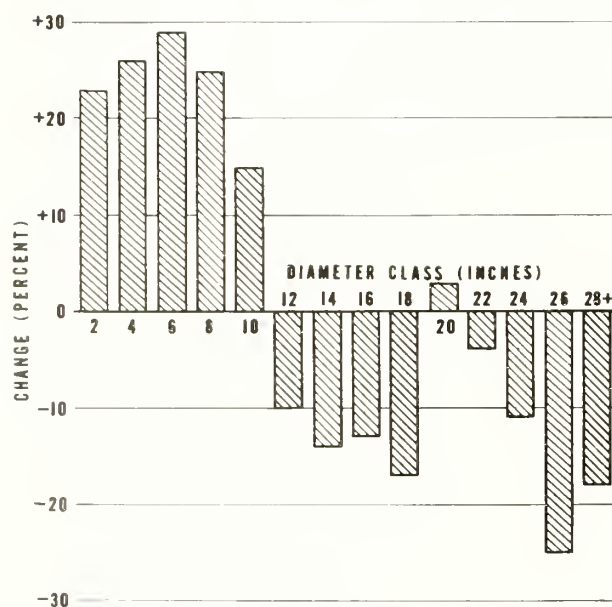


Figure 8. Percentage change in number of hardwood growing stock trees between surveys.

timber trees has declined in most diameter classes. The drop in hardwood sawtimber, both in the uplands and in the bottoms, was quite general over the State. On upland soils, the volume of hardwood sawtimber fell off some 24 percent; on bottom-lands, 12 percent.

Another significant aspect of the changing hardwood situation is in upper-grade standard lumber logs. These are the logs that are normally most in demand for lumber and other products requiring clear material. Between surveys the volume of such logs—that is, grades 1 and 2—declined 21 percent (table 4). The shrinkage in better-grade hardwood is not likely to be arrested in the near future unless the effort devoted to hardwood forestry is substantially expanded, with emphasis on quality as well as the volume of future growth. On development that may facilitate such effort is the increasing demand for hardwood pulpwood. In time, this should enable more and more hardwood managers to thin their stands and make improvement cuttings without reducing the inventory suitable for more exacting products.

Table 4. Sawtimber volume by log grade and tree diameter 1959

Species group and d.b.h. class (inches)	All grades	Grade 1 ¹	Grade 2	Lower grades
— Million board feet —				
Softwood:				
10 to 12	9,442.0	35.0	256.6	9,150.4
14 to 18	11,238.8	37.6	2,819.5	8,381.7
20 and up	3,602.8	596.1	766.4	2,240.3
Total	24,283.6	668.7	3,842.5	19,772.4
Hardwood:				
12	3,790.1		31.8	3,758.3
14 to 18	8,571.9	232.8	1,841.1	6,498.0
20 and up	4,532.2	879.0	1,206.7	2,446.5
Total	16,894.2	1,111.8	3,079.6	12,702.8

¹ All cedar sawlogs were graded as No. 1.

TIMBER GROWTH AND CUT

Softwood Growth Is Increasing

Forest fires, insect pests, tree diseases, and other natural causes kill about 92 million cubic feet of Arkansas timber annually. The loss is equivalent to 14 percent of the net growth of growing stock, and is much higher in hardwoods than in softwoods. After allowance is made for mortality, net annual growth amounts to 340 million cubic feet of softwood growing stock and 297 million of hardwood. This equals 31 cubic feet per acre a year, or about 0.4 cords

For sawtimber alone, growth totals 1.6 billion board feet of softwood and 0.8 billion of hardwood. Overall, sawtimber growth is some 10 percent greater than at the time of the earlier survey. The increase is the result of a sizable gain in softwood that offset the growth reduction of hardwood. Though part of the hardwood decline is due to its elimination on areas more suitable for pine, hardwood growth has also diminished in hardwood-producing areas. Within the entire Delta region of Arkansas, by way of illustration, current annual net growth is 91 board feet per acre in hardwood timber types; at the time of the prior survey it was 120 board feet. The task of rebuilding the sawtimber inventory on sites capable of growing industrial hardwood is obviously more difficult when growth is waning. Substantially reducing mortality would be one means of increasing overall growth of hardwood sawtimber. Per-acre growth can also be increased by reducing the proportion of some low-growing species and by improving stand structure.

Cut Is Chiefly Softwood

In 1958, when the most recent statistics were compiled, 193 million cubic feet of softwood and 185 million of hardwood were cut in Arkansas. The estimate of hardwood cut includes 4 million cubic feet killed in cultural operations. Nearly all of the softwood cut was pine. Oak made up 75 percent of the hardwood, other firm-textured hardwoods accounted for 11 percent, and soft-textured hardwoods, mainly sweetgum, for the remaining 14 percent.

It will be noted in figure 9 that in 1958 the

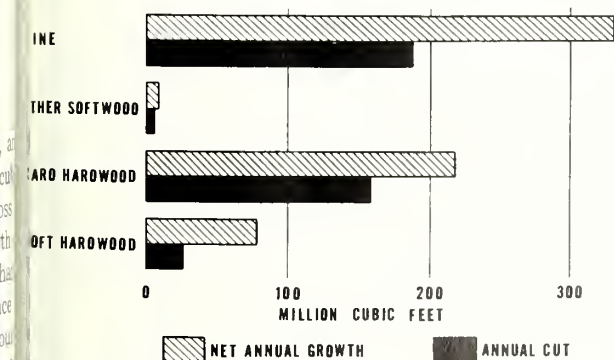


Figure 9. Growth and cut of growing stock, 1958.

growth of hardwood growing stock exceeded the cut. Although hardwood growth was some 20 percent lower than 10 years earlier, the reduction in hardwood cut was even more pronounced. Despite its decline, therefore, hardwood growth still exceeded the cut.

The most significant relationships of timber cut to growth in Arkansas are in softwoods 12 inches and larger in diameter, and hardwoods 16 inches and up. Trees of these sizes provide some three-fifths of the total cut of both softwood and hardwood. It is encouraging, therefore, that net growth of softwood sawtimber 12 inches and over was 1.7 times the 1958 cut. But for hardwood sawtimber at least 16 inches in diameter, the cut exceeded growth by 69 percent (fig. 10).

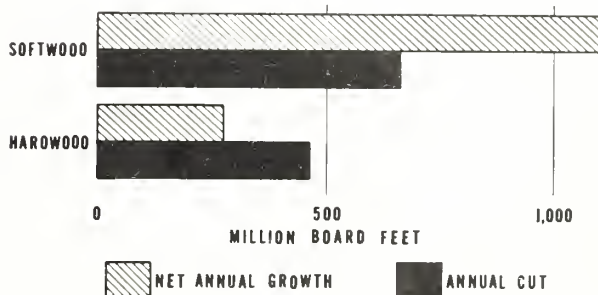
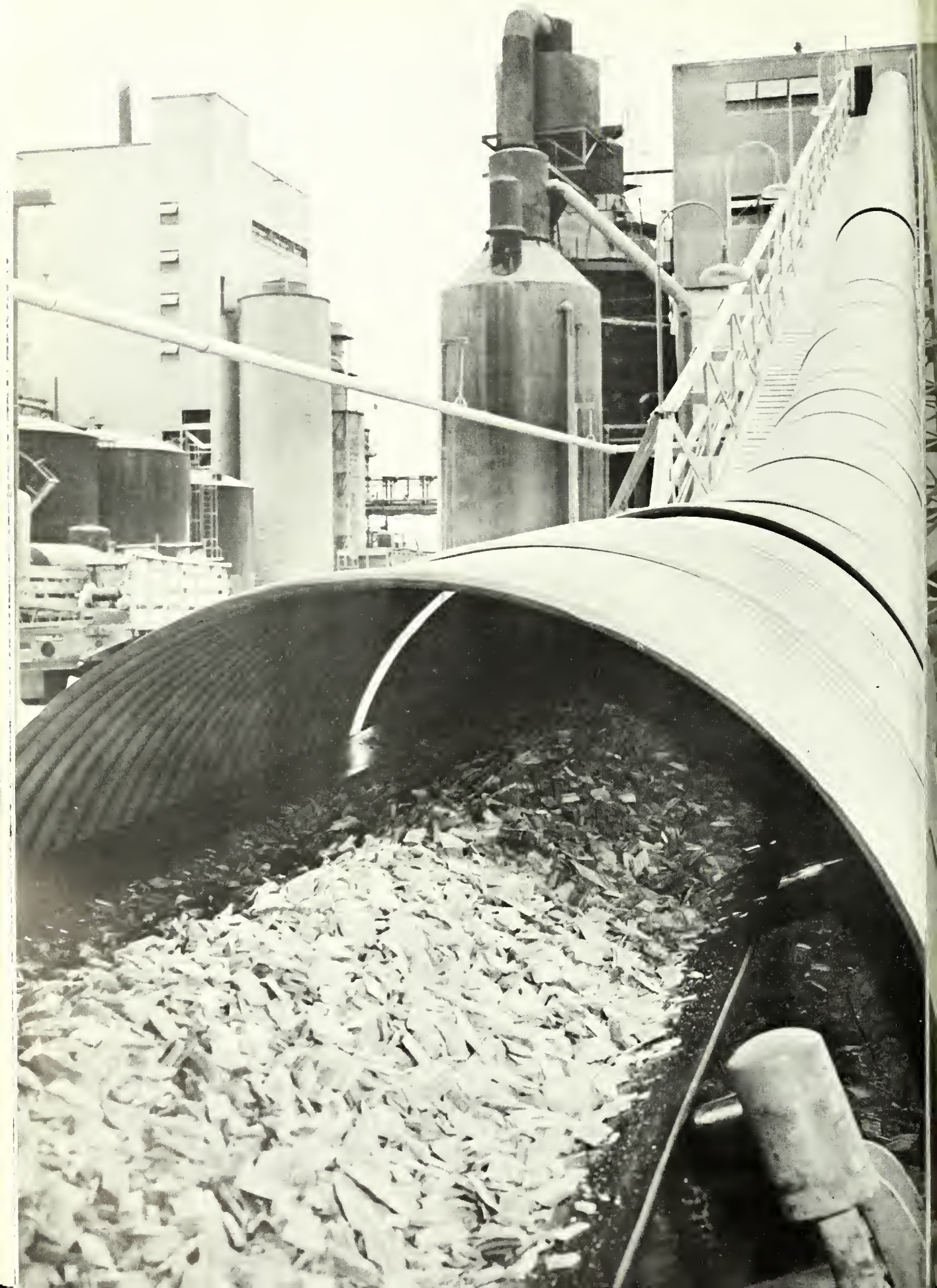


Figure 10. Net annual growth and cut, in 1958, of softwoods 12 inches and larger in diameter; hardwoods, 16 inches and up.

The timber outlook in Arkansas under current trends is mixed. In view of the downward trend in hardwood inventory and the continuing emphasis on harvesting large trees, it appears that recent production levels may not be maintained in terms of the size and quality of timber that have long sustained the traditional hardwood industries. Accelerated improvement in hardwood management and greater use of products with less exacting requirements—pulpwood, for example—would make the outlook more favorable. On the other hand, the upward trend in pine inventory plus the rising level of growth provide opportunities for industrial expansion. With further pine increases in sight, multi-million dollar additions to pulp and sawmill capacity are likely.



Timber Industries

In 1958 the production of industrial roundwood in Arkansas totaled 274 million cubic feet. Output of domestic-use products, chiefly fuelwood, was 77 million.

Lumber is still pre-eminent in industrial wood usage, but demand for paper products and availability of timber supplies has helped boost pulpwood to a new high. These two items constitute 90 percent of the industrial output. The remainder is largely veneer logs, cooperage bolts, poles, piling, and posts.

LUMBER IS MAINLY PINE

The lumber industry in Arkansas is as widely dispersed as the resource to which it is oriented. Virtually every county has several sawmills.

Changes in the industry during the postwar era have been striking. In 1958 there were 974 active sawmills in the State as compared to 1,736 in 1946. The decline has been chiefly in mills cutting less than 5 million board feet annually. Over 760 of them were scrapped, closed, stored, or moved out of the State. Of the 925 sawmills producing under 5 million board feet in 1958, 794 cut less than a half million.

Mills sawing more than 5 million board feet annually numbered 49 in 1958, 52 in 1946. Their share of the industry's total output, however, increased from about 40 to 65 percent. These large mills are concentrated in the southern part of the State. Pine makes up three-fourths of their output, while that from smaller mills is chiefly hardwood.

The total Arkansas sawlog harvest exceeded a billion board feet in 1958. Three-fifths was softwood—almost all pine. Oak supplied three-fourths of the hardwood; sweetgum, blackgum, and tupelo most of the remainder.

About half of the hardwood lumber goes into flooring. Of the State's 30 flooring plants, 17 are operated in conjunction with sawmills. Others depend largely upon small sawmills for rough lumber. Unlike flooring manufacturers, Arkansas furniture makers generally purchase their rough lumber. Only 5 of the 59 wood-furniture plants in the State operate their own sawmills.

Arkansas sawmills also chipped 265,000 cords of debarked slabs, edgings, and other residues in 1958 for sale to pulp mills. Of this, 263,000 cords were pine, 2,000 were hardwood.

The South's first commercial facilities for converting sawmill waste into pulp chips were in Bradley County. From a negligible amount in 1952, use of pine chips in Arkansas has climbed to about 70 percent of the volume that might theoretically be made available at recent lumber output levels. Over 50 sawmills are now chipping residues. Though use of hardwood residues at sawmills has increased noticeably, chipping of hardwood is still in its infancy.

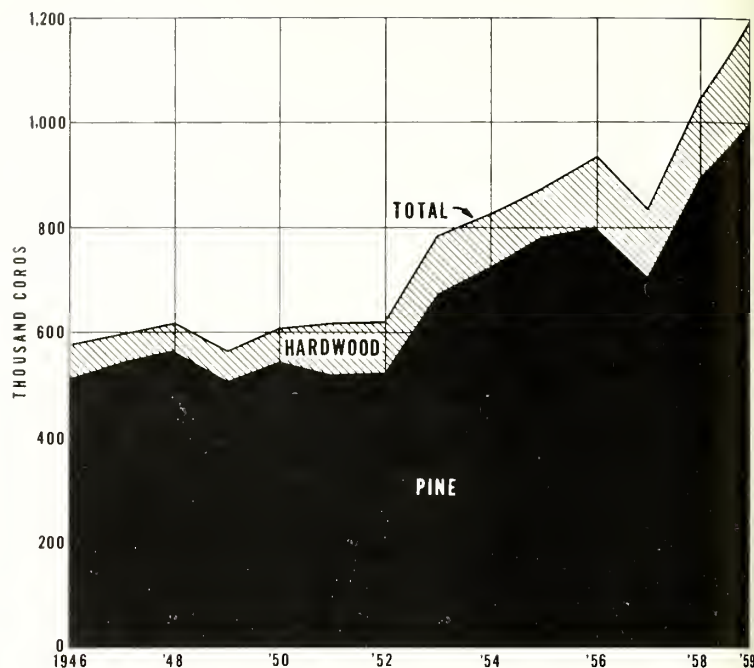
PULPWOOD TOPS MILLION CORDS

Pulp and paper is the fastest-growing segment of Arkansas' forest industry.

Between 1950 and 1959 production of round pulpwood nearly doubled. Only in 1957 did output fail to reach new highs. The 1959 harvest—1,192,400 cords—was 14 percent over the previous peak of 1958. As with bolts, pulpwood derived from residues hit a new high in 1959—332,000 cords.

Southern pines are the keystone of the industry. Currently, they supply about 85 percent of the round pulpwood. Hardwood use, however, is trending up (fig. 11). The industry's

Figure 11. *Production of round pulpwood in Arkansas, 1946-59.*



preference is for soft-textured hardwoods that are also in demand for traditional forest products such as lumber, veneer, and slack cooperage. Sweetgum alone, for example, makes up three-fifths of the hardwood used in pulp manufacture. Oak and other firm-textured species, which comprise three-fourths of the hardwood timber in Arkansas, account for a fifth of the hardwood that is pulped.

Construction of two new mills and enlargement of the two already established increased total daily pulping capacity in Arkansas from 635 tons in 1946 to 2,285 tons in 1959. During this period, Arkansas' share of mill capacity in the seven Midsouth States increased from 9 to 12 percent. The average mill can now manufacture about 570 tons of pulp every day, as compared to 320 tons in 1946. Daily capability of individual mills ranges from 150 to 895 tons.

Plans have been announced for new mills in the vicinity of McGehee and Texarkana. These facilities are expected to have a combined capacity of some 800 tons daily. Expansion of existing mills both in Arkansas and north Louisiana is also under way. The pulpwood harvest in Arkansas thus promises to trend upward for some time. The continued growth of the pulp and paper industry provides timber owners, especially of pine, with a strong incentive for managing their holdings.

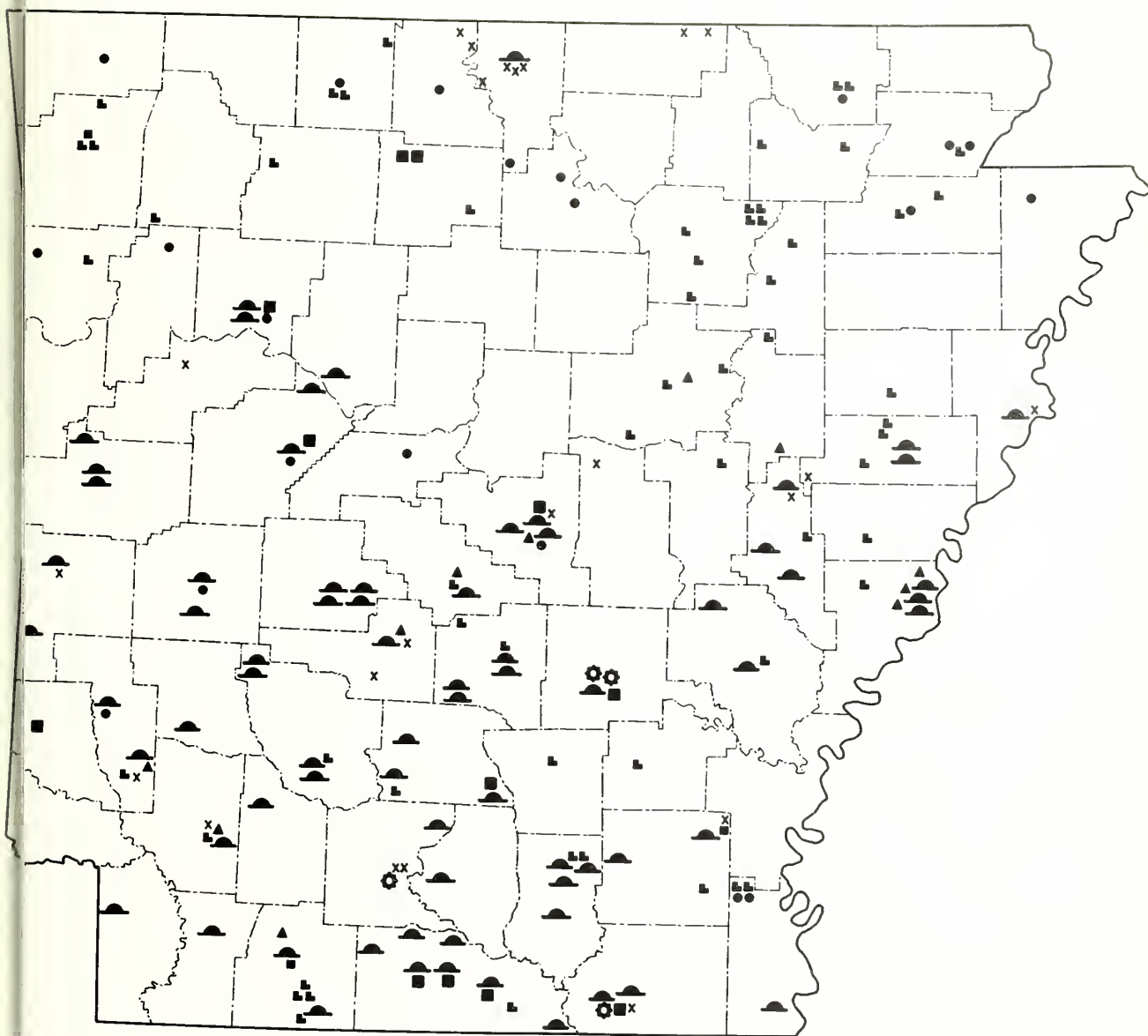
VENEER IS ALL HARDWOOD

Veneers manufactured in Arkansas are chiefly for the container and plywood industries, although some logs go into face veneers.

Arkansas forests supply about three-fourths of the volume of logs consumed by the State's veneer industry. Veneer log production in 1958 totaled 32 million board feet (4.5 million cubic feet), of which nearly 9 million were shipped out-of-state. These shipments were balanced by receipt of over 8 million board feet from Mississippi, Louisiana, and Texas. The 11 veneer mills in Arkansas thus consumed an average of 2.9 million board feet per plant (fig. 12). In 1948, the 18 mills active at that time used an average of 3.6 million per plant. Four of the seven plants that shut down manufactured container veneer. Their closure presumably reflects in part the impact of competitive products, such as paperboard cartons.

Open-market dealings are the primary means by which Arkansas veneer mills obtain logs. In 1958, the industry bought some 58 percent of its logs at the mill yard, mainly from contract loggers. Stumpage purchases accounted for another 23 percent. Though only 4 mills secured logs from their own land, the volume was 19 percent of the total.

Four-fifths of the veneer log volume cut in Arkansas is soft-textured hardwood. Sweet-



— SAWMILLS (LARGE AND MEDIUM ONLY)

■ WOOD-PRESERVING PLANTS (PRESSURE)

⚙ PULP MILLS

▣ WOOD-PRESERVING PLANTS (NON-PRESSURE)

▲ VENEER PLANTS

▤ HANDLE AND FURNITURE-STOCK MILLS

● COOPERAGE PLANTS

× OTHER PLANTS

Figure 12. Location of primary wood-using plants in Arkansas, 1958.

black-, and tupelo gum made up 57 percent of the total 1958 veneer output, as compared to 78 percent in 1948. Other soft hardwoods largely compensated for the proportionate drop in the above species.

POLE OUTPUT TRENDS UP

Southern pine has been the principal source of the Nation's poles and piling for many years. Arkansas produced about 10 percent of the total volume of southern pine harvested for these purposes in 1958. The volume was 6.6 million cubic feet, of which two-thirds came from the southern counties. Another 0.2 million cubic feet of piling was made from cypress and hardwood. Of the pole and piling volume produced in Arkansas during 1958, poles alone made up over 80 percent.

Expansion of Arkansas' wood-preserving industry has paralleled the upward trend of pole and piling output shown in figure 13. Between 1948 and 1958, six new pressure plants were established and existing facilities were enlarged. Expressed in size of pressure-treating cylinders, plant capacity of the industry increased from 40 to 75 thousand cubic feet during this period. Twelve of the 15 wood-treating plants in the State are of the commercial

pressure type. The three non-pressure plants largely treat pine fence posts.

OTHER PRODUCTS

Arkansas is a leading source of hardwood cooperage. Output is mainly tight cooperage for aging whiskey. Demand for slack cooperage has been strongly affected by the trend toward other types of packaging for storage and shipment of dry materials. In 1958, output of cooperage roundwood in Arkansas totaled 2 million board feet (2.9 million cubic feet). Virtually all was processed within the State. Of the cooperage plants active in this year, 1 were cutting tight cooperage; 3, slack.

Fuelwood production in Arkansas dropped from 1.3 million cords in 1948 to 0.9 million cords (73.5 million cubic feet) in 1958. The decline is chiefly due to substitution of more convenient fuels for cooking and heating in rural areas. Increased urbanization and higher per capita income are expected to contribute to further reduction in domestic fuelwood consumption.

Various additional items comprised 4 percent of Arkansas' 1958 timber output. The total volume, 15 million cubic feet, was mostly in fence posts and chemical wood.

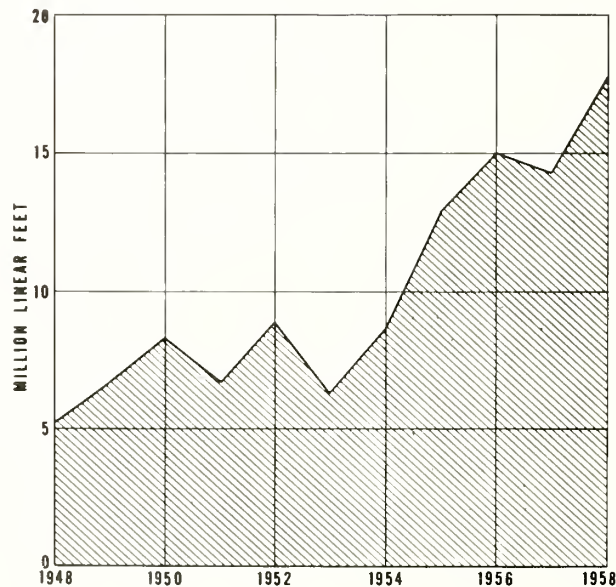


Figure 13. Pole and piling production in Arkansas, 1948-58.

Improving Forest Productivity

Anticipated increases in population and gross national product are expected to boost the Nation's future timber demand. In the South, timber output will have to be doubled to meet the need anticipated a few decades from now. Only with fuller development of potentially productive forest lands can this need be met. Essential to such development is heavy and sustained investment in cultural measures. As indicated earlier, the improved outlook for Arkansas' pine resources is attributable partly to the effort already expended on such measures as deadening of undesirable trees in order to provide more growing space for thrifty timber. But overall, the forest betterment task is still sizable.

PINE RESTOCKING PROSPECTS CAN BE INCREASED

Of the 20.8 million acres of commercial forest land in Arkansas, 16.3 million are in the uplands. Over most of the uplands pine and hardwood grow naturally in mixture. The hardwood in these upland forests is generally regarded as a problem because it occupies growing space that could be more profitably used by pine. Not only do these hardwoods grow slowly, but they are short-boled and apt to be limby or defective in one way or another.

In managed stands on the Crossett Experimental Forest in Ashley County, it has been found that hardwood on upland sites cannot compete with southern pine from the standpoint of dollar returns per unit of growing space.³ Moreover, droughts that limit tree growth occur nearly every summer throughout that portion of the shortleaf-loblolly pine-hard-

wood region that lies west of the Mississippi River.⁴ Hardwood removal helps to conserve soil moisture and permits the water supply to be used by the preferred pines.

Removal of low-value hardwood, by cutting, poisoning, or other means, is now recognized as one of the first tasks in stands that are to be managed for pine. Of the 16.3 million acres of upland forest, 11.7 million are primarily pine sites and should be so managed, at least in the light of present knowledge. Some 9.9 million acres in pine sites have a hardwood problem in the sense that 20 percent or more of each acre is occupied by hardwoods.

About 3.4 million of the hardwood-encumbered acreage is over 50 percent stocked with pine. With removal of competing hardwoods, these stands can be expected to produce excellent crops of pine. The bulk of this acreage lies in the southwest counties and is fully capable of producing 500 or more board feet of pine per acre annually.

Another 2.2 million acres lack adequate pine stocking but still have ample seed trees. Here, hardwood control must be undertaken just before or just after a good seed year. And after treatment the area must be given almost perfect fire protection for 10 or more years. Since most of the hardwood on these sites is over 2 inches in diameter, its reduction will largely have to be accomplished by girdling or chemical treatment. Either method may prove satisfactory for trees 10 inches in d.b.h. and larger. Where pine reproduction is present or expected, smaller hardwoods must be poisoned if seedlings are not to be crowded out by vigorous sprout competition.

Reynolds, R. R. Eighteen years of selection timber management on the Crossett Experimental Forest. U. S. Dept. Agr. Tech. Bul. 1206, 68 pp., illus. 1959.

⁴Moyle, R. C., and Zahner, R. Soil moisture as affected by stand conditions. U. S. Forest Serv. South. Forest Expt. Sta. Occas. Paper 137, 14 pp., illus. 1954.



On the remaining 4.3 million acres there is neither adequate pine stocking nor enough seed trees. Restoration may be expensive because both intensive hardwood control and planting or direct seeding of pine will be needed. On those acres with some pine stocking, partial or reinforcement planting will do the job. An additional 300,000 plantable acres, nearly half of which are in and around Nevada and Columbia Counties, are free of serious hardwood competition. These estimates do not include fields that are no longer in cultivation but have not yet reverted to forest and on which planting may also be desirable for erosion control, watershed protection, or other reasons.

CULL-TREE CONTROL WIDELY NEEDED

Arkansas has 9 million acres of commercial forest that appear to be primarily suited to growing hardwood. The great majority of these timberlands are without management, or are still in the early stages of transition from unmanaged to managed forests. Past treatment has left most hardwood sites burdened with a high proportion of stems that are undesirable as future growing stock.

Some of the undesirable components include trees with sufficient merchantable volume to warrant removal in commercial improvement cuts. Additionally, many stands are loaded with outright culls. All told, more than 5 million acres of hardwood sites in Arkansas are noticeably hampered with cull trees. That is, a sixth or more of each acre is dominated by trees unmerchantable now or prospectively for veneer, factory lumber, or other high-quality products. Removal of this material will make openings essential for reproduction and will release desirable growing stock already established.

Much of the sound volume in cull trees could, of course, serve for fuelwood or other farm-use products if demand were sufficient. With increasing markets for wood fiber, some of it can be channelled into pulpwood. For

example, cull-tree volume in soft-textured hardwoods generally acceptable for pulping totals 3.5 million cords on hardwood sites alone. But the total quantity on these sites—about 19 million cords—is so large that investment in deadening is likely to prove the only effective way of rapidly reducing this tremendous overburden.

FUTURE DEPENDS ON NONINDUSTRIAL LANDOWNERS

Review of forestry progress in Arkansas indicates that the greatest advances in management have been made on the holdings of timber-connected industries and public agencies. These lands make up only 7 million acres. Furthermore, the 3 million acres in public ownership for the most part are on the least productive forest soils.

The lion's share of the commercial timberland consists of nearly 14 million acres in farm and other private nonindustrial holdings. Currently, volume averages 425 cubic feet per acre. It is on these ownerships that opportunities for increasing timber yields through stand improvement are the greatest. If the average volume on such lands within each of the major physiographic regions were raised to that on the public and industrial lands, the 14 million acres would support an average of 798 cubic feet per acre, or about 1.9 times their current volume. If increased to this level during the next few decades, the private nonindustrial holdings might be considered to have achieved a reasonable share of their potential productivity. Even so, with the further improvement expected during the years ahead on public and industry lands, the growing stock on the 14 million acres would still be less than the State average.

Thus the forestry efforts of the 160,000 owners of private, nonindustrial timberlands will decide whether Arkansas realizes its potential timber economy before the turn of the century. The sixties are the decade of decision.

Appendix

ACCURACY OF THE SURVEY

The data on forest acreage and timber volume in this report were secured by a systematic sampling method involving a forest-nonforest classification on aerial photographs and on-the-ground measurements of trees at sample points. In the Delta, Ouachita, and southwest regions, the sample points were taken in pairs at and near the intersections of a grid of lines spaced 3 miles apart; in the Ozark region the average spacing was 4.2 miles. Tally trees were selected with a 3.03 diopter prism.

Accuracy of the estimates may be affected by two types of errors. The first stems from the use of a sample to estimate the whole and from variability of the items being sampled. This type is termed sampling error; it is susceptible to a mathematical evaluation of the probability of error. The second type—often referred to as reporting or estimating error—derives from mistakes in measurement, judgment, arithmetic, or recording, and limitations of method or equipment. Its effects cannot be appraised mathematically, but the Forest Survey constantly attempts to hold such error to a minimum by proper training and good supervision, and by emphasis on careful work.

Statistical analysis of the data indicates a sampling error of plus or minus 0.3 percent for the estimate of total forest area, 1.2 percent for total cubic volume, and 1.9 percent for total board-foot volume. As the acreage and volume totals for the State are broken down by forest type, species, county, and other subdivisions of the data, the possibility of error increases and is greatest for the smallest items. The order of this increase is suggested in the following tabulation, which shows the sampling error to which the estimates are liable two chances out of three.

Forest area		Cubic volume		Board-foot volume	
Size of area sampled	Sampling error ¹	Volume sampled	Sampling error ²	Volume sampled	Sampling error ²
Thousand acres	Percent	Million cu. ft.	Percent	Million bd. ft.	Percent
21,000	0.3	12,000	1.2	41,000	1.7
10,000	0.4	6,000	1.7	20,000	2.4
5,000	0.6	3,000	2.4	10,000	3.5
2,000	1.0	1,000	4.2	5,000	4.9
500	1.9	500	5.9	2,000	7.7
100	4.3	100	13.2	300	19.9

¹ By random-sampling formula.

² Estimated by use of a procedure described by D. B. DeLury in *Values and Integrals of the Orthogonal Polynomials up to n = 26*. Univ. Toronto Press, 33 pp. Toronto, Ont. 1950.

County data on timber volume have been included in the report. Sampling error on growing stock approaches plus or minus 15 percent in counties with 72 million cubic feet of volume. The sampling error for most county estimates of cubic volume will range from plus or minus 6 percent to plus or minus 26 percent. Grouping counties greatly strengthens the total volume data and is necessary to provide reliable estimates of species-group breakdowns of volume. Groupings of a million acres or more of forest land are recommended.

Growth estimates were derived from radial-growth measurements and mortality data taken at sample points. No attempt was made to calculate sampling error in these estimates.

Estimates of annual cut are based on studies conducted during the period of forest inventory. The sampling error to which the total cubic-foot estimate of annual cut is liable, on a probability of two chances out of three, is plus or minus 3.0 percent.

In computing changes in timber volumes since 1951, data from the earlier survey were adjusted to make them closely comparable to those from the latest survey. This was necessary because of certain basic differences between the two sets of data. In every case, the data from the earlier survey were adjusted to conform to the standards of the latest survey before the change was computed.

DEFINITIONS OF TERMS

Forest Land Class

Forest land.—Includes: (a) land which is at least 10 percent stocked by trees of any size and capable of producing timber or other wood products, or of exerting an influence on the climate or on the water regime; (b) land from which the trees have been removed to less than 10 percent stocking and which has not been developed for other use; (c) afforested areas.

Commercial forest land.—Forest land which is (a) producing, or is physically capable of producing, usable crops of wood (usually sawtimber), (b) economically available now or prospectively, and (c) not withdrawn from timber utilization.

Noncommercial forest land.—Forest land (a) withdrawn from timber utilization through statute, ordinance, or administrative order but which otherwise qualifies as commercial forest land and (b)

incapable of yielding usable wood products (usually sawtimber) because of adverse site conditions, or so physically inaccessible as to be unavailable economically in the foreseeable future.

Tree Species

Commercial species.—Includes species that normally have value for commercial timber products; excludes so-called weed or noncommercial species such as blackjack oak, scrub post oak, blue beech, scourwood, etc.

Softwoods.—Loblolly pine (*Pinus taeda*), shortleaf pine (*P. echinata*), cypress (*Taxodium distichum*), and cedar (*Juniperous virginiana*).

Hardwoods.—Broadleaved species, of which the most numerous are the oaks (*Quercus* spp.) and sweetgum (*Liquidambar styraciflua*).

Forest Type

Forest type is determined upon the basis of the predominant species as indicated by cubic volume for sawtimber and poletimber stands, and number of trees for seedling-sapling stands.

Loblolly-shortleaf pine.—Forests in which 50 percent or more of the stand is loblolly pine, shortleaf pine, or other southern yellow pines excepting ongleaf or slash pine, singly or in combination. Common associates include oak, hickory, and gum.

Oak-pine.—Forests in which 50 percent or more of the stand is hardwoods, usually upland oaks, but in which southern pines make up 25-49 percent of the stand. Common associates include gum, hickory, and yellow-poplar.

Cedar.—Forests in which 25 percent or more of the stand is cedar. Common associates include oak and hickory.

Oak-hickory.—Forests in which 50 percent or more of the stand is upland oaks or hickory, singly or in combination, except where pines comprise 25-49 percent (or cedar at least 25 percent) in which case the stand would be classified oak-pine (or cedar). Common associates include yellow-poplar, elm, maple, and black walnut.

Oak-gum-cypress.—Bottom-land forests in which 50 percent or more of the stand is tupelo, blackgum, sweetgum, oaks, or southern cypress, singly or in combination, except where pines comprise 25-49 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 50 percent or more of the stand is elm, ash, or cottonwood, singly or in combination. Common associates include willow, sycamore, beech, and maple.

Class of Timber

Sawtimber trees.—Live trees of commercial species at least 9.0 inches d.b.h. in softwoods and 11.0 inches d.b.h. in hardwoods, that contain at

least an 8-foot merchantable butt log—or, if the butt log is a cull, at least 50 percent of the gross sawlog volume is in merchantable logs. To be merchantable, a log must meet the following requirements:

- (a) In softwoods, logs having a minimum 6-inch small-end diameter inside bark and at least one-third sound, with sweep or crook not exceeding two-thirds the small-end diameter.
- (b) In hardwoods, logs having a minimum 8-inch small-end diameter inside bark and which meet the specifications of a standard lumber log or a tie and timber log.

Poletimber trees.—Trees of commercial species which meet regional specifications of soundness and form, and which are of the following diameters at breast height: softwoods 5.0 to 9.0 inches; hardwoods 5.0 to 11.0 inches. (Such trees will usually become sawtimber trees if left to grow.)

Seedling and sapling trees.—Live trees of commercial species less than 5.0 inches in diameter at breast height and of good form and vigor.

Cull trees.—Live trees of sawtimber or poletimber size that are unmerchantable for sawlogs now or prospectively because of defect, rot, or species.

Rotten cull trees.—Live trees of sawtimber or poletimber size which fail to meet regional specifications of proportion of sound volume to total volume.

Sound cull trees.—Live trees of sawtimber or poletimber size which meet regional specifications of freedom from rot but will not make at least one merchantable sawlog now or prospectively according to regional specifications because of roughness, poor form, or species.

Hardwood limbs.—Limbs of hardwood sawtimber trees and sawtimber-size cull hardwood trees to a minimum diameter of 4.0 inches inside bark.

Stand-size Class

Large sawtimber.—Stands with sawtimber trees having a minimum net volume per acre of 1,500 board feet, International ¼-inch rule, and at least half of this volume in sawtimber trees 15.0 inches d.b.h. and larger.

Small sawtimber.—Stands with sawtimber trees having a minimum net volume per acre of 1,500 board feet, International ¼-inch rule, but which do not meet the specifications for large sawtimber.

Poletimber.—Stands failing to meet the sawtimber stand specification, but at least 10 percent stocked with poletimber and larger (5.0 inches d.b.h. and larger) trees and with at least half the minimum stocking in poletimber trees.

Seedling and sapling.—Stands not qualifying as either sawtimber or poletimber stands, but having at least 10 percent stocking of trees of commercial species and with at least half the minimum stocking in seedling and sapling trees.

Nonstocked and other areas.—Commercial forest land not qualifying as sawtimber, poletimber, or seedling and sapling stands.

Tree Stocking

Stocking is the extent to which growing space is effectively utilized by present or potential growing-stock trees of commercial species. Stands are considered to be well stocked when the percentage of full stocking is 70 or above, medium stocked when the percentage is 40 to 69, poorly stocked when the percentage is 10 to 39, and nonstocked when the percentage is under 10.

Volume

Sawtimber volume.—Net volume in board feet, International $\frac{1}{4}$ -inch rule, of live sawtimber trees to a specified merchantable top.

Growing stock.—Net volume in cubic feet of live sawtimber and live poletimber trees from stump to a minimum 4.0-inch top diameter (of central stem) inside bark.

All-timber volume.—Net volume in cubic feet of live and salvable dead sawtimber trees and poletimber trees of commercial species, and cull trees of all species from stump to a minimum 4.0-inch top inside bark. Includes bole only of softwoods but both bole and limbs of hardwoods to a minimum 4.0-inch diameter inside bark.

Softwood Log Grades

Softwood log grades are based on the value yield per unit outturn of yard lumber. The value of lumber yield may be expressed relative to the value of No. 2 Common lumber taken as 100 percent. Expressed thus, studies have shown that lumber from grade 1 logs has a value 244 percent as great as No. 2 Common lumber, while the corresponding percentages are 189 percent for grade 2 logs, 142 percent for grade 3 logs, and 107 percent for grade 4 logs. For detailed specifications of log grades, see *Interim log grades for southern pine*, U. S. Forest Service, Southern Forest Experiment Station, 18 pp. 1953.

Hardwood Log Class

Specifications for standard lumber logs (hardwood log grades 1, 2, and 3) are based on suitability for standard factory lumber. Studies have shown that for nearly all species tested, the yield of No. 1 Common and better lumber in grade 1 logs varies from 65 to 80 percent; in grade 2 logs from 40 to 64 percent; and in grade 3 logs from 13 to 36 percent.

For detailed specifications of log grades, see *Hardwood log grades for standard lumber: proposals and results*, U. S. Forest Products Laboratory D1737. 1949.

Tie and timber logs are suitable for ties, timbers, and certain other construction lumber items. Specifications for tie and timber logs are based chiefly on knot size and log soundness; clear cuttings are not required.

Stand Quality

Fair and better.—A stand in which at least four grade-2 or better logs are present per acre.

Poor.—A stand in which fewer than four grade-2 or better logs are present per acre.

Miscellaneous Definitions

Farm ownership.—Private commercial forest land in farms, but excluding lands on which farm operators do not control timber use.

Basal area.—Cross-sectional area, including bark, of trees at breast height, measured in square feet.

D. b. h. (Diameter breast high).—Tree diameter in inches, outside bark, measured at 4- $\frac{1}{2}$ feet above ground.

Diameter class.—The 2-inch diameter classes extend from 1.0 inch below to 0.9 inch above the stated midpoint. Thus, the 12-inch class includes trees 11.0 inches to and including 12.9 inches d.b.h.

Net annual growth of sawtimber.—The change during a specified year in net board-foot volume of live sawtimber on commercial forest land resulting from natural causes.

Net annual growth of growing stock.—The change during a specified year in net cubic-foot volume of growing stock on commercial forest land resulting from natural causes.

Annual mortality.—The net volume, excluding salvage, removed from live sawtimber and from growing stock during a specified year through death from natural causes.

Annual cut of sawtimber.—The net board-foot volume of live sawtimber trees cut or killed by logging, and by cultural operations, on commercial forest land during a specified year.

Annual cut of growing stock.—The net cubic-foot volume of live sawtimber and poletimber trees cut or killed by logging, or by cultural operations, on commercial forest land during a specified year.

Timber products output.—The volume of timber products cut from both growing stock and other sources.



DETAILED TABLES

Table 5. *Forest and nonforest land by Survey region, 1959*

Land use	State of Arkansas	Southwest	Ouachita	Ozark	South Delta	North Delta
<i>Thousand acres</i>						
Forest:						
Commercial	20,757.0	6,959.7	3,552.2	6,995.9	2,041.2	1,208.0
Noncommercial:						
Productive- reserved	59.0	.2	38.1	18.0	1.7	1.0
Unproductive	.	.	.	.	..	..
Total forest	20,816.0	6,959.9	3,590.3	7,013.9	2,042.9	1,209.0
Nonforest ¹	12,800.6	1,901.9	1,177.9	3,588.4	2,647.0	3,485.4
All land	33,616.6	8,861.8	4,768.2	10,602.3	4,689.9	4,694.4

¹ Includes some acreage classifiable as water according to Survey standards of area classification but defined by the Bureau of Census as land.

Table 6. *Commercial forest land by class of ownership, 1959*

Class of ownership	Commercial forest	
	<i>Thousand acres</i>	<i>Percent</i>
Private:		
Farm	5,948.3	28.7
Forest industry	4,028.3	19.4
Other	7,924.7	38.1
Total private	17,901.3	86.2
Public:		
National forest	2,385.4	11.5
Other federal	265.7	1.3
State	193.9	.9
County and municipal	10.7	.1
Total public	2,855.7	13.8
All ownerships	20,757.0	100.0

ble 7. Land area and commercial forest by county, 1959

County	All land	Commercial forest		County	All land	Commercial forest	
	Thousand acres	Thousand acres	Percent		Thousand acres	Thousand acres	Percent
Kansas	662.4	276.1	41.7	Lee	396.8	161.0	40.6
Cherokee	597.2	461.4	77.3	Lincoln	361.6	171.8	47.5
Cherokee	341.8	281.0	82.2	Little River	348.2	240.6	69.1
Clinton	567.0	301.1	53.1	Logan	463.4	292.4	63.1
Columbia	378.7	252.8	66.8	Lonoke	512.0	152.8	29.8
Madison	415.4	358.0	86.2	Madison	532.5	402.5	75.6
Marion	401.9	342.2	85.1	Marion	375.8	301.2	80.1
Monroe	405.8	253.3	62.4	Miller	401.3	268.3	66.9
Newton	414.1	184.3	44.5	Mississippi	589.4	56.1	9.5
Polk	562.0	448.4	79.8	Monroe	394.9	219.9	55.7
Saline	416.0	127.2	30.6	Montgomery	498.3	428.5	86.0
Sevier	380.8	265.0	69.6	Nevada	394.2	301.6	76.5
Shelby	384.6	309.3	80.4	Newton	526.1	470.7	89.5
Union	491.5	348.0	70.8	Ouachita	472.3	387.4	82.0
Washington	358.4	170.1	47.5	Perry	355.2	288.1	81.1
Wayne	458.9	87.1	19.0	Phillips	450.5	156.9	34.8
Webster	382.7	248.3	64.9	Pike	386.4	329.2	85.2
Wheeler	398.7	61.8	15.5	Poinsett	487.7	108.2	22.2
Woods	400.6	120.2	30.0	Polk	550.4	462.8	84.1
Wright	430.1	382.8	89.0	Pope	522.2	350.2	67.1
Xenia	496.6	274.1	55.2	Prairie	431.4	176.1	40.8
York	535.0	424.3	79.3	Pulaski	490.8	297.1	60.5
Zachary	419.8	180.8	43.1	Randolph	407.7	224.2	55.0
Adair	393.6	244.5	62.1	St. Francis	407.0	108.2	26.6
Albany	389.1	254.2	65.3	Saline	464.0	389.8	84.0
Anderson	435.6	370.5	85.1	Scott	574.8	471.0	82.0
Antelope	403.8	353.0	87.4	Searcy	425.0	328.0	77.2
Ashtabula	370.6	112.3	30.3	Sebastian	338.6	137.9	40.7
Barren	470.4	291.1	61.9	Sevier	374.4	297.6	79.5
Bell	397.4	325.0	81.8	Sharp	381.4	266.4	69.8
Benton	384.0	286.1	74.5	Stone	390.4	323.5	82.9
Berkeley	483.2	292.3	60.5	Union	673.3	567.4	84.3
Birmingham	367.4	238.2	64.8	Van Buren	457.0	344.3	75.3
Bolton	407.7	129.2	31.7	Washington	616.4	332.7	54.0
Bolton	569.6	268.2	47.1	White	666.9	344.4	51.6
Bolton	432.6	326.2	75.4	Woodruff	378.9	149.2	39.4
Bolton	338.4	238.0	70.3	Yell	597.1	414.1	69.4
Bolton	378.9	148.5	39.2	All counties	33,616.6	20,757.0	61.7

Table 8. Commercial forest land by stand size and forest type, by Survey region, 1959

Forest type	All stand sizes	Large saw-timber	Small saw-timber	Pole-timber	Seedling and sapling	Non-stocked & other areas ¹	All stand sizes	Large saw-timber	Small saw-timber	Pole-timber	Seedling and sapling	No stock & other areas
Thousand acres							Thousand acres					
STATE OF ARKANSAS							OZARK					
Softwood types:												
Loblolly-shortleaf pine	6,485.6	1,266.7	2,557.1	1,896.3	658.1	107.4	622.1	13.6	167.0	333.5	98.8	9
Oak-pine	1,697.1	175.0	208.8	844.9	438.8	29.6	430.7	18.7	33.4	253.5	106.1	19
Cedar	595.1			138.8	445.3	11.0	539.7			114.3	414.4	11
Total	8,777.8	1,441.7	2,765.9	2,880.0	1,542.2	148.0	1,592.5	32.3	200.4	701.3	619.3	39
Hardwood types:												
Oak-hickory	7,524.2	352.5	389.2	3,950.7	2,614.9	216.9	5,100.6	232.6	225.0	2,720.7	1,773.7	148
Elm-ash-cottonwood	458.0	156.9		123.0	133.6	44.5	35.0	9.2		12.2		13
Oak-gum-cypress	3,997.0	1,145.4	488.2	1,494.6	703.4	165.4	267.8	86.1	41.3	76.3	54.2	9
Total	11,979.2	1,654.8	877.4	5,568.3	3,451.9	426.8	5,403.4	327.9	266.3	2,809.2	1,827.9	172
All types	20,757.0	3,096.5	3,643.3	8,448.3	4,994.1	574.8	6,995.9	360.2	466.7	3,510.5	2,447.2	211
SOUTHWEST							SOUTH DELTA					
Softwood types:												
Loblolly-shortleaf pine	3,596.8	938.5	1,466.6	669.6	435.2	86.9	93.1	23.6	39.6	15.8	14.1	
Oak-pine	911.8	139.4	146.3	379.7	235.8	10.6	34.4	5.1	4.7	14.5	10.1	
Cedar												
Total	4,508.6	1,077.9	1,612.9	1,049.3	671.0	97.5	127.5	28.7	44.3	30.3	24.2	
Hardwood types:												
Oak-hickory	982.2	55.8	111.0	537.0	255.6	22.8	305.3	24.0	32.8	160.4	59.3	28
Elm-ash-cottonwood	108.6	27.9		22.5	46.0	12.2	165.6	52.2		55.6	39.1	18
Oak-gum-cypress	1,360.3	354.8	197.1	464.1	282.7	61.6	1,442.8	540.5	133.5	504.7	207.2	56
Total	2,451.1	438.5	308.1	1,023.6	584.3	96.6	1,913.7	616.7	166.3	720.7	305.6	104
All types	6,959.7	1,516.4	1,921.0	2,072.9	1,255.3	194.1	2,041.2	645.4	210.6	751.0	329.8	104
OUACHITA							NORTH DELTA					
Softwood types:												
Loblolly-shortleaf pine	2,159.6	291.0	879.2	872.8	105.3	11.3	14.0		4.7	4.6	4.7	
Oak-pine	315.5	11.8	24.4	192.5	86.8		4.7			4.7		
Cedar	43.0			18.3	24.7		12.4			6.2	6.2	
Total	2,518.1	302.8	903.6	1,083.6	216.8	11.3	31.1		4.7	15.5	10.9	
Hardwood types:												
Oak-hickory	841.0	16.7	11.2	393.2	414.4	5.5	295.1	23.4	9.2	139.4	111.9	11
Elm-ash-cottonwood	27.6	5.3		10.9	11.4		121.2	62.3		21.8	37.1	
Oak-gum-cypress	165.5	16.9	28.4	85.1	23.8	11.3	760.6	147.1	87.9	364.4	135.5	25
Total	1,034.1	38.9	39.6	489.2	449.6	16.8	1,176.9	232.8	97.1	525.6	284.5	36
All types	3,552.2	341.7	943.2	1,572.8	666.4	28.1	1,208.0	232.8	101.8	541.1	295.4	36

¹ Includes areas not classified elsewhere.

Table 9. Commercial forest land by degree of tree stocking and forest type, by Survey region, 1959

Forest type	All stocking	Well stocked	Medium stocked	Poorly stocked	Non- stocked	All stocking	Well stocked	Medium stocked	Poorly stocked	Non- stocked
— Thousand acres —						— Thousand acres —				
STATE OF ARKANSAS						OZARK				
Softwood types:										
Loblolly-shortleaf pine	6,485.6	5,267.5	821.0	332.5	64.6	622.1	453.1	95.1	64.7	9.2
Oak-pine	1,697.1	1,206.9	300.3	160.4	29.5	430.7	311.5	82.6	17.6	19.0
Cedar	595.1	277.1	201.3	116.7	.	539.7	251.4	177.8	110.5	.
Total	8,777.8	6,751.5	1,322.6	609.6	94.1	1,592.5	1,016.0	355.5	192.8	28.2
Hardwood types:										
Oak-hickory	7,524.2	4,876.7	1,609.6	892.6	145.3	5,100.6	3,446.1	1,013.5	529.4	111.6
Elm-ash-cottonwood	458.0	207.1	113.4	99.7	37.8	35.0	9.2	12.2	.	13.6
Oak-gum-cypress	3,997.0	2,538.9	946.5	424.8	86.8	267.8	185.0	46.3	36.5	.
Total	11,979.2	7,622.7	2,669.5	1,417.1	269.9	5,403.4	3,640.3	1,072.0	565.9	125.2
All types	20,757.0	14,374.2	3,992.1	2,026.7	364.0	6,995.9	4,656.3	1,427.5	758.7	153.4
SOUTHWEST						SOUTH DELTA				
Softwood types:										
Loblolly-shortleaf pine	3,596.8	2,855.9	457.7	239.0	44.2	93.1	87.7	5.4	.	.
Oak-pine	911.8	664.8	132.6	103.9	10.5	34.4	23.9	5.4	5.1	.
Cedar	...	...	.	..	..	...	...	...	.	.
Total	4,508.6	3,520.7	590.3	342.9	54.7	127.5	111.6	10.8	5.1	...
Hardwood types:										
Oak-hickory	982.2	623.2	212.5	129.1	17.4	305.3	188.7	43.1	67.8	5.7
Elm-ash-cottonwood	108.6	74.1	16.8	5.5	12.2	165.6	86.1	25.2	42.3	12.0
Oak-gum-cypress	1,360.3	913.5	283.6	128.3	34.9	1,442.8	904.1	348.3	165.3	25.1
Total	2,451.1	1,610.8	512.9	262.9	64.5	1,913.7	1,178.9	416.6	275.4	42.8
All types	6,959.7	5,131.5	1,103.2	605.8	119.2	2,041.2	1,290.5	427.4	280.5	42.8
OUACHITA						NORTH DELTA				
Softwood types:										
Loblolly-shortleaf pine	2,159.6	1,861.5	258.1	28.8	11.2	14.0	9.3	4.7	.	..
Oak-pine	315.5	206.7	75.0	33.8	..	4.7	..	4.7	..	..
Cedar	43.0	19.5	23.5	...	...	12.4	6.2	.	6.2	.
Total	2,518.1	2,087.7	356.6	62.6	11.2	31.1	15.5	9.4	6.2	..
Hardwood types:										
Oak-hickory	841.0	484.6	236.9	113.9	5.6	295.1	134.1	103.6	52.4	5.0
Elm-ash-cottonwood	27.6	...	21.9	5.7	.	121.2	37.7	37.3	46.2	..
Oak-gum-cypress	165.5	108.3	34.3	17.2	5.7	760.6	428.0	234.0	77.5	21.1
Total	1,034.1	592.9	293.1	136.8	11.3	1,176.9	599.8	374.9	176.1	26.1
All types	3,552.2	2,680.6	649.7	199.4	22.5	1,208.0	615.3	384.3	182.3	26.1

Table 10. Area of sawtimber stands by stand quality and forest type, by Survey region, 1959

Forest type	All qualities	Fair or better	Poor	All qualities	Fair or better	Poor
	Thousand acres			Thousand acres		
	STATE OF ARKANSAS			OZARK		
Softwood types:						
Loblolly-shortleaf pine	3,823.8	2,021.3	1,802.5	180.6	57.0	123.6
Oak-pine	383.8	169.7	214.1	52.1	14.1	38.0
Cedar	..	..	..	..	..	..
Total	4,207.6	2,191.0	2,016.6	232.7	71.1	161.6
Hardwood types:						
Oak-hickory	741.7	210.5	531.2	457.6	117.0	340.6
Elm-ash-cottonwood	156.9	106.0	50.9	9.2	9.2	..
Oak-gum-cypress	1,633.6	849.9	783.7	127.4	77.0	50.4
Total	2,532.2	1,166.4	1,365.8	594.2	203.2	391.0
All types	6,739.8	3,357.4	3,382.4	826.9	274.3	552.6
	SOUTHWEST			SOUTH DELTA		
Softwood types:						
Loblolly-shortleaf pine	2,405.1	1,387.3	1,017.8	63.2	28.2	35.0
Oak-pine	285.7	150.5	135.2	9.8	5.1	4.7
Cedar	..	..	..	..	..	..
Total	2,690.8	1,537.8	1,153.0	73.0	33.3	39.7
Hardwood types:						
Oak-hickory	166.8	49.2	117.6	56.8	22.9	33.9
Elm-ash-cottonwood	27.9	27.9	..	52.2	33.4	18.8
Oak-gum-cypress	551.9	313.0	238.9	674.0	383.9	290.1
Total	746.6	390.1	356.5	783.0	440.2	342.8
All types	3,437.4	1,927.9	1,509.5	856.0	473.5	382.5
	OUACHITA			NORTH DELTA		
Softwood types:						
Loblolly-shortleaf pine	1,170.2	548.8	621.4	4.7	..	4.7
Oak-pine	36.2	..	36.2	..	..	..
Cedar	..	..	..	..	..	..
Total	1,206.4	548.8	657.6	4.7	..	4.7
Hardwood types:						
Oak-hickory	27.9	16.7	11.2	32.6	4.7	27.9
Elm-ash-cottonwood	5.3	5.3	..	62.3	30.2	32.1
Oak-gum-cypress	45.3	5.3	40.0	235.0	70.7	164.3
Total	78.5	27.3	51.2	329.9	105.6	224.3
All types	1,284.9	576.1	708.8	334.6	105.6	229.0

Table 11. Basal area per acre of growing stock and cull trees by forest type and Survey region, 1959

Forest type	State of Arkansas	Southwest	Ouachita	Ozark	South Delta	North Delta
— Square feet —						
Loblolly-shortleaf pine:						
2- and 4-inch good trees ¹	18.6	17.3	21.8	15.1	23.5	10.9
Growing stock	52.5	54.2	53.8	37.6	57.2	28.3
2- and 4-inch poor trees	4.2	4.0	4.5	4.4	2.7	8.9
Cull trees	6.7	6.2	7.0	8.8	4.2	3.8
All trees	82.0	81.7	87.1	65.9	87.6	51.9
Oak-pine:						
2- and 4-inch good trees ¹	15.9	18.6	13.1	12.8	11.7	.
Growing stock	33.7	38.0	28.7	28.1	37.2	23.6
2- and 4-inch poor trees	5.3	4.5	5.8	6.9	.6	.
Cull trees	11.0	9.3	14.4	12.8	5.2	9.6
All trees	65.9	70.4	62.0	60.6	54.7	33.2
Cedar:						
2- and 4-inch good trees ¹	11.3	.	16.7	11.0	.	6.9
Growing stock	18.2	..	17.3	18.1	.	30.2
2- and 4-inch poor trees	4.4	...	6.5	4.3	...	..
Cull trees	11.0	...	8.5	11.0	.	16.4
All trees	44.9	...	49.0	44.4	.	53.5
Oak-hickory:						
2- and 4-inch good trees ¹	12.1	12.2	13.0	12.2	11.6	7.4
Growing stock	28.6	35.7	25.7	27.3	40.1	25.1
2- and 4-inch poor trees	4.7	3.3	5.4	5.0	3.6	2.5
Cull trees	14.0	11.2	11.3	15.6	8.8	8.9
All trees	59.4	62.4	55.4	60.1	64.1	43.9
Elm-ash-cottonwood:						
2- and 4-inch good trees ¹	6.7	4.1	8.5	3.5	4.6	12.4
Growing stock	41.2	31.6	36.5	21.3	46.0	50.2
2- and 4-inch poor trees	7.7	9.5	9.0	10.9	8.8	3.3
Cull trees	14.4	13.8	6.8	2.5	15.9	18.1
All trees	70.0	59.0	60.8	38.2	75.3	84.0
Oak-gum-cypress:						
2- and 4-inch good trees ¹	9.3	9.7	11.3	7.9	9.8	7.8
Growing stock	46.2	46.4	43.0	46.9	49.0	40.7
2- and 4-inch poor trees	6.2	7.8	2.3	3.4	6.4	4.9
Cull trees	17.6	16.8	13.0	18.8	17.4	20.0
All trees	79.3	80.7	69.6	77.0	82.6	73.4
All types:						
2- and 4-inch good trees ¹	13.8	15.1	18.3	12.2	10.3	8.1
Growing stock	39.9	47.6	43.8	28.3	47.6	37.6
2- and 4-inch poor trees	4.9	4.8	4.8	5.0	5.9	4.1
Cull trees	12.1	9.5	9.0	14.5	15.2	16.8
All trees	70.7	77.0	75.9	60.0	79.0	66.6

¹ Includes only sound, well-formed trees.

Table 12. Total volume by class of timber and species, by Survey region, 1959

Species	All timber	Growing stock				Hardwood limbs	Cull trees
		Total growing stock	Sawtimber trees		Pole- timber trees		
			Sawlog portions	Upper stems			
----- Thousand cords -----							
STATE OF ARKANSAS							
Softwood:							
Loblolly pine	28,882	28,835	22,811	1,388	4,636		47
Shortleaf pine	40,810	40,711	28,245	2,310	10,156		99
Other softwoods	2,969	2,681	2,004	245	432		288
Total	72,661	72,227	53,060	3,943	15,224		434
Hardwood:							
Red oaks	36,814	24,593	9,766	5,363	9,464	3,528	8,693
White oaks	36,369	25,952	9,858	4,505	11,589	3,347	7,070
Hickory	14,494	10,994	3,956	1,843	5,195	1,074	2,426
Sweetgum	16,116	13,192	5,417	2,743	5,032	546	2,378
Black and tupelo gums	7,224	5,282	2,921	1,113	1,248	382	1,560
Other hardwoods	30,771	18,706	8,171	3,438	7,097	2,631	9,434
Total	141,788	98,719	40,089	19,005	39,625	11,508	31,561
All species	214,449	170,946	93,149	22,948	54,849	11,508	31,995
SOUTHWEST							
Softwood:							
Loblolly pine	27,855	27,808	22,074	1,315	4,419		47
Shortleaf pine	16,391	16,360	12,488	823	3,049		31
Other softwoods	1,038	957	815	77	65		81
Total	45,284	45,125	35,377	2,215	7,533		159
Hardwood:							
Red oaks	14,192	9,990	3,875	2,407	3,708	1,239	2,963
White oaks	10,776	8,270	3,306	1,733	3,231	935	1,571
Hickory	4,016	3,021	1,103	703	1,215	322	673
Sweetgum	9,416	7,771	3,007	1,561	3,203	282	1,363
Black and tupelo gums	2,394	1,896	966	430	500	122	376
Other hardwoods	7,209	4,182	1,546	684	1,952	485	2,542
Total	48,003	35,130	13,803	7,518	13,809	3,385	9,488
All species	93,287	80,255	49,180	9,733	21,342	3,385	9,647
OUACHITA							
Softwood:							
Loblolly pine	424	424	318	33	73		
Shortleaf pine	19,691	19,636	12,695	1,192	5,749		55
Other softwoods	297	241	118	23	100		56
Total	20,412	20,301	13,131	1,248	5,922		111
Hardwood:							
Red oaks	2,497	1,582	494	291	797	234	681
White oaks	5,883	4,128	1,371	573	2,184	490	1,265
Hickory	1,349	1,033	170	75	788	48	268
Sweetgum	1,476	1,178	418	217	543	41	257
Black and tupelo gums	791	470	207	103	160	39	282
Other hardwoods	1,676	860	253	116	491	91	725
Total	13,672	9,251	2,913	1,375	4,963	943	3,478
All species	34,084	29,552	16,044	2,623	10,885	943	3,589

Table 12. Total volume by class of timber and species, by Survey region, 1959
(Continued)

Species	All timber ¹	Growing stock				Hardwood limbs	Cull trees
		Total growing stock	Sawtimber trees		Pole- timber trees		
			Sawlog portions	Upper stems			
----- Thousand cords -----							
OZARK							
Softwood:							
Loblolly pine	7	7			7		
Shortleaf pine	4,169	4,156	2,670	269	1,217		13
Other softwoods	379	352	133	19	200		27
Total	4,555	4,515	2,803	288	1,424		40
Hardwood:							
Red oaks	12,614	8,184	3,239	1,545	3,400	1,194	3,236
White oaks	13,345	8,811	2,973	1,139	4,699	1,194	3,340
Hickory	4,911	3,646	1,063	440	2,143	272	993
Sweetgum	2,398	1,843	863	413	567	103	452
Black and tupelo gums	2,252	1,542	831	296	415	107	603
Other hardwoods	6,465	3,152	1,210	506	1,436	573	2,740
Total	41,985	27,178	10,179	4,339	12,660	3,443	11,364
All species	46,540	31,693	12,982	4,627	14,084	3,443	11,404
SOUTH DELTA							
Softwood:							
Loblolly pine	596	596	419	40	137		
Shortleaf pine	519	519	363	24	132		
Other softwoods	822	727	591	93	43		95
Total	1,937	1,842	1,373	157	312		95
Hardwood:							
Red oaks	4,971	3,343	1,479	783	1,081	548	1,080
White oaks	4,199	3,181	1,530	754	897	491	527
Hickory	3,194	2,482	1,301	505	676	354	358
Sweetgum	2,122	1,818	844	440	534	92	212
Black and tupelo gums	1,075	837	541	181	115	66	172
Other hardwoods	10,664	7,506	3,774	1,510	2,222	1,043	2,115
Total	26,225	19,167	9,469	4,173	5,525	2,594	4,464
All species	28,162	21,009	10,842	4,330	5,837	2,594	4,559
NORTH DELTA							
Softwood:							
Loblolly pine	...	...					
Shortleaf pine	40	40	29	2	9		
Other softwoods	433	404	347	33	24		29
Total	473	444	376	35	33		29
Hardwood:							
Red oaks	2,540	1,494	679	337	478	313	733
White oaks	2,166	1,562	678	306	578	237	367
Hickory	1,024	812	319	120	373	78	134
Sweetgum	704	582	285	112	185	28	94
Black and tupelo gums	712	537	376	103	58	48	127
Other hardwoods	4,757	3,006	1,388	622	996	439	1,312
Total	11,903	7,993	3,725	1,600	2,668	1,143	2,767
All species	12,376	8,437	4,101	1,635	2,701	1,143	2,796

¹ Sound volume in dead trees considered salvable is not included. This volume totals 103 thousand cords.

Table 13. Total volume by class of timber and species, by Survey region, 1959

Species	All timber ¹	Growing stock				Pole- timber trees	Hardwood limbs	Cull trees
		Total growing stock	Sawtimber trees					
			Sawlog portions	Upper stems				
— Million cubic feet —								
STATE OF ARKANSAS								
Softwood:								
Loblolly pine	2,166.1	2,162.6	1,710.8	104.1	347.7	..		3.5
Shortleaf pine	3,060.7	3,053.3	2,118.3	173.2	761.8	..		7.4
Other softwoods	222.8	201.2	150.4	18.4	32.4	..		21.6
Total	5,449.6	5,417.1	3,979.5	295.7	1,141.9	...		32.5
Hardwood:								
Red oaks	2,466.5	1,647.7	654.3	359.4	634.0	236.4		582.4
White oaks	2,436.6	1,738.7	660.5	301.8	776.4	224.2		473.7
Hickory	971.1	736.6	265.1	123.4	348.1	71.9		162.6
Sweetgum	1,079.9	883.9	362.9	183.8	337.2	36.7		159.3
Black and tupelo gums	484.0	353.9	195.8	74.5	83.6	25.6		104.5
Other hardwoods	2,061.7	1,253.3	547.4	230.4	475.5	176.3		632.1
Total	9,499.8	6,614.1	2,686.0	1,273.3	2,654.8	771.1		2,114.6
All species	14,949.4	12,031.2	6,665.5	1,569.0	3,796.7	771.1		2,147.1
SOUTHWEST								
Softwood:								
Loblolly pine	2,089.1	2,085.6	1,655.6	98.6	331.4	...		3.5
Shortleaf pine	1,229.3	1,227.0	936.6	61.7	228.7	..		2.3
Other softwoods	77.9	71.8	61.1	5.8	4.9	...		6.1
Total	3,396.3	3,384.4	2,653.3	166.1	565.0	..		11.9
Hardwood:								
Red oaks	950.8	669.3	259.6	161.3	248.4	83.0		198.5
White oaks	722.0	554.1	221.5	116.1	216.5	62.6		105.3
Hickory	269.1	202.4	73.9	47.1	81.4	21.6		45.1
Sweetgum	630.9	520.7	201.5	104.6	214.6	18.9		91.3
Black and tupelo gums	160.4	127.0	64.7	28.8	33.5	8.2		25.2
Other hardwoods	483.0	280.2	103.6	45.8	130.8	32.5		170.3
Total	3,216.2	2,353.7	924.8	503.7	925.2	226.8		635.7
All species	6,612.5	5,738.1	3,578.1	669.8	1,490.2	226.8		647.6
OUACHITA								
Softwood:								
Loblolly pine	31.8	31.8	23.8	2.5	5.5	...		..
Shortleaf pine	1,476.8	1,472.7	952.1	89.4	431.2	...		4.1
Other softwoods	22.3	18.1	8.9	1.7	7.5	...		4.2
Total	1,530.9	1,522.6	984.8	93.6	444.2	..		8.3
Hardwood:								
Red oaks	167.3	106.0	33.1	19.5	53.4	15.7		45.6
White oaks	394.1	276.6	91.9	38.4	146.3	32.8		84.7
Hickory	90.4	69.2	11.4	5.0	52.8	3.2		18.0
Sweetgum	98.9	78.9	28.0	14.5	36.4	2.8		17.2
Black and tupelo gums	53.0	31.5	13.9	6.9	10.7	2.6		18.9
Other hardwoods	112.3	57.6	16.9	7.8	32.9	6.1		48.6
Total	916.0	619.8	195.2	92.1	332.5	63.2		233.0
All species	2,446.9	2,142.4	1,180.0	185.7	776.7	63.2		241.3

Table 13. Total volume by class of timber and species, by Survey region, 1959
(Continued)

Species	All timber ¹	Growing stock				Pole- timber trees	Hardwood limbs	Cull trees
		Total growing stock	Sawtimber trees					
			Sawlog portions	Upper stems				
— Million cubic feet —								
OZARK								
Softwood:								
Loblolly pine	.5	.5	.	.	.5	.	.	.
Shortleaf pine	312.7	311.7	200.2	20.2	91.3	.	.	1.0
Other softwoods	28.4	26.4	10.0	1.4	15.0	.	.	2.0
Total	341.6	338.6	210.2	21.6	106.8	.	.	3.0
Hardwood:								
Red oaks	845.1	548.3	217.0	103.5	227.8	80.0	.	216.2
White oaks	894.1	590.3	199.2	76.3	314.8	80.0	.	223.8
Hickory	329.0	244.3	71.2	29.5	143.6	18.2	.	66.5
Sweetgum	160.7	123.5	57.8	27.7	38.0	6.9	.	30.3
Black and tupelo gums	150.9	103.3	55.7	19.8	27.8	7.2	.	40.4
Other hardwoods	433.2	211.2	81.1	33.9	96.2	38.4	.	183.6
Total	2,813.0	1,820.9	682.0	290.7	848.2	230.7	.	761.4
All species	3,154.6	2,159.5	892.2	312.3	955.0	230.7	.	764.4
SOUTH DELTA								
Softwood:								
Loblolly pine	44.7	44.7	31.4	3.0	10.3	.	.	.
Shortleaf pine	38.9	38.9	27.2	1.8	9.9	.	.	.
Other softwoods	61.7	54.6	44.4	7.0	3.2	.	.	7.1
Total	145.3	138.2	103.0	11.8	23.4	.	.	7.1
Hardwood:								
Red oaks	333.1	224.0	99.1	52.5	72.4	36.7	.	72.4
White oaks	281.3	213.1	102.5	50.5	60.1	32.9	.	35.3
Hickory	214.0	166.3	87.2	33.8	45.3	23.7	.	24.0
Sweetgum	142.2	121.8	56.5	29.5	35.8	6.2	.	14.2
Black and tupelo gums	72.0	56.1	36.3	12.1	7.7	4.4	.	11.5
Other hardwoods	714.5	502.9	252.8	101.2	148.9	69.9	.	141.7
Total	1,757.1	1,284.2	634.4	279.6	370.2	173.8	.	299.1
All species	1,902.4	1,422.4	737.4	291.4	393.6	173.8	.	306.2
NORTH DELTA								
Softwood:								
Loblolly pine	...	...	...	...	...	...	...	...
Shortleaf pine	3.0	3.0	2.2	.1	.7	.	.	.
Other softwoods	32.5	30.3	26.0	2.5	1.8	.	.	2.2
Total	35.5	33.3	28.2	2.6	2.5	..	..	2.2
Hardwood:								
Red oaks	170.2	100.1	45.5	22.6	32.0	21.0	.	49.1
White oaks	145.1	104.6	45.4	20.5	38.7	15.9	.	24.6
Hickory	68.6	54.4	21.4	8.0	25.0	5.2	.	9.0
Sweetgum	47.2	39.0	19.1	7.5	12.4	1.9	.	6.3
Black and tupelo gums	47.7	36.0	25.2	6.9	3.9	3.2	.	8.5
Other hardwoods	318.7	201.4	93.0	41.7	66.7	29.4	.	87.9
Total	797.5	535.5	249.6	107.2	178.7	76.6	.	185.4
All species	833.0	568.8	277.8	109.8	181.2	76.6	.	187.6

¹ Sound volume in dead trees considered salvable is not included. This volume totals 7 million cubic feet.

Table 14. *Growing stock by species and Survey region, 1959*

Species	State of Arkansas	Southwest	Ouachita	Ozark	South Delta	North Delta
— Million cubic feet —						
Softwood:						
Loblolly pine	2,162.6	2,085.6	31.8	0.5	44.7	.
Shortleaf pine	3,053.3	1,227.0	1,472.7	311.7	38.9	3.0
Cypress	173.5	71.3	13.4	4.6	54.2	30.0
Cedar	27.7	.5	4.7	21.8	.4	.3
Total	5,417.1	3,384.4	1,522.6	338.6	138.2	33.3
Hardwood:						
Black, scarlet, and southern red oaks	816.7	301.9	52.0	389.0	57.7	16.1
Cherrybark, Shumard, and northern red oaks	330.1	91.6	37.1	141.8	31.1	28.5
Water oaks	500.9	275.8	16.9	17.5	135.2	55.5
White oak (<i>Quercus alba</i>)	733.1	211.1	133.0	323.8	41.0	24.2
Other white oaks	1,005.6	343.0	143.6	266.5	172.1	80.4
Pecan	141.2	49.5	.8	16.4	48.1	26.4
Other hickories	595.4	152.9	68.4	227.9	118.2	28.0
Sweetgum	883.9	520.7	78.9	123.5	121.8	39.0
Black and tupelo gums	353.9	127.0	31.5	103.3	56.1	36.0
Cottonwood	69.7	7.2	1.1	.	36.4	25.0
Willow	140.4	26.4	1.6	1.7	54.1	56.6
Soft maples	46.1	18.4	3.5	8.8	14.1	1.3
Yellow-poplar	5.1	.	.	.	3.6	1.5
Sweetbay and magnolia	16.8	14.2	..	2.6	.	..
White elm	147.3	32.5	6.7	30.4	45.8	31.9
Other elms	185.5	42.0	14.9	48.3	63.7	16.6
Ash	191.5	40.8	9.3	31.3	85.7	24.4
Hackberry	180.2	22.6	2.6	13.3	124.1	17.6
Beech	32.4	20.3	..	4.0	3.4	4.7
Sycamore	51.9	10.5	5.4	14.0	20.3	1.7
Other hardwoods	186.4	45.3	12.5	56.8	51.7	20.1
Total	6,614.1	2,353.7	619.8	1,820.9	1,284.2	535.5
All species	12,031.2	5,738.1	2,142.4	2,159.5	1,422.4	568.8

Table 15. Distribution of growing stock by species within each forest type, 1959

Species	All types	Loblolly-shortleaf pine	Cedar	Oak-pine	Oak-hickory	Bottomland hardwood types		
						Total	Elm-ash cotton-wood	Oak-gum-cypress
----- Percent -----								
Softwood:								
Loblolly pine	18.0	33.7	.	17.5	1.4	0.9	.	1.1
Shortleaf pine	25.4	48.9	4.2	17.9	2.5	.2	.	.2
Cypress	1.4	(¹)	.8	.	(¹)	5.8	1.6	6.2
Cedar	.2	(¹)	19.9	(¹)	.4	(¹)	.	(¹)
Total	45.0	82.6	24.9	35.4	4.3	6.9	1.6	7.5
Hardwood:								
Black, scarlet, and southern red oaks	6.8	3.2	2.1	12.9	20.7	1.2	.	1.3
Cherrybark, Shumard, and northern red oaks	2.7	.6	3.4	3.7	6.7	3.5	1.0	3.8
Water oaks	4.2	.8	.7	4.7	1.1	13.2	1.5	14.4
White oak (<i>Quercus alba</i>)	6.1	3.1	5.5	10.8	17.4	1.6	.	1.8
Other white oaks	8.4	3.4	30.7	10.4	15.2	11.3	1.3	12.3
Pecan	1.8	(¹)	.	.2	(¹)	7.1	1.8	7.6
Other hickories	4.4	1.6	11.8	5.2	12.6	2.6	.	2.9
Sweetgum	7.3	2.9	2.3	10.5	8.7	14.3	2.1	15.5
Black and tupelo gums	2.9	.9	2.5	2.5	4.9	5.5	1.5	5.9
Cottonwood	.6	(¹)	.	..	(¹)	2.3	19.9	.5
Willow	1.2	.	.	.1	..	4.8	38.0	1.3
Soft maples	.4	.1	.	.6	.5	.9	3.7	.6
Yellow-poplar	(¹)	.	.	..	.2	.	..	..
Sweetbay and magnolia	.1	.	.	.6	.1	.3	.	.4
Elm	2.8	.4	7.8	1.0	2.7	7.9	4.1	8.3
Ash	1.6	.2	2.6	.3	.9	5.3	3.7	5.4
Hackberry	1.5	(¹)	..	.1	.2	5.9	4.5	6.1
Beech	.3	.1	.	.3	.8	.2	..	.3
Sycamore	.4	(¹)	1.1	.1	.5	1.3	6.8	.7
Other hardwoods	1.5	.1	4.6	.6	2.5	3.9	8.5	3.4
Total	55.0	17.4	75.1	64.6	95.7	93.1	98.4	92.5
All species	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

¹ Negligible.

Table 16. *Growing stock by species and stand size, by Survey region, 1959*

Species	All stand sizes	Large saw-timber	Small saw-timber	Pole-timber	Seedling and sapling	Nonstocked and other areas ¹
— Million cubic feet —						
STATE OF ARKANSAS						
Softwood:						
Loblolly pine	2,162.6	1,023.2	804.2	265.3	67.6	2.3
Shortleaf pine	3,053.3	555.5	1,810.3	628.2	57.3	2.0
Other softwoods	201.2	125.6	18.3	39.6	13.4	4.3
Total	5,417.1	1,704.3	2,632.8	933.1	138.3	8.6
Hardwood:						
Red oaks	1,647.7	489.3	329.9	688.7	132.3	7.5
White oaks	1,738.7	378.3	369.2	789.9	187.2	14.1
Hickory	736.6	232.3	107.2	310.8	77.2	9.1
Sweetgum	883.9	268.0	280.9	272.7	58.0	4.3
Black and tupelo gums	353.9	155.2	69.2	102.9	25.3	1.3
Other hardwoods	1,253.3	576.0	143.9	415.3	98.2	19.9
Total	6,614.1	2,099.1	1,300.3	2,580.3	578.2	56.2
All species	12,031.2	3,803.4	3,933.1	3,513.4	716.5	64.8
SOUTHWEST						
Softwood:						
Loblolly pine	2,085.6	989.2	783.6	244.3	66.2	2.3
Shortleaf pine	1,227.0	268.5	838.8	98.4	19.7	1.6
Other softwoods	71.8	53.5	11.1	2.2	1.9	3.1
Total	3,384.4	1,311.2	1,633.5	344.9	87.8	7.0
Hardwood:						
Red oaks	669.3	273.1	170.4	195.0	28.7	2.1
White oaks	554.1	165.4	192.9	165.9	29.1	.8
Hickory	202.4	72.2	55.2	52.9	17.7	4.4
Sweetgum	520.7	184.1	164.4	132.3	37.0	2.9
Black and tupelo gums	127.0	60.9	31.6	28.6	5.4	.5
Other hardwoods	280.2	103.7	63.5	83.9	22.3	6.8
Total	2,353.7	859.4	678.0	658.6	140.2	17.5
All species	5,738.1	2,170.6	2,311.5	1,003.5	228.0	24.5
OUACHITA						
Softwood:						
Loblolly pine	31.8	14.7	7.5	9.1	.5	..
Shortleaf pine	1,472.7	271.0	778.2	398.0	25.1	.4
Other softwoods	18.1	4.8	.3	11.7	1.3	...
Total	1,522.6	290.5	786.0	418.8	26.9	.4
Hardwood:						
Red oaks	106.0	18.4	19.0	54.8	12.2	1.6
White oaks	276.6	31.7	73.5	143.7	27.1	.6
Hickory	69.2	7.0	10.4	44.1	7.7	.
Sweetgum	78.9	8.5	30.6	35.4	3.6	.8
Black and tupelo gums	31.5	5.4	8.3	13.5	3.7	.6
Other hardwoods	57.6	6.7	12.5	31.6	6.5	.3
Total	619.8	77.7	154.3	323.1	60.8	3.9
All species	2,142.4	368.2	940.3	741.9	87.7	4.3

Table 16. *Growing stock by species and stand size, by Survey region, 1959*
(Continued)

Species	All stand sizes	Large saw-timber	Small saw-timber	Pole-timber	Seedling and sapling	Nonstocked and other areas ¹
— Million cubic feet —						
OZARK						
Softwood:						
Loblolly pine	.5	.	.5	.	.	.
Shortleaf pine	311.7	12.1	162.6	126.1	10.9	.
Other softwoods	26.4	3.8	.8	16.9	4.2	.7
Total	338.6	15.9	163.9	143.0	15.1	.7
Hardwood:						
Red oaks	548.3	88.2	76.3	312.9	68.8	2.1
White oaks	590.3	50.4	60.3	359.1	114.3	6.2
Hickory	244.3	38.6	18.9	143.3	43.1	.4
Sweetgum	123.5	6.8	44.4	65.2	7.1	.
Black and tupelo gums	103.3	28.6	9.1	51.8	13.8	.
Other hardwoods	211.2	44.3	21.0	99.0	38.9	8.0
Total	1,820.9	256.9	230.0	1,031.3	286.0	16.7
All species	2,159.5	272.8	393.9	1,174.3	301.1	17.4
SOUTH DELTA						
Softwood:						
Loblolly pine	44.7	19.3	12.6	11.9	9	.
Shortleaf pine	38.9	3.9	27.9	5.6	1.5	.
Other softwoods	54.6	46.1	1.8	1.5	4.7	.5
Total	138.2	69.3	42.3	19.0	7.1	.5
Hardwood:						
Red oaks	224.0	77.9	40.4	91.1	13.1	1.5
White oaks	213.1	108.5	31.4	60.8	8.2	4.2
Hickory	166.3	100.5	10.1	45.7	6.1	3.9
Sweetgum	121.8	56.2	26.1	30.2	8.7	.6
Black and tupelo gums	56.1	32.6	16.6	5.6	1.1	.2
Other hardwoods	502.9	317.9	32.4	130.8	17.0	4.8
Total	1,284.2	693.6	157.0	364.2	54.2	15.2
All species	1,422.4	762.9	199.3	383.2	61.3	15.7
NORTH DELTA						
Softwood:						
Loblolly pine	..	..	..	..	..	..
Shortleaf pine	3.0	.	2.8	.1	.1	.
Other softwoods	30.3	17.4	4.3	7.3	1.3	.
Total	33.3	17.4	7.1	7.4	1.4	..
Hardwood:						
Red oaks	100.1	31.7	23.8	34.9	9.5	.2
White oaks	104.6	22.3	11.1	60.4	8.5	2.3
Hickory	54.4	14.0	12.6	24.8	2.6	.4
Sweetgum	39.0	12.4	15.4	9.6	1.6	.
Black and tupelo gums	36.0	27.7	3.6	3.4	1.3	.
Other hardwoods	201.4	103.4	14.5	70.0	13.5	.
Total	535.5	211.5	81.0	203.1	37.0	2.9
All species	568.8	228.9	88.1	210.5	38.4	2.9

¹ Includes areas not classified elsewhere.

Table 17. *Average volume per acre of growing stock by forest type and Survey region, 1959*

Forest type	State of Arkansas	Southwest	Ouachita	Ozark	South Delta	North Delta
— Cubic feet —						
Softwood types:						
Loblolly-shortleaf pine	898	1,037	785	493	981	336
Oak-pine	462	577	331	312	517	298
Cedar	146		165	143		226
Average	763	944	717	325	856	286
Hardwood types:						
Oak-hickory	319	466	270	287	520	293
Elm-ash-cottonwood	614	460	478	280	749	692
Oak-gum-cypress	665	718	575	618	714	512
Average	445	606	325	304	686	476
All types	580	824	603	309	697	471

Table 18. *Average volume per acre of growing stock by stand size and forest type, 1959*

Forest type	All stand sizes	Large saw-timber	Small saw-timber	Pole-timber	Seedling and sapling	Nonstocked and other areas ¹
— Cubic feet —						
Softwood types:						
Loblolly-shortleaf pine	898	1,421	1,167	489	161	81
Oak-pine	462	1,288	837	367	167	
Cedar	146			262	113	55
Average	763	1,405	1,142	442	149	63
Hardwood types:						
Oak-hickory	319	773	760	373	129	85
Elm-ash-cottonwood	614	1,182		587	111	191
Oak-gum-cypress	665	1,152	981	465	193	173
Average	445	1,074	883	402	141	130
All types	580	1,228	1,080	416	143	113

¹ Includes areas not classified elsewhere.

Table 19. *Growing stock volume by species and county, 1959*

County	All species	Softwood			Hardwood			
		Total	Pine	Other softwoods	Total	Soft hardwoods ¹	Oaks	Other hard hardwoods ²
— Million cubic feet —								
Arkansas	213.6	8.4	.	8.4	205.2	35.4	83.9	85.9
Ashley	519.8	369.6	367.7	1.9	150.2	28.7	97.0	24.5
Baxter	95.3	16.4	15.7	.7	78.9	4.6	61.2	13.1
Benton	89.4	1.0	.	1.0	88.4	5.2	79.6	3.6
Boone	61.7	1.8	.	1.8	59.9	1.2	45.0	13.7
Bradley	329.1	192.8	183.6	9.2	136.3	34.3	81.8	20.2
Calhoun	297.9	180.9	171.7	9.2	117.0	36.7	62.9	17.4
Carroll	100.8	22.5	21.3	1.2	78.3	.4	63.2	14.7
Chicot	119.5	.	.	.	119.5	29.9	30.8	58.8
Clark	338.7	216.4	214.8	1.6	122.3	32.4	66.4	23.5
Clay	61.1	.7	.	.7	60.4	8.4	22.8	29.2
Cleburne	75.0	31.3	30.9	.4	43.7	9.4	26.7	7.6
Cleveland	260.8	135.7	134.8	.9	125.1	43.6	62.1	19.4

Table 19. *Growing stock volume by species and county, 1959*
(Continued)

County	All species	Softwood			Hardwood			
		Total	Pine	Other softwoods	Total	Soft hardwoods ¹	Oaks	Other hard hardwoods ²
— Million cubic feet —								
Columbia	167.1	102.4	102.4	.	64.7	24.2	29.0	11.5
Conway	55.8	10.5	5.5	5.0	45.3	16.8	19.0	9.5
Craighead	39.6	6.3	.	6.3	33.3	21.8	8.9	2.6
Crawford	85.4	10.2	9.6	.6	75.2	13.5	44.5	17.2
Crittenden	29.0	.	.	.	29.0	21.1	.	7.9
Cross	57.3	.	.	.	57.3	11.2	23.8	22.3
Dallas	401.9	283.3	280.7	2.6	118.6	30.4	69.8	18.4
Desha	221.0	13.6	.	13.6	207.4	26.4	49.9	131.1
Drew	381.6	178.5	157.6	20.9	203.1	56.1	113.3	33.7
Faulkner	29.8	.2	.2	.	29.6	10.5	13.3	5.8
Franklin	85.8	17.0	17.0	.	68.8	14.1	34.2	20.5
Fulton	51.6	.	.	.	51.6	3.6	39.6	8.4
Garland	241.5	167.9	167.9	.	73.6	13.4	46.7	13.5
Grant	451.5	224.1	219.8	4.3	227.4	68.0	132.5	26.9
Greene	48.2	6.1	3.0	3.1	42.1	11.1	26.1	4.9
Hempstead	203.4	96.0	96.0	.	107.4	26.7	41.8	38.9
Hot Spring	208.2	135.1	135.1	.	73.1	22.3	41.4	9.4
Howard	246.9	184.9	184.4	.5	62.0	17.0	29.9	15.1
Independence	78.0	12.7	12.7	.	65.3	2.9	44.8	17.6
Izard	60.7	10.0	7.7	2.3	50.7	2.3	36.9	11.5
Jackson	40.9	1.8	.	1.8	39.1	3.2	18.8	17.1
Jefferson	162.3	55.4	47.6	7.8	106.9	26.9	48.0	32.0
Johnson	149.7	44.3	44.0	.3	105.4	23.0	55.2	27.2
Lafayette	177.7	109.6	100.2	9.4	68.1	13.5	32.7	21.9
Lawrence	36.0	.3	.	.3	35.7	2.8	24.5	8.4
Lee	119.5	.8	.	.8	118.7	52.4	23.7	42.6
Lincoln	111.7	34.0	30.2	3.8	77.7	32.8	30.1	14.8
Little River	120.6	61.7	61.7	.	58.9	9.7	34.7	14.5
Logan	162.8	119.2	116.2	3.0	43.6	5.7	28.8	9.1
Lonoke	64.6	.4	.	.4	64.2	24.7	31.1	8.4
Madison	94.6	3.5	2.4	1.1	91.1	12.6	51.7	26.8
Marion	68.5	2.1	.6	1.5	66.4	1.3	48.0	17.1
Miller	110.7	43.1	41.9	1.2	67.6	30.5	23.1	14.0
Mississippi	52.4	9.0	.	9.0	43.4	31.3	.4	11.7
Monroe	194.8	18.1	5.8	12.3	176.7	28.2	66.8	81.7
Montgomery	306.2	231.6	231.6	.	74.6	6.5	57.6	10.5
Nevada	174.2	83.1	81.6	1.5	91.1	41.3	41.9	7.9
Newton	170.4	18.7	18.0	.7	151.7	16.3	97.4	38.0
Ouachita	297.7	136.5	130.8	5.7	161.2	68.6	76.1	16.5
Perry	215.5	180.9	180.9	.	34.6	7.8	22.5	4.3
Phillips	112.6	3.0	.	3.0	109.6	22.2	33.7	53.7
Pike	301.1	232.4	232.4	.	68.7	14.4	41.6	12.7
Poinsett	56.7	2.9	.	2.9	53.8	18.9	24.3	10.6
Polk	273.2	203.7	203.2	.5	69.5	12.1	46.2	11.2
Pope	163.8	63.3	63.3	.	100.5	27.8	55.8	16.9
Prairie	102.8	4.5	.	4.5	98.3	24.6	39.1	34.6
Pulaski	118.7	60.2	47.5	12.7	58.5	20.9	28.5	9.1
Randolph	54.1	.8	.	.8	53.3	2.0	31.0	20.3
St. Francis	63.0	.	.	.	63.0	17.5	27.4	18.1
Saline	259.4	169.8	169.8	.	89.6	23.6	41.8	24.2
Scott	293.0	224.6	224.0	.6	68.4	5.6	52.2	10.6
Searcy	85.3	6.9	6.9	.	78.4	4.4	55.8	18.2
Sebastian	25.5	8.3	7.7	.6	17.2	.	12.0	5.2
Sevier	234.5	127.9	127.1	.8	106.6	38.5	38.4	29.7
Sharp	52.8	4.9	4.2	.7	47.9	2.6	32.7	12.6
Stone	112.5	19.9	18.6	1.3	92.6	15.2	60.2	17.2
Union	514.7	290.4	288.3	2.1	224.3	87.3	107.0	30.0
Van Buren	102.7	26.7	26.0	.7	76.0	10.8	46.5	18.7
Washington	72.4	2.1	1.8	.3	70.3	3.2	49.8	17.3
White	163.4	11.8	5.8	6.0	151.6	50.1	16.5	55.0
Woodruff	84.6	6.2	.	6.2	78.4	15.2	27.7	35.5
Yell	246.6	156.4	155.7	.7	90.2	26.2	46.3	17.7
Total	12,031.2	5,417.1	5,215.9	201.2	6,614.1	1,565.8	3,386.4	1,661.9

¹ Includes cottonwood, sweetgum, yellow-poplar, and the like.

² Includes ash, hickory, sycamore, and the like.

Table 20. Growing stock volume of softwood and hardwood, by diameter group and county, 1959

County	All species	Softwood			Hardwood		
		Total	6-12 inches	14 inches and up	Total	6-12 inches	14 inches and up
— Million cubic feet —							
Arkansas	213.6	8.4	1.6	6.8	205.2	73.0	132.2
Ashley	519.8	369.6	121.5	248.1	150.2	79.4	70.8
Baxter	95.3	16.4	8.0	8.4	78.9	43.1	35.8
Benton	89.4	1.0	1.0	.	88.4	52.4	36.0
Boone	61.7	1.8	1.2	.6	59.9	45.3	14.6
Bradley	329.1	192.8	95.5	97.3	136.3	63.1	73.2
Calhoun	297.9	180.9	55.3	125.6	117.0	62.7	54.3
Carroll	100.8	22.5	18.6	3.9	78.3	47.9	30.4
Chicot	119.5	.	.	.	119.5	43.7	75.8
Clark	338.7	216.4	118.9	97.5	122.3	73.5	48.8
Clay	61.1	.7	.	.7	60.4	39.8	20.6
Cleburne	75.0	31.3	28.0	3.3	43.7	27.8	15.9
Cleveland	260.8	135.7	52.0	83.7	125.1	50.1	75.0
Columbia	167.1	102.4	59.9	42.5	64.7	36.4	28.3
Conway	55.8	10.5	10.5	.	45.3	24.5	20.8
Craighead	39.6	6.3	1.5	4.8	33.3	10.8	22.5
Crawford	85.4	10.2	9.5	.7	75.2	47.3	27.9
Crittenden	29.0	.	.	.	29.0	14.1	14.9
Cross	57.3	.	.	.	57.3	31.9	25.4
Dallas	401.9	283.3	113.9	169.4	118.6	74.2	44.4
Desha	221.0	13.6	.	13.6	207.4	59.9	147.5
Drew	381.6	178.5	46.1	132.4	203.1	114.0	89.1
Faulkner	29.8	.2	.2	.	29.6	21.3	8.3
Franklin	85.8	17.0	6.8	10.2	68.8	47.3	21.5
Fulton	51.6	.	.	.	51.6	35.5	16.1
Garland	241.5	167.9	103.2	64.7	73.6	49.3	24.3
Grant	451.5	224.1	94.2	129.9	227.4	108.9	118.5
Greene	48.2	6.1	2.4	3.7	42.1	21.2	20.9
Hempstead	203.4	96.0	60.0	36.0	107.4	58.0	49.4
Hot Spring	208.2	135.1	82.7	52.4	73.1	58.8	14.3
Howard	246.9	184.9	112.1	72.8	62.0	36.1	25.9
Independence	78.0	12.7	12.7	.	65.3	34.6	30.7
Izard	60.7	10.0	10.0	.	50.7	28.0	22.7
Jackson	40.9	1.8	.7	1.1	39.1	16.8	22.3
Jefferson	162.3	55.4	23.7	31.7	106.9	68.2	38.7
Johnson	149.7	44.3	28.2	16.1	105.4	62.4	43.0
Lafayette	177.7	109.6	39.3	70.3	68.1	33.4	34.7
Lawrence	36.0	.3	.3	.	35.7	19.4	16.3
Lee	119.5	.8	.8	.	118.7	50.0	68.7

Table 20. *Growing stock volume of softwood and hardwood, by diameter group and county, 1959*
(Continued)

County	All species	Softwood			Hardwood		
		Total	6-12 inches	14 inches and up	Total	6-12 inches	14 inches and up
----- Million cubic feet -----							
Lincoln	111.7	34.0	22.8	11.2	77.7	43.6	34.1
Little River	120.6	61.7	27.2	34.5	58.9	38.5	20.4
Logan	162.8	119.2	80.8	38.4	43.6	28.4	15.2
Lonoke	64.6	.4	.4	.	64.2	33.8	30.4
Madison	94.6	3.5	3.5	.	91.1	70.2	20.9
Marion	68.5	2.1	1.7	.4	66.4	40.7	25.7
Miller	110.7	43.1	40.9	2.2	67.6	35.4	32.2
Mississippi	52.4	9.0	.6	8.4	43.4	9.4	34.0
Monroe	194.8	18.1	6.1	12.0	176.7	56.0	120.7
Montgomery	306.2	231.6	155.7	75.9	74.6	46.9	27.7
Nevada	174.2	83.1	54.0	29.1	91.1	48.2	42.9
Newton	170.4	18.7	14.6	4.1	151.7	98.2	53.5
Ouachita	297.7	136.5	77.8	58.7	161.2	99.1	62.1
Perry	215.5	180.9	118.3	62.6	34.6	26.8	7.8
Phillips	112.6	3.0	1.0	2.0	109.6	38.4	71.2
Pike	301.1	232.4	148.1	84.3	68.7	47.2	21.5
Poinsett	56.7	2.9	.3	2.6	53.8	22.4	31.4
Polk	273.2	203.7	131.3	72.4	69.5	49.7	19.8
Pope	163.8	63.3	45.2	18.1	100.5	60.4	40.1
Prairie	102.8	4.5	.7	3.8	98.3	56.0	42.3
Pulaski	118.7	60.2	43.1	17.1	58.5	38.1	20.4
Randolph	54.1	.8	.	.8	53.3	34.5	18.8
St. Francis	63.0	.	.	.	63.0	29.1	33.9
Saline	259.4	169.8	103.3	66.5	89.6	61.2	28.4
Scott	293.0	224.6	166.8	57.8	68.4	48.1	20.3
Searcy	85.3	6.9	5.4	1.5	78.4	57.3	21.1
Sebastian	25.5	8.3	7.3	1.0	17.2	12.0	5.2
Sevier	234.5	127.9	66.6	61.3	106.6	71.7	34.9
Sharp	52.8	4.9	4.9	.	47.9	26.6	21.3
Stone	112.5	19.9	10.9	9.0	92.6	55.4	37.2
Union	514.7	290.4	174.4	116.0	224.3	109.6	114.7
Van Buren	102.7	26.7	20.4	6.3	76.0	57.3	18.7
Washington	72.4	2.1	2.1	.	70.3	49.7	20.6
White	163.4	11.8	8.4	3.4	151.6	65.2	86.4
Woodruff	84.6	6.2	.8	5.4	78.4	37.6	40.8
Yell	246.6	156.4	121.8	34.6	90.2	52.5	37.7
Total	12,031.2	5,417.1	2,987.5	2,429.6	6,614.1	3,619.3	2,994.8

Table 21. *Sawtimber volume by species and county, 1959*

County	All species	Softwood			Hardwood			
		Total	Pine	Other softwoods	Total	Soft hardwoods ¹	Oaks	Other hard hardwoods ²
— Million board feet —								
Arkansas	728.1	43.3	.	43.3	684.8	131.0	287.2	266.6
Ashley	2,364.4	2,005.1	1,996.0	9.1	359.3	67.3	251.0	41.0
Baxter	286.0	79.0	77.4	1.6	207.0	3.2	176.0	27.8
Benton	225.5	.	.	.	225.5	10.2	211.5	3.8
Boone	115.2	7.3	.	7.3	107.9	.	83.8	24.1
Bradley	1,309.2	961.3	914.4	46.9	347.9	74.6	229.8	43.5
Calhoun	1,286.0	959.1	906.7	52.4	326.9	130.8	147.1	49.0
Carroll	270.0	88.0	88.0	.	182.0	.	140.7	41.3
Chicot	428.2	.	.	.	428.2	114.0	81.0	233.2
Clark	1,317.2	1,016.9	1,008.7	8.2	300.3	75.6	168.7	56.0
Clay	138.8	4.3	.	4.3	134.5	22.0	56.3	56.2
Cleburne	143.9	62.0	60.3	1.7	81.9	29.9	50.8	1.2
Cleveland	975.6	672.8	666.7	6.1	302.8	99.7	158.9	44.2
Columbia	612.7	469.0	469.0	.	143.7	56.1	73.2	14.4
Conway	146.6	20.5	9.4	11.1	126.1	50.8	53.0	22.3
Craighead	158.3	35.3	.	35.3	123.0	96.4	21.4	5.2
Crawford	199.2	42.1	40.1	2.0	157.1	29.0	92.5	35.6
Crittenden	89.1	.	.	.	89.1	78.7	.	10.4
Cross	154.1	.	.	.	154.1	30.7	72.6	50.8
Dallas	1,751.6	1,489.8	1,475.2	14.6	261.8	65.8	163.0	33.0
Desha	906.8	75.3	.	75.3	831.5	133.9	184.3	513.3
Drew	1,526.8	977.5	845.3	132.2	549.3	189.9	295.0	64.4
Faulkner	65.8	.	.	.	65.8	33.5	29.6	2.7
Franklin	222.1	85.3	85.3	.	136.8	43.2	62.4	31.2
Fulton	94.9	.	.	.	94.9	12.9	71.5	10.5
Garland	801.5	672.4	672.4	.	129.1	32.8	85.0	11.3
Grant	1,733.0	1,150.8	1,130.9	19.9	582.2	192.1	326.1	64.0
Greene	158.0	31.6	13.1	18.5	126.4	58.0	61.2	7.2
Hempstead	717.1	448.3	448.3	.	268.8	60.3	103.9	104.6
Hot Spring	640.6	547.2	547.2	.	93.4	21.7	64.7	7.0
Howard	960.9	805.4	804.3	1.1	155.5	39.6	81.5	34.4
Independence	214.9	43.5	43.5	.	171.4	3.8	140.0	27.6
Izard	146.5	13.3	13.3	.	133.2	9.2	90.8	33.2
Jackson	128.4	6.9	.	6.9	121.5	5.4	55.0	61.1
Jefferson	508.6	269.4	223.8	45.6	239.2	59.0	92.5	87.7
Johnson	466.8	209.3	209.3	.	257.5	75.7	130.6	51.2
Lafayette	780.4	572.6	528.5	44.1	207.8	49.0	108.6	50.2
Lawrence	82.0	.6	.	.6	81.4	8.0	60.9	12.5
Lee	306.2	.	.	.	306.2	118.3	76.3	111.6
Lincoln	293.7	131.4	109.6	21.8	162.3	74.7	57.8	29.8
Little River	411.8	286.1	286.1	.	125.7	14.7	76.5	34.5

Table 21. *Sawtimber volume by species and county, 1959*
(Continued)

County	All species	Softwood			Hardwood			
		Total	Pine	Other softwoods	Total	Soft hardwoods ¹	Oaks	Other hard hardwoods ²
— Million board feet —								
Logan	557.5	467.2	465.4	1.8	90.3	5.9	70.5	13.9
Lonoke	179.6	1.7	.	1.7	177.9	64.8	97.5	15.6
Madison	158.2	3.6	2.4	1.2	154.6	18.8	88.0	47.8
Marion	154.1	2.0	.	2.0	152.1	.	124.8	27.3
Miller	345.3	152.1	147.9	4.2	193.2	96.2	64.9	32.1
Mississippi	194.0	54.4	.	54.4	139.6	109.0	.	30.6
Monroe	673.5	93.6	24.0	69.6	579.9	92.2	212.3	275.4
Montgomery	1,082.0	889.8	889.8	.	192.2	14.8	141.3	36.1
Nevada	565.3	349.3	341.1	8.2	216.0	95.9	103.0	17.1
Newton	435.8	72.8	71.9	.9	363.0	59.0	239.8	64.2
Ouachita	944.6	585.2	554.0	31.2	359.4	158.3	158.6	42.5
Perry	759.5	711.1	711.1	..	48.4	13.2	31.1	4.1
Phillips	370.7	14.6	.	14.6	356.1	66.5	94.7	194.9
Pike	1,217.4	1,083.5	1,083.5	..	133.9	30.0	90.0	13.9
Poinsett	189.1	14.7	..	14.7	174.4	77.8	70.0	26.6
Polk	914.2	799.9	799.9	...	114.3	27.3	79.3	7.7
Pope	511.0	249.7	249.7	..	261.3	99.2	132.4	29.7
Prairie	301.7	25.1	.	25.1	276.6	76.9	107.2	92.5
Pulaski	339.6	235.0	191.7	43.3	104.6	40.1	55.3	9.2
Randolph	129.5	4.1	..	4.1	125.4	6.6	69.8	49.0
St. Francis	193.3	..	..	..	193.3	60.0	88.0	45.3
Saline	856.9	687.9	687.9	.	169.0	49.0	77.4	42.6
Scott	936.1	827.4	825.4	2.0	108.7	12.4	94.7	1.6
Searcy	183.6	17.3	17.3	..	166.3	7.9	118.8	39.6
Sebastian	59.4	28.9	25.4	3.5	30.5	..	20.1	10.4
Sevier	829.5	627.4	625.3	2.1	202.1	69.1	77.7	55.3
Sharp	134.3	12.1	9.9	2.2	122.2	7.6	79.5	35.1
Stone	340.5	82.6	82.6	...	257.9	47.3	170.8	39.8
Union	1,843.3	1,200.2	1,191.9	8.3	643.1	265.2	307.1	70.8
Van Buren	232.2	101.7	99.0	2.7	130.5	32.1	86.9	11.5
Washington	122.5	3.1	3.1	..	119.4	3.0	88.3	28.1
White	508.9	38.4	17.0	21.4	470.5	151.3	135.2	184.0
Woodruff	289.3	32.5	..	32.5	256.8	58.4	82.9	115.5
Yell	758.9	532.0	530.2	1.8	226.9	78.1	129.7	19.1
Total	41,177.8	24,283.6	23,320.2	963.4	16,894.2	4,395.4	8,360.3	4,138.5

¹ Includes cottonwood, sweetgum, yellow-poplar, and the like.

² Includes ash, hickory, sycamore, and the like.

Table 22. *Sawtimber volume of softwood and hardwood, by diameter group and county, 1959*

County	All species	Softwood			Hardwood		
		Total	10-14 inches	16 inches and up	Total	12-14 inches	16 inches and up
— Million board feet —							
Arkansas	728.1	43.3	7.0	36.3	684.8	144.8	540.0
Ashley	2,364.4	2,005.1	785.0	1,220.1	359.3	147.7	211.6
Baxter	286.0	79.0	42.5	36.5	207.0	88.0	119.0
Benton	225.5	.	.	.	225.5	135.6	89.9
Boone	115.2	7.3	7.3	.	107.9	66.1	41.8
Bradley	1,309.2	961.3	573.5	387.8	347.9	131.7	216.2
Calhoun	1,286.0	959.1	354.6	604.5	326.9	142.3	184.6
Carroll	270.0	88.0	79.3	8.7	182.0	67.4	114.6
Chicot	428.2	.	.	.	428.2	145.2	283.0
Clark	1,317.2	1,016.9	634.6	382.3	300.3	174.7	125.6
Clay	138.8	4.3	.	4.3	134.5	64.3	70.2
Cleburne	143.9	62.0	56.0	6.0	81.9	38.9	43.0
Cleveland	975.6	672.8	258.3	414.5	302.8	89.8	213.0
Columbia	612.7	469.0	301.2	167.8	143.7	69.0	74.7
Conway	146.6	20.5	20.5	.	126.1	54.3	71.8
Craighead	158.3	35.3	7.9	27.4	123.0	41.4	81.6
Crawford	199.2	42.1	42.1	.	157.1	79.9	77.2
Crittenden	89.1	.	.	.	89.1	45.2	43.9
Cross	154.1	.	.	.	154.1	68.7	85.4
Dallas	1,751.6	1,489.8	894.2	595.6	261.8	138.3	123.5
Desha	906.8	75.3	4.5	70.8	831.5	171.5	660.0
Drew	1,526.8	977.5	276.6	700.9	549.3	261.8	287.5
Faulkner	65.8	.	.	.	65.8	42.1	23.7
Franklin	222.1	85.3	56.5	28.8	136.8	77.0	59.8
Fulton	94.9	.	.	.	94.9	63.6	31.3
Garland	801.5	672.4	383.9	288.5	129.1	63.1	66.0
Grant	1,733.0	1,150.8	606.2	544.6	582.2	212.6	369.6
Greene	158.0	31.6	13.1	18.5	126.4	69.8	56.6
Hempstead	717.1	448.3	327.2	121.1	268.8	112.2	156.6
Hot Spring	640.6	547.2	401.5	145.7	93.4	55.7	37.7
Howard	960.9	805.4	503.5	301.9	155.5	79.6	75.9
Independence	214.9	43.5	43.5	.	171.4	60.3	111.1
Izard	146.5	13.3	13.3	.	133.2	75.5	57.7
Jackson	128.4	6.9	3.9	3.0	121.5	41.5	80.0
Jefferson	508.6	269.4	121.1	148.3	239.2	128.6	110.6
Johnson	466.8	209.3	165.0	44.3	257.5	85.9	171.6
Lafayette	780.4	572.6	311.7	260.9	207.8	71.4	136.4
Lawrence	82.0	.6	.6	.	81.4	30.7	50.7
Lee	306.2	.	.	.	306.2	73.7	232.5

Table 22. Sawtimber volume of softwood and hardwood, by diameter group and county, 1959
(Continued)

County	All species	Softwood			Hardwood		
		Total	10-14 inches	16 inches and up	Total	12-14 inches	16 inches and up
— Million board feet —							
Lincoln	293.7	131.4	89.6	41.8	162.3	92.1	70.2
Little River	411.8	236.1	95.2	190.9	125.7	83.4	42.3
Logan	557.5	467.2	350.5	116.7	90.3	41.8	48.5
Lonoke	179.6	1.7	1.7	.	177.9	86.6	91.3
Madison	158.2	3.6	3.6	.	154.6	104.9	49.7
Marion	154.1	2.0	.	2.0	152.1	102.2	49.9
Miller	345.3	152.1	147.9	4.2	193.2	105.8	87.4
Mississippi	194.0	54.4	2.9	51.5	139.6	25.3	114.3
Monroe	673.5	93.6	23.2	70.4	579.9	149.1	430.8
Montgomery	1,082.0	889.8	658.9	230.9	192.2	123.0	69.2
Nevada	565.3	349.3	238.6	110.7	216.0	111.5	104.5
Newton	435.8	72.8	53.2	19.6	363.0	202.4	160.6
Ouachita	944.6	585.2	382.5	202.7	359.4	202.9	156.5
Perry	759.5	711.1	484.6	226.5	48.4	36.0	12.4
Phillips	370.7	14.6	3.1	11.5	356.1	149.4	206.7
Pike	1,217.4	1,083.5	796.6	286.9	133.9	74.7	59.2
Poinsett	189.1	14.7	11.4	3.3	174.4	56.2	118.2
Polk	914.2	799.9	560.2	239.7	114.3	64.7	49.6
Pope	511.0	249.7	205.6	44.1	261.3	148.4	112.9
Prairie	301.7	25.1	1.6	23.5	276.6	119.3	157.3
Pulaski	339.6	235.0	182.6	52.4	104.6	52.5	52.1
Randolph	129.5	4.1	4.1	.	125.4	76.4	49.0
St. Francis	193.3	.	.	.	193.3	80.8	112.5
Saline	856.9	687.9	394.0	293.9	169.0	101.0	68.0
Scott	936.1	827.4	570.5	256.9	108.7	47.0	61.7
Searcy	183.6	17.3	9.5	7.8	166.3	106.6	59.7
Sebastian	59.4	28.9	28.9	.	30.5	11.9	18.6
Sevier	829.5	627.4	337.2	290.2	202.1	108.9	93.2
Sharp	134.3	12.1	12.1	.	122.2	69.7	52.5
Stone	340.5	82.6	42.7	39.9	257.9	107.4	150.5
Union	1,843.3	1,200.2	690.1	510.1	643.1	238.8	404.3
Van Buren	232.2	101.7	88.6	13.1	130.5	63.9	66.6
Washington	122.5	3.1	3.1	.	119.4	62.4	57.0
White	508.9	38.4	16.9	21.5	470.5	201.0	269.5
Woodruff	289.3	32.5	8.1	24.4	256.8	98.9	157.9
Yell	758.9	532.0	410.0	122.0	226.9	116.8	110.1
Total	41,177.8	24,283.6	14,205.4	10,078.2	16,894.2	7,333.6	9,560.6

Table 23. *Sawtimber volume by species and tree diameter, by Survey region, 1959*

Species	All diameter classes	10-12 inches ¹	14-18 inches	20-24 inches	26 inches and up
— — — — — Million board feet — — — — —					
STATE OF ARKANSAS					
Softwood:					
Loblolly pine	10,686.0	2,870.0	5,441.1	2,108.6	266.3
Shortleaf pine	12,634.2	5,418.1	5,502.6	689.7	23.8
Other softwoods	963.4	153.9	295.1	250.7	263.7
Total	24,283.6	9,442.0	11,238.8	3,049.0	553.8
Hardwood:					
Red oaks	4,201.9	963.0	2,064.6	873.6	300.7
White oaks	4,158.4	1,027.5	2,240.0	642.3	248.6
Hickory	1,654.4	396.1	735.3	350.6	172.4
Sweetgum	2,232.6	578.6	1,187.4	325.7	140.9
Black and tupelo gums	1,203.7	174.0	627.8	322.3	79.6
Other hardwoods	3,443.2	650.9	1,716.8	786.2	289.3
Total	16,894.2	3,790.1	8,571.9	3,300.7	1,231.5
All species	41,177.8	13,232.1	19,810.7	6,349.7	1,785.3
SOUTHWEST					
Softwood:					
Loblolly pine	10,344.8	2,760.4	5,284.9	2,042.0	257.5
Shortleaf pine	5,626.2	2,750.8	2,599.6	267.1	8.7
Other softwoods	388.6	74.7	128.0	115.0	70.9
Total	16,359.6	5,585.9	8,012.5	2,424.1	337.1
Hardwood:					
Red oaks	1,658.3	404.6	823.5	345.2	85.0
White oaks	1,391.0	321.8	729.3	244.4	95.5
Hickory	457.6	90.8	223.6	115.1	28.1
Sweetgum	1,237.3	315.9	706.8	183.2	31.4
Black and tupelo gums	397.7	50.3	184.5	115.1	47.8
Other hardwoods	631.2	184.8	293.6	130.5	22.3
Total	5,773.1	1,368.2	2,961.3	1,133.5	310.1
All species	22,132.7	6,954.1	10,973.8	3,557.6	647.2
OUACHITA					
Softwood:					
Loblolly pine	144.8	45.8	67.3	29.4	2.3
Shortleaf pine	5,654.4	2,874.7	2,362.7	401.9	15.1
Other softwoods	52.4	21.9	16.1	4.9	9.5
Total	5,851.6	2,942.4	2,446.1	436.2	26.9
Hardwood:					
Red oaks	218.5	46.7	117.7	39.0	15.1
White oaks	565.9	131.7	356.0	74.7	3.5
Hickory	66.6	27.2	37.6	1.8	.
Sweetgum	165.0	50.2	95.4	15.2	4.2
Black and tupelo gums	83.4	17.2	45.0	21.2	..
Other hardwoods	114.6	49.8	43.7	21.1	..
Total	1,214.0	322.8	695.4	173.0	22.8
All species	7,065.6	3,265.2	3,141.5	609.2	49.7

Table 23. Sawtimber volume by species and tree diameter, by Survey region, 1959
(Continued)

Species	All diameter classes	10-12 inches ¹	14-18 inches	20-24 inches	26 inches and up
— — — — — Million board feet — — — — —					
OZARK					
Softwood:					
Loblolly pine	...	...	...	...	...
Shortleaf pine	1,179.5	694.3	468.9	16.3	.
Other softwoods	58.2	27.8	15.7	14.7	.
Total	1,237.7	722.1	484.6	31.0	.
Hardwood:					
Red oaks	1,380.3	336.9	712.6	308.4	22.4
White oaks	1,287.2	418.1	723.8	122.1	23.2
Hickory	421.7	145.4	227.6	37.3	11.4
Sweetgum	356.6	89.7	197.2	49.5	20.2
Black and tupelo gums	334.9	61.6	203.5	57.5	12.3
Other hardwoods	489.6	109.3	255.9	95.6	28.8
Total	4,270.3	1,161.0	2,320.6	670.4	118.3
All species	5,508.0	1,883.1	2,805.2	701.4	118.3
SOUTH DELTA					
Softwood:					
Loblolly pine	196.4	63.8	88.9	37.2	6.5
Shortleaf pine	161.0	94.4	62.2	4.4	.
Other softwoods	297.0	14.3	58.6	61.2	162.9
Total	654.4	172.5	209.7	102.8	169.4
Hardwood:					
Red oaks	652.5	113.2	285.6	110.1	143.6
White oaks	638.3	82.8	293.3	155.2	107.0
Hickory	585.4	92.5	192.8	169.2	130.9
Sweetgum	360.1	79.2	129.0	66.8	85.1
Black and tupelo gums	221.6	34.6	90.2	80.2	16.6
Other hardwoods	1,584.8	228.0	765.7	392.2	198.9
Total	4,042.7	630.3	1,756.6	973.7	682.1
All species	4,697.1	802.8	1,966.3	1,076.5	851.5
NORTH DELTA					
Softwood:					
Loblolly pine	...	...	...	...	...
Shortleaf pine	13.1	3.9	9.2	.	.
Other softwoods	167.2	15.2	76.7	54.9	20.4
Total	180.3	19.1	85.9	54.9	20.4
Hardwood:					
Red oaks	292.3	61.6	125.2	70.9	34.6
White oaks	276.0	73.1	137.6	45.9	19.4
Hickory	123.1	40.2	53.7	27.2	2.0
Sweetgum	113.6	43.6	59.0	11.0	.
Black and tupelo gums	166.1	10.3	104.6	48.3	2.9
Other hardwoods	623.0	79.0	357.9	146.8	39.3
Total	1,594.1	307.8	838.0	350.1	98.2
All species	1,774.4	326.9	923.9	405.0	118.6

¹ Hardwood sawtimber volume was not tallied in trees under 11.0 inches d.b.h.

Table 24. *Sawtimber volume by species and stand size, by Survey region, 1959*

Species	All stand sizes	Large saw-timber	Small saw-timber	Pole-timber	Seedling and sapling	Nonstocked and other areas ¹
— Million board feet —						
STATE OF ARKANSAS						
Softwood:						
Loblolly pine	10,686.0	6,029.5	3,767.1	663.5	218.8	7.1
Shortleaf pine	12,634.2	3,037.1	7,843.2	1,541.7	203.0	9.2
Other softwoods	963.4	700.4	92.3	106.0	44.1	20.6
Total	24,283.6	9,767.0	11,702.6	2,311.2	465.9	36.9
Hardwood:						
Red oaks	4,201.9	1,688.8	883.6	1,252.9	356.2	20.4
White oaks	4,158.4	1,356.4	945.3	1,331.6	475.5	49.6
Hickory	1,654.4	874.3	209.5	407.5	135.4	27.7
Sweetgum	2,232.6	901.5	737.4	455.1	131.2	7.4
Black and tupelo gums	1,203.7	630.1	212.6	293.8	63.0	4.2
Other hardwoods	3,443.2	2,055.0	363.7	757.4	207.6	59.5
Total	16,894.2	7,506.1	3,352.1	4,498.3	1,368.9	168.8
All species	41,177.8	17,273.1	15,054.7	6,809.5	1,834.8	205.7
SOUTHWEST						
Softwood:						
Loblolly pine	10,344.8	5,839.2	3,669.1	614.4	215.0	7.1
Shortleaf pine	5,626.2	1,485.6	3,893.4	183.4	56.6	7.2
Other softwoods	388.6	292.9	59.4	11.0	4.7	20.6
Total	16,359.6	7,617.7	7,621.9	808.8	276.3	34.9
Hardwood:						
Red oaks	1,658.3	862.9	378.2	344.0	65.7	7.5
White oaks	1,391.0	541.7	482.3	292.5	72.5	2.0
Hickory	457.6	223.6	107.7	73.0	39.8	13.5
Sweetgum	1,237.3	602.1	378.3	171.2	81.0	4.7
Black and tupelo gums	397.7	239.7	79.3	67.1	9.3	2.3
Other hardwoods	631.2	285.0	129.7	153.7	45.5	17.3
Total	5,773.1	2,755.0	1,555.5	1,101.5	313.8	47.3
All species	22,132.7	10,372.7	9,177.4	1,910.3	590.1	82.2
OUACHITA						
Softwood:						
Loblolly pine	144.8	81.5	38.7	22.4	2.2	.
Shortleaf pine	5,654.4	1,462.8	3,063.3	1,030.2	96.1	2.0
Other softwoods	52.4	27.0	.	23.6	1.8	.
Total	5,851.6	1,571.3	3,102.0	1,076.2	100.1	2.0
Hardwood:						
Red oaks	218.5	63.6	30.7	93.9	26.6	3.7
White oaks	565.9	83.4	168.5	245.6	66.8	1.6
Hickory	66.6	13.0	9.3	33.3	11.0	.
Sweetgum	165.0	23.6	72.4	59.4	8.3	1.3
Black and tupelo gums	83.4	20.1	21.5	27.3	12.6	1.9
Other hardwoods	114.6	19.6	27.1	49.1	17.6	1.2
Total	1,214.0	223.3	329.5	508.6	142.9	9.7
All species	7,065.6	1,794.6	3,431.5	1,584.8	243.0	11.7

Table 24. Sawtimber volume by species and stand size, by Survey region, 1959
(Continued)

Species	All stand sizes	Large saw-timber	Small saw-timber	Pole-timber	Seedling and sapling	Nonstocked and other areas ¹
— Million board feet —						
OZARK						
Softwood:						
Loblolly pine	.	.	.	.	.	.
Shortleaf pine	1,179.5	67.7	760.2	310.3	41.3	.
Other softwoods	58.2	21.5	4.3	28.3	4.1	.
Total	1,237.7	89.2	764.5	338.6	45.4	.
Hardwood:						
Red oaks	1,380.3	337.0	272.8	566.7	199.9	3.9
White oaks	1,287.2	249.1	161.8	548.1	303.0	25.2
Hickory	421.7	143.7	37.6	171.6	68.8	.
Sweetgum	356.6	29.6	161.7	146.4	18.9	.
Black and tupelo gums	334.9	96.0	26.0	177.8	35.1	.
Other hardwoods	489.6	166.2	53.0	167.2	72.0	31.2
Total	4,270.3	1,021.6	712.9	1,777.8	697.7	60.3
All species	5,508.0	1,110.8	1,477.4	2,116.4	743.1	60.3
SOUTH DELTA						
Softwood:						
Loblolly pine	196.4	108.8	59.3	26.7	1.6	.
Shortleaf pine	161.0	21.0	113.9	17.8	8.3	.
Other softwoods	297.0	257.6	6.5	5.4	27.5	.
Total	654.4	387.4	179.7	49.9	37.4	.
Hardwood:						
Red oaks	652.5	307.7	131.8	176.0	32.2	4.8
White oaks	638.3	402.2	100.1	111.0	12.1	12.9
Hickory	585.4	453.9	18.7	92.2	8.9	11.7
Sweetgum	360.1	212.8	72.5	50.4	23.0	1.4
Black and tupelo gums	221.6	148.1	58.9	11.9	2.7	.
Other hardwoods	1,584.8	1,170.6	108.8	257.2	38.4	9.8
Total	4,042.7	2,695.3	490.8	698.7	117.3	40.6
All species	4,697.1	3,082.7	670.5	748.6	154.7	40.6
NORTH DELTA						
Softwood:						
Loblolly pine	.	.	.	.	.	.
Shortleaf pine	13.1	.	12.4	.	.7	.
Other softwoods	167.2	101.4	22.1	37.7	6.0	.
Total	180.3	101.4	34.5	37.7	6.7	.
Hardwood:						
Red oaks	292.3	117.6	70.1	72.3	31.8	.5
White oaks	276.0	80.0	32.6	134.4	21.1	7.9
Hickory	123.1	40.1	36.2	37.4	6.9	2.5
Sweetgum	113.6	33.4	52.5	27.7	.	.
Black and tupelo gums	166.1	126.2	26.9	9.7	3.3	.
Other hardwoods	623.0	413.6	45.1	130.2	34.1	.
Total	1,594.1	810.9	263.4	411.7	97.2	10.9
All species	1,774.4	912.3	297.9	449.4	103.9	10.9

¹ Includes areas not classified elsewhere.

Table 25. *Sawtimber volume by species and Survey region, 1959*

Species	State of Arkansas	Southwest	Ouachita	Ozark	South Delta	North Delta
— Million board feet —						
Softwood:						
Loblolly pine	10,686.0	10,344.8	144.8	.	196.4	.
Shortleaf pine	12,634.2	5,626.2	5,654.4	1,179.5	161.0	13.1
Cypress	920.1	387.5	43.4	25.6	297.0	166.6
Cedar	43.3	1.1	9.0	32.6	.	.6
Total	24,283.6	16,359.6	5,851.6	1,237.7	654.4	180.3
Hardwood:						
Black, scarlet, and southern red oaks	1,851.6	633.6	100.8	934.1	135.7	47.4
Cherrybark, Shumard, and northern red oaks	936.5	293.4	71.4	388.4	89.5	93.8
Water oaks	1,413.8	731.3	46.3	57.8	427.3	151.1
White oak (<i>Quercus alba</i>)	1,733.8	529.3	278.0	742.7	109.8	74.0
Other white oaks	2,424.6	861.7	287.9	544.5	528.5	202.0
Pecan	391.5	160.0	.	61.1	92.6	77.8
Other hickories	1,262.9	297.6	66.6	360.6	492.8	45.3
Sweetgum	2,232.6	1,237.3	165.0	356.6	360.1	113.6
Black and tupelo gums	1,203.7	397.7	83.4	334.9	221.6	166.1
Cottonwood	291.8	29.5	5.7	.	141.6	115.0
Willow	458.6	109.8	5.9	7.1	136.2	199.6
Soft maples	81.5	30.7	.	7.9	41.4	1.5
Yellow-poplar	15.8	.	.	.	10.0	5.8
Sweetbay and magnolia	23.5	19.2	.	4.3	.	.
White elm	423.8	68.2	6.9	88.6	154.1	106.0
Other elms	433.8	65.9	19.8	97.5	205.3	45.3
Ash	531.3	81.5	32.6	64.9	291.6	60.7
Hackberry	549.8	58.2	2.3	44.8	405.2	39.3
Beech	99.7	62.4	.	10.8	12.2	14.3
Sycamore	190.2	36.1	13.3	41.1	97.5	2.2
Other hardwoods	343.4	69.7	28.1	122.6	89.7	33.3
Total	16,894.2	5,773.1	1,214.0	4,270.3	4,042.7	1,594.1
All species	41,177.8	22,132.7	7,065.6	5,508.0	4,697.1	1,774.4

Table 26. *Average sawtimber volume per acre by forest type and Survey region, 1959*

Forest type	State of Arkansas	Southwest	Ouachita	Ozark	South Delta	North Delta
— Board feet —						
Softwood types:						
Loblolly-shortleaf pine	3,677	4,559	2,786	1,698	3,854	1,200
Oak-pine	1,327	1,706	901	841	1,299	979
Cedar	291	.	416	276	.	508
Average	2,993	3,982	2,509	984	3,165	891
Hardwood types:						
Oak-hickory	710	994	552	652	1,181	725
Elm-ash-cottonwood	2,129	1,564	1,236	1,226	2,435	2,682
Oak-gum-cypress	2,149	2,229	1,501	2,128	2,446	1,588
Average	1,244	1,705	722	729	2,244	1,484
All types	1,984	3,180	1,989	787	2,301	1,469

Table 27. Average sawtimber volume per acre by stand size and forest type, 1959

Forest type	All stand sizes	Large saw-timber	Small saw-timber	Pole-timber	Seedling and sapling	Nonstocked and other areas ¹
----- Board feet -----						
Softwood types:						
Loblolly-shortleaf pine	3,677	7,404	4,762	1,052	414	225
Oak-pine	1,327	5,128	2,611	733	433	
Cedar	291			478	241	
Average	2,993	7,127	4,599	931	369	164
Hardwood types:						
Oak-hickory	710	2,832	2,316	645	324	227
Elm-ash-cottonwood	2,129	5,074		963	267	566
Oak-gum-cypress	2,149	4,543	2,934	978	545	649
Average	1,244	4,229	2,660	741	367	425
All types	1,984	5,578	4,132	806	367	358

¹ Includes areas not classified elsewhere.

Table 28. Softwood sawtimber volume by log grade and stand quality, by species group, and by Survey region, 1959

Species group and Survey region	All grades	Grade 1 ¹	Grade 2	Grade 3			Grade 4		
				Total	In fair and better stands	In poor stands	Total	In fair and better stands	In poor stands
----- Million board feet -----									
Species group:									
Loblolly pine	10,686.0	414.0	1,906.5	3,659.5	2,300.6	1,358.9	4,706.0	2,559.4	2,146.6
Shortleaf pine	12,634.2	130.7	1,820.1	4,547.0	2,013.4	2,533.6	6,136.4	2,765.5	3,370.9
Other softwoods	963.4	124.0	115.9	220.0	163.5	56.5	503.5	286.4	217.1
Total	24,283.6	668.7	3,842.5	8,426.5	4,477.5	3,949.0	11,345.9	5,611.3	5,734.6
Survey region:									
Southwest	16,359.6	492.8	2,829.4	5,931.9	3,607.3	2,324.6	7,105.5	3,991.6	3,113.9
Ouachita	5,851.6	87.2	789.0	1,971.0	673.5	1,297.5	3,004.4	1,221.8	1,782.6
Ozark	1,237.7	39.0	134.7	327.9	104.9	223.0	736.1	173.3	562.8
South Delta	654.4	49.1	79.2	165.2	84.7	80.5	360.9	173.5	187.4
North Delta	180.3	.6	10.2	30.5	7.1	23.4	139.0	51.1	87.9
Total	24,283.6	668.7	3,842.5	8,426.5	4,477.5	3,949.0	11,345.9	5,611.3	5,734.6

¹ All cedar sawlogs were graded as No. 1.

Table 29. Hardwood sawtimber volume by log class and stand quality, by species group, and by Survey region, 1959

Species group and Survey region	All classes	Standard lumber logs					Tie and timber logs		
		Grade 1	Grade 2	Grade 3			Total	In fair and better stands	In poor stands
				Total	In fair and better stands	In poor stands			
----- Million board feet -----									
Species group:									
Red oaks	4,201.9	242.4	664.3	2,157.8	579.5	1,578.3	1,137.4	322.2	815.2
White oaks	4,158.4	207.1	747.3	2,682.5	650.5	2,032.0	521.5	163.1	358.4
Hickory	1,654.4	168.9	258.9	852.4	303.8	548.6	374.2	158.0	216.2
Sweetgum	2,232.6	136.3	369.0	1,200.7	460.2	740.5	526.6	215.9	310.7
Black and tupelo gums	1,203.7	155.2	332.7	635.8	297.4	338.4	80.0	41.4	38.6
Other hardwoods	3,443.2	201.9	707.4	1,944.0	883.4	1,060.6	589.9	236.2	353.7
Total	16,894.2	1,111.8	3,079.6	9,473.2	3,174.8	6,298.4	3,229.6	1,136.8	2,092.8
Survey region:									
Southwest	5,773.1	393.5	1,055.9	2,911.7	1,322.8	1,588.9	1,412.0	591.4	820.6
Ouachita	1,214.0	35.0	205.2	760.1	156.0	604.1	213.7	24.0	189.7
Ozark	4,270.3	242.0	770.8	2,824.9	490.7	2,334.2	432.6	69.7	362.9
South Delta	4,042.7	360.7	796.7	1,982.2	911.2	1,071.0	903.1	408.9	494.2
North Delta	1,594.1	80.6	251.0	994.3	294.1	700.2	268.2	42.8	225.4
Total	16,894.2	1,111.8	3,079.6	9,473.2	3,174.8	6,298.4	3,229.6	1,136.8	2,092.8

Table 30. *Annual cut of growing stock and sawtimber by species group and county,¹ 1958*

County	Growing stock			Sawtimber		
	All Species	Softwood	Hardwood	All Species	Softwood	Hardwood
	— Million cubic feet —			— Million board feet —		
Arkansas	2.9	1.2	1.7	11.5	4.5	7.0
Ashley	16.9	9.8	7.1	63.3	40.6	22.7
Baxter	6.8	...	6.8	21.9	...	21.9
Benton and Carroll	3.0	2.4	.6	12.4	10.1	2.3
Boone and Marion	.3	.	.3	1.0	.	1.0
Bradley	16.5	12.2	4.3	62.9	44.3	18.6
Calhoun	10.0	8.0	2.0	40.5	32.5	8.0
Chicot	.7	..	.7	1.6	..	1.6
Clark	14.7	9.9	4.8	55.1	39.8	15.3
Clay	.5	...	.5	1.4	...	1.4
Cleburne	1.0	.2	.8	1.3	.5	.8
Cleveland	5.4	2.4	3.0	21.5	9.6	11.9
Columbia	7.2	5.0	2.2	23.4	17.0	6.4
Conway	.6	.4	.2	1.6	.7	.9
Craighead	1.2	...	1.2	3.7	...	3.7
Crawford	.7	.1	.6	2.4	..	2.4
Crittenden	.1	...	.1	...	...	...
Cross	6.3	...	6.3	18.6	..	18.6
Dallas	14.3	8.5	5.8	50.3	33.4	16.9
Desha	1.7	.3	1.4	7.5	1.2	6.3
Drew	14.2	3.2	11.0	47.6	11.8	35.8
Faulkner	.1	.	.1	.5	...	.5
Franklin	2.9	...	2.9	8.8	...	8.8
Fulton	.3	..	.3	.4	...	.4
Garland	6.0	2.7	3.3	25.8	12.9	12.9
Grant	15.9	10.6	5.3	58.2	39.3	18.9
Greene	3.2	.	3.2	9.6	...	9.6
Hempstead	4.7	2.9	1.8	16.3	11.4	4.9
Hot Spring	7.9	5.3	2.6	25.0	15.5	9.5
Howard	9.7	7.8	1.9	37.7	30.0	7.7
Independence	4.9	.3	4.6	19.0	.3	18.7
Izard	.4	.1	.3	1.7	.2	1.5
Jackson	1.3	.	1.3	3.9	..	3.9
Jefferson	5.1	2.5	2.6	19.5	9.9	9.6
Johnson	4.0	3.6	.4	22.4	21.4	1.0
Lafayette	5.2	3.6	1.6	22.7	18.0	4.7
Lawrence	2.5	..	2.5	7.5	..	7.5
Lee	1.2	..	1.2	4.2	...	4.2
Lincoln	2.1	.5	1.6	6.8	.7	6.1

Table 30. *Annual cut of growing stock and sawtimber by species group and county,¹ 1958*
(Continued)

County	Growing stock			Sawtimber		
	All Species	Softwood	Hardwood	All Species	Softwood	Hardwood
	— Million cubic feet —			— Million board feet —		
Little River	4.3	1.0	3.3	15.8	2.8	13.0
Logan	3.4	1.4	2.0	11.0	5.3	5.7
Lonoke	4.5	..	4.5	17.3	..	17.3
Madison						
and Washington	.3	..	.3	1.1	..	1.1
Miller	3.2	1.8	1.4	7.7	2.2	5.5
Mississippi						
and Poinsett	2.7	1.5	1.2	10.3	6.9	3.4
Monroe	10.7	.7	10.0	39.8	2.8	37.0
Montgomery	7.9	4.4	3.5	22.0	9.7	12.3
Nevada	2.9	1.6	1.3	10.6	5.4	5.2
Newton and Searcy	8.1	..	8.1	31.5	..	31.5
Ouachita	7.0	4.2	2.8	25.5	15.8	9.7
Perry	4.0	2.4	1.6	9.4	4.2	5.2
Phillips	2.4	..	2.4	9.0	..	9.0
Pike	8.9	5.7	3.2	34.3	22.5	11.8
Polk	5.9	3.2	2.7	23.7	15.1	8.6
Pope	3.4	2.6	.8	6.6	4.0	2.6
Prairie	2.4	..	2.4	8.7	..	8.7
Pulaski	2.9	2.7	.2	11.9	11.4	.5
Randolph	1.0	..	1.0	2.5	..	2.5
St. Francis	.8	..	.8	2.2	..	2.2
Saline	10.6	8.7	1.9	46.1	39.6	6.5
Scott	8.6	5.9	2.7	37.7	28.9	8.8
Sebastian	.9	.9	..	2.7	2.7	..
Sevier	8.4	5.7	2.7	29.1	20.6	8.5
Sharp	1.3	1.3	..	3.6	3.6	..
Stone	4.7	1.9	2.8	26.5	15.2	11.3
Union	36.7	24.1	12.6	132.2	85.7	46.5
Van Buren	.7	.4	.3	4.1	3.0	1.1
White	3.9	.4	3.5	11.0	.4	10.6
Woodruff	2.3	..	2.3	6.4	..	6.4
Yell	10.6	7.2	3.4	48.2	36.1	12.1
All counties	377.8	193.2	184.6	1,388.0	749.5	638.5

¹For use of county data, groupings of at least 50 million cubic feet are recommended.

Table 31. *Annual cut of sawtimber and growing stock by species group and class of timber, by Survey region, 1958*

Class of timber	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
— Million cubic feet —			— Million board feet —			
STATE OF ARKANSAS						
Sawtimber trees	281.6	144.4	137.2	1,388.0	749.5	638.5
Poletimber trees	96.2	48.8	47.4	...	...	...
Total	377.8	193.2	184.6	1,388.0	749.5	638.5
SOUTHWEST						
Sawtimber trees	158.8	97.4	61.4	779.7	498.2	281.5
Poletimber trees	55.2	35.9	19.3	...	...	...
Total	214.0	133.3	80.7	779.7	498.2	281.5
OUACHITA						
Sawtimber trees	46.5	31.0	15.5	238.5	165.9	72.6
Poletimber trees	14.3	8.5	5.8	...	...	...
Total	60.8	39.5	21.3	238.5	165.9	72.6
OZARK						
Sawtimber trees	36.9	11.0	25.9	180.3	59.4	120.9
Poletimber trees	11.5	2.7	8.8	...	...	...
Total	48.4	13.7	34.7	180.3	59.4	120.9
SOUTH DELTA						
Sawtimber trees	26.1	3.8	22.3	125.9	19.1	106.8
Poletimber trees	7.6	1.4	6.2	...	...	...
Total	33.7	5.2	28.5	125.9	19.1	106.8
NORTH DELTA						
Sawtimber trees	13.3	1.2	12.1	63.6	6.9	56.7
Poletimber trees	7.6	.3	7.3	...	...	...
Total	20.9	1.5	19.4	63.6	6.9	56.7

Table 32. *Annual cut of sawtimber and growing stock by species, 1958*

Species	Growing stock	Sawtimber
	Million cubic feet	Million board feet
Softwood:		
Pines	188.2	728.6
Other softwoods	5.0	20.9
Total	193.2	749.5
Hardwood:		
Red oaks	81.0	298.6
White oaks	58.0	192.1
Hickory	7.9	25.6
Other hard hardwoods	12.0	39.4
Black and tupelo gums	4.5	16.7
Sweetgum	19.0	59.4
Other soft hardwoods	2.2	6.7
Total	184.6	638.5
All species	377.8	1,388.0

Table 33. *Net annual growth of sawtimber and growing stock by species group and class of timber, by Survey region, 1958*

Class of timber	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
— Million cubic feet —			— Million board feet —			
STATE OF ARKANSAS						
Sawtimber trees	470.3	288.5	181.8	2,399.7	1,635.6	764.1
Poletimber trees	166.9	51.6	115.3	.	.	.
Total	637.2	340.1	297.1	2,399.7	1,635.6	764.1
SOUTHWEST						
Sawtimber trees	264.8	192.4	72.4	1,422.7	1,133.4	289.3
Poletimber trees	74.8	32.1	42.7	.	.	.
Total	339.6	224.5	115.1	1,422.7	1,133.4	289.3
OUACHITA						
Sawtimber trees	78.1	67.7	10.4	400.0	358.4	41.6
Poletimber trees	29.5	13.2	16.3	.	.	.
Total	107.6	80.9	26.7	400.0	358.4	41.6
OZARK						
Sawtimber trees	58.3	19.8	38.5	263.5	98.5	165.0
Poletimber trees	36.1	4.5	31.6	.	.	.
Total	94.4	24.3	70.1	263.5	98.5	165.0
SOUTH DELTA						
Sawtimber trees	46.9	7.1	39.8	210.0	35.6	174.4
Poletimber trees	18.7	1.7	17.0	.	.	.
Total	65.6	8.8	56.8	210.0	35.6	174.4
NORTH DELTA						
Sawtimber trees	22.2	1.5	20.7	103.5	9.7	93.8
Poletimber trees	7.8	.1	7.7	.	.	.
Total	30.0	1.6	28.4	103.5	9.7	93.8

Table 34. *Net annual growth per acre of sawtimber and growing stock, by forest-type group and Survey region, 1958*

Survey region	Growing stock			Sawtimber		
	All types	Softwood types	Hardwood types	All types	Softwood types	Hardwood types
— — Cubic feet — —			— — Board feet — —			
Southwest	49	59	31	204	265	93
Ouachita	30	37	15	113	146	32
Ozark	13	18	12	38	65	30
South Delta	32	67	30	103	242	94
North Delta	25	16	25	86	55	86
Average	31	45	20	116	193	59

Table 35. Number of growing stock trees by species group and Survey region (1959) and change since 1951

Diameter class (inches)	Softwood		Hardwood		Softwood		Hardwood	
	Thousand trees	Percent change	Thousand trees	Percent change	Thousand trees	Percent change	Thousand trees	Percent change
STATE OF ARKANSAS					OZARK			
2-4	1,702,358	+ 35	6,067,171	+ 24	253,556	+ 54	2,068,282	+ 22
6-8	441,184	+ 29	785,147	+ 28	51,875	+ 12	282,648	+ 58
10-12	150,335	+ 27	255,408	+ 5	15,186	+ 50	87,562	+ 31
14-18	54,493	+ 28	100,646	- 14	2,962	+ 52	28,969	- 4
20 and up	6,496	+ 71	18,563	- 5	70	+ 21	3,923	- 11
Total	2,354,866	+ 33	7,226,935	+ 23	323,649	+ 45	2,471,384	+ 25
SOUTHWEST					SOUTH DELTA			
2-4	890,855	+ 51	2,114,227	+ 55	34,730	+ 84	557,192	+ 49
6-8	202,801	+ 26	237,367	+ 23	8,835	+ 86	94,041	+ 14
10-12	79,733	+ 17	83,880	+ 3	2,814	+ 37	36,789	+ 7
14-18	36,246	+ 30	33,640	- 12	1,191	+ 12	19,492	- 5
20 and up	4,797	+ 78	5,768	- 2	430	+ 310	5,748	+ 24
Total	1,214,432	+ 43	2,474,882	+ 47	48,000	+ 78	713,262	+ 38
OUACHITA					NORTH DELTA			
2-4	515,328	+ 8	1,065,305	- 7	7,889	+ 40	262,165	- 19
6-8	175,601	+ 36	119,413	+ 29	2,072	+ 33	51,678	- 24
10-12	51,982	+ 43	26,830	- 10	620	- 60	20,347	- 35
14-18	13,512	+ 29	9,371	- 27	582	- 48	9,174	- 42
20 and up	1,007	+ 36	1,100	- 34	192	- 4	2,024	- 32
Total	757,430	+ 16	1,222,019	- 4	11,355	+ 12	345,388	- 22

STANDARD TABLES

These tables are identical in format to those that follow which will be found in all State reports issued by the Forest Survey. Their purpose is to facilitate compilation of data for various States and regions.

Table I. Land area, by major classes of land, Arkansas, 1959

Class of land	Area
	Thousand acres
Commercial	20,757.0
Non-commercial:	
Productive-reserved	59.0
Nonproductive	..
Total forest	20,816.0
Forest ¹	12,800.6
Land	33,616.6

¹ Includes some acreage of water according to Survey standards of classification but defined by the Bureau of Census as land.

Table II. Commercial forest land area, by ownership class, Arkansas, 1959

Ownership class	Area
	Thousand acres
Individually owned or managed:	
National forest	2,385.4
Indian	..
Bureau of Land Management	.6
Other	265.1
Total	2,651.1
State	193.9
County and municipal	10.7
Private:	
Firm	5,948.3
Industrial and other	11,953.0
Total	17,901.3
All ownerships	20,757.0

Table III. Area of commercial forest land, by major forest types, Arkansas, 1959

Forest type	Area
	Thousand acres
Loblolly-shortleaf pine	6,485.6
Oak-pine	1,697.1
Cedar	595.1
Oak-hickory	7,524.2
Oak-gum-cypress	3,997.0
Elm-ash-cottonwood	458.0
Total	20,757.0

Table IV. Net volume of live sawtimber and growing stock on commercial forest land, by stand-size class, Arkansas, 1959

Stand-size class	Sawtimber	Growing stock
	Million board feet	Million cubic feet
Sawtimber stands	32,327.8	7,736.5
Poletimber stands	6,809.5	3,513.4
Seedling and sapling stands	1,834.8	716.5
Nonstocked and other areas not elsewhere classified	205.7	64.8
Total	41,177.8	12,031.2

Table V. *Net volume of live sawtimber and growing stock on commercial forest land, by ownership class, Arkansas, 1959*

Ownership class	Sawtimber	Growing stock
	Million board feet	Million cubic feet
Federally owned or managed:		
National forest	5,507.5	1,551.7
Indian	...	...
Bureau of Land Management	1.1	.3
Other	812.8	216.2
Total	6,321.4	1,768.2
State	337.4	107.4
County and municipal	8.7	3.6
Private:		
Farm	6,740.2	2,441.5
Industrial and other	27,770.1	7,710.5
Total	34,510.3	10,152.0
All ownerships	41,177.8	12,031.2

Table VI. *Net volume of live sawtimber and growing stock on commercial forest land, by species, Arkansas, 1959*

Species	Sawtimber	Growing stock
	Million board feet	Million cubic feet
Softwoods:		
Shortleaf and loblolly pines	23,320.2	5,215.9
Cypress	920.1	173.5
Other eastern softwoods	43.3	27.7
Total	24,283.6	5,417.1
Hardwoods:		
White oaks (<i>Quercus alba</i> and <i>michauxii</i>)	1,824.6	761.8
Red oaks (<i>Q. rubra</i> , <i>falcata</i> var. <i>pagodaefolia</i> , and <i>shumardii</i>)	936.5	330.1
Other white oaks	2,333.8	976.9
Other red oaks	3,265.4	1,317.6
Sugar maple	...	6.4
Soft maples	81.5	46.1
Beech	99.7	32.4
Sweetgum	2,232.6	883.9
Tupelo and blackgum	1,203.7	353.9
Ash	531.3	191.5
Hickory	1,654.4	736.6
Cottonwood	291.8	69.7
Basswood	20.8	9.4
Yellow-poplar	15.8	5.1
Black walnut	75.2	23.1
Other eastern hardwoods	2,327.1	869.6
Total	16,894.2	6,614.1
All species	41,177.8	12,031.2

Table VII. *Net volume of live sawtimber on commercial forest land, by diameter class groups and species, Arkansas, 1959*

Species	Diameter class groups						Total
	10 inches	12 inches	14 inches	16 inches	18 inches	20 inches and up	
	— Million board feet —						
Southern yellow pines	4,395.2	4,892.9	4,669.9	3,703.3	2,570.5	3,088.4	23,320.2
Other eastern softwoods	72.0	81.9	93.5	87.7	113.9	514.4	963.4
White oaks (<i>Quercus alba</i> and <i>michauxii</i>)	..	526.4	443.6	339.9	228.0	286.7	1,824.6
Other white oaks	..	501.1	503.2	406.2	319.1	604.2	2,333.8
Red oaks (<i>Q. rubra</i> , <i>falcata</i> var. <i>pagodaefolia</i> , and <i>shumardii</i>)	..	169.3	188.4	185.6	133.6	259.6	936.5
Other red oaks	..	793.7	733.8	467.9	355.3	914.7	3,265.4
Beech	..	17.7	6.5	19.0	18.7	37.8	99.7
Sweetgum	..	578.6	546.4	389.5	251.5	466.6	2,232.6
Tupelo and blackgum	..	174.0	225.9	263.9	138.0	401.9	1,203.7
Yellow-poplar	..	1.8	..	1.3	7.6	5.1	15.8
Other eastern hardwoods	..	1,027.5	895.7	764.3	739.0	1,555.6	4,982.1

Table VIII. *Net volume of all timber on commercial forest land, by class of material and species group, Arkansas, 1959*

Class of material	Total	Softwoods	Hardwoods
	— Million cubic feet —		
Growing stock:			
Sawtimber trees:			
Sawlog portion	6,665.5	3,979.5	2,686.0
Upper stem portion	1,569.0	295.7	1,273.3
Total	8,234.5	4,275.2	3,959.3
Poletimber trees	3,796.7	1,141.9	2,654.8
Total growing stock	12,031.2	5,417.1	6,614.1
Other material:			
Sound cull trees	1,335.3	14.8	1,320.5
Rotten cull trees	811.8	17.7	794.1
Hardwood limbs	771.1	..	771.1
Salvable dead trees	7.1	1.9	5.2
Total other material	2,925.3	34.4	2,890.9
Total, all timber	14,956.5	5,451.5	9,505.0

Table IX. *Net annual growth, annual mortality, and annual cut of live sawtimber and growing stock on commercial forest land, by species group, Arkansas, 1958*

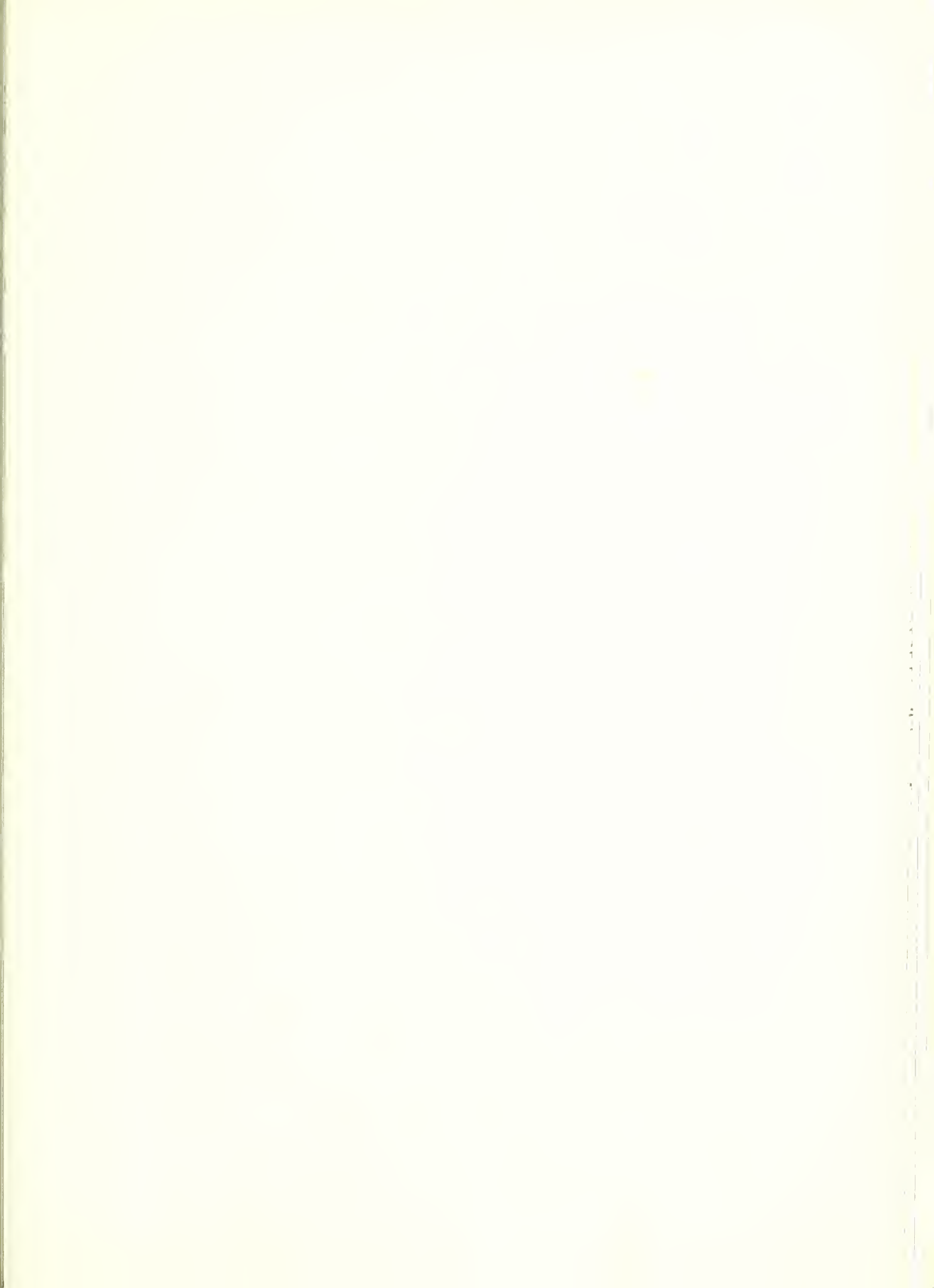
Item	Sawtimber			Growing stock		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
	— Million board feet —			— Million cubic feet —		
Net annual growth	2,399.7	1,635.6	764.1	637.2	340.1	297.1
Annual mortality	284.4	72.8	211.6	92.3	17.4	74.9
Annual cut						
Timber products	1,281.3	737.1	544.2	306.0	182.8	123.2
Logging residues ¹	106.7	12.4	94.3	71.8	10.4	61.4
Total annual cut ¹	1,388.0	749.5	638.5	377.8	193.2	184.6

¹ Includes 52.5 million board feet and 24.0 million cubic feet from cultural operations.

Table X. Output of timber products and annual cut of live sawtimber and growing stock, Arkansas, 1958

Product	Output of timber products					Annual cut of sawtimber			Annual cut of growing stock		
	Volume in standard units		Roundwood volume			Total	Soft-woods	Hard-woods	Total	Soft-woods	Hard-woods
	Standard units	Number	Total	Soft-woods	Hard-woods						
			Thousand cubic feet			Thousand board feet			Thousand cubic feet		
Sawlogs	M bd. ft. ¹	1,073,166	169,283	109,256	60,027	1,027,609	627,430	400,179	201,692	116,117	8
Veneer logs & bolts	M bd. ft. ¹	32,074	4,490		4,490	35,442		35,442	6,479		
Cooperage logs & bolts	M bd. ft. ¹	20,194	2,895		2,895	26,011		26,011	5,960		
Pulpwood	Std. cords ²	1,041,463	78,553	67,016	11,537	104,819	79,526	25,293	74,831	63,442	1
Fuelwood	Std. cords ²	943,922	73,540	2,166	71,374	66,190	2,137	64,053	39,962	1,530	3
Piling	M linear feet	2,036	1,232	1,097	135	7,060	6,289	771	1,450	1,292	
Poles	M pieces	579	5,615	5,615		32,168	32,168		6,605	6,605	
Posts	M pieces	15,533	6,344	3,853	2,491	4,784	673	4,111	5,820	3,291	
Hewn ties	M pieces	98	688	28	660	5,234	208	5,026	1,206	38	
Mine timbers	M cu. ft.	75	75	13	62	88	6	82	79	14	
Handle stock dimension	M cu. ft.	1,572	1,572		1,572	13,018		13,018	3,671	...	
Chemical wood	M cu. ft.	3,555	3,555		3,555	2,279		2,279	2,311	...	
Miscellaneous ³	M cu. ft.	2,910	2,910	964	1,946	10,810	1,026	9,784	3,736	922	
Total			350,752	190,008	160,744	1,335,512	749,463	586,049	353,802	193,251	16

¹ International 1/4-inch rule.² Rough wood basis.³ Not including 21.2 million cubic feet of wood from mill residues used for pulp.⁴ Not including 58.5 million cubic feet of wood from mill residues used for domestic and industrial fuel.⁵ Includes furniture squares, excelsior, and other miscellaneous products.⁶ Not including 3.1 million cubic feet of mill residues used for miscellaneous products.⁷ Not including 52.5 million board feet of wood killed by cultural operations.⁸ Not including 24.0 million cubic feet of wood killed by cultural operations.





FOREST SURVEY RELEASE 84

SOUTHERN FOREST EXPERIMENT STATION

New Orleans, Louisiana

Forest Service, U.S. Department of Agriculture

1960

SOUTHERN PULPWOOD PRODUCTION, 1960



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SOUTHERN PULPWOOD PRODUCTION, 1960

Joe F. Christopher

and

Martha E. Nelson

SOUTHERN FOREST EXPERIMENT STATION
New Orleans, Louisiana

and

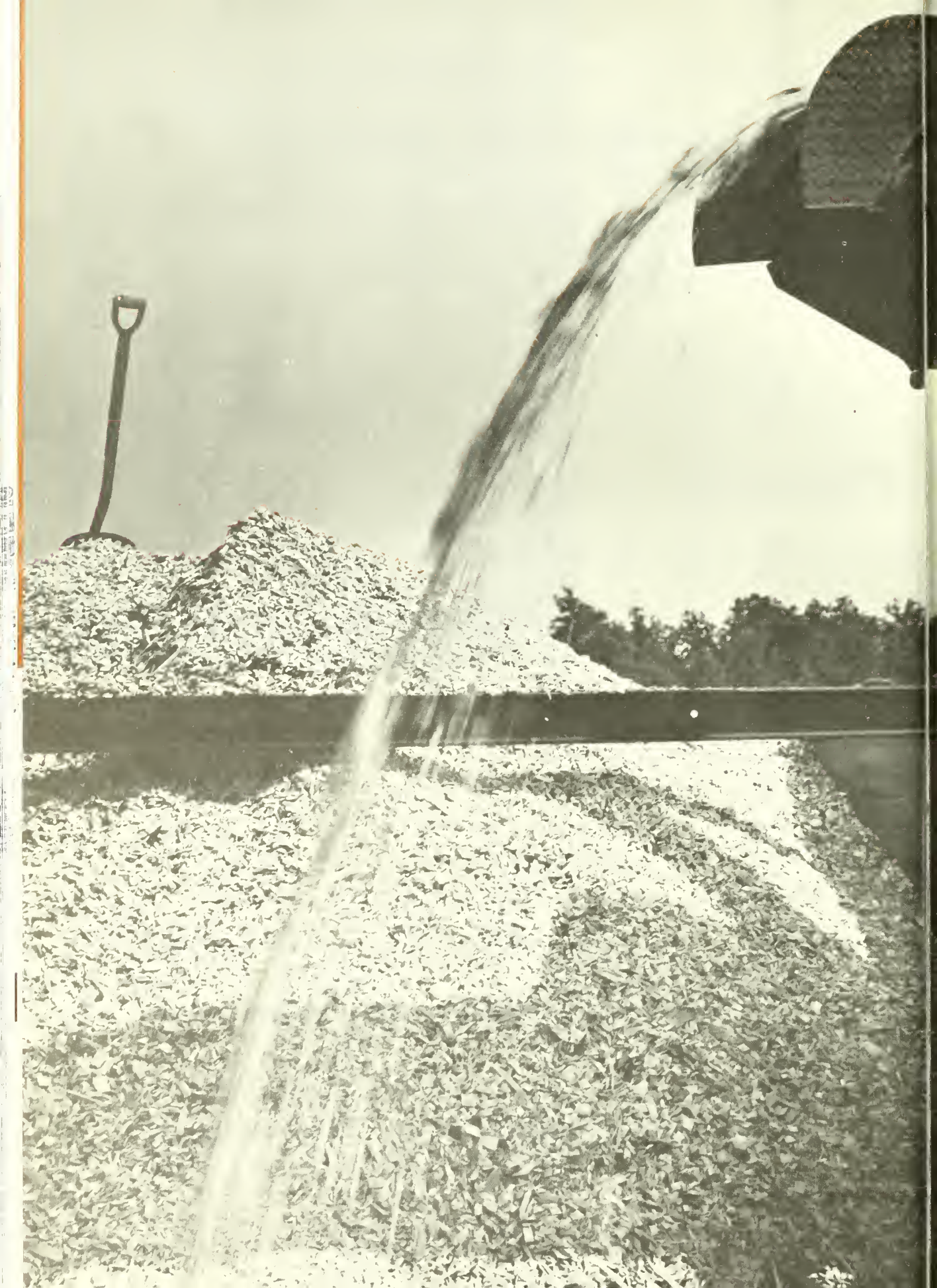
SOUTHEASTERN FOREST EXPERIMENT STATION
Asheville, North Carolina

of the

Forest Service, U. S. Department of Agriculture

in cooperation with

SOUTHERN PULPWOOD CONSERVATION ASSOCIATION
Atlanta, Georgia



1960's PULPWOOD HARVEST IN THE SOUTH reached an all-time high of 23,551,000 cords—57 percent of the Nation's total. At year's end, the South had 81 pulpmills with a total daily capacity of more than 50,000 tons. Seven mills outside the South also were using wood grown within the region.

All together, southern States produced 4 percent more pulpwood in 1960 than in the previous record year of 1959. Changes in State harvests ranged from a 13-percent increase in South Carolina to a 3-percent decline in Oklahoma. Georgia produced 4.9 million cords, to continue as southern leader for the thirteenth consecutive year. Alabama harvested more than 3 million cords; three other States—North Carolina, South Carolina, and Florida—each cut more than 2 million.

Table 1. *Pulpwood production in the South, 1960 and change since 1959*

State	Round pulpwood and residues	Change
	Thousand cords	Percent
Alabama	3,019.7	+ 3
Arkansas	1,555.9	+ 2
Florida	2,100.4	- 1
Georgia	4,905.8	+ 4
Louisiana	1,856.9	+ 3
Mississippi	1,973.6	- 2
North Carolina	2,273.6	+ 6
Oklahoma	53.1	- 3
South Carolina	2,190.4	+13
Tennessee	361.8	+ 2
Texas	1,426.4	+ 1
Virginia	1,833.4	+ 6
All states	23,551.0	+ 4

Some 20,595,500 cords were delivered to mills as bolts. This was a 2-percent increase over 1959. More than 80 percent of the roundwood was pine, which went to 63 of the South's 81 mills.

Hardwood bolts totaled 4,104,600 cords. This volume was 9 percent above that of 1959 and set a new record for the tenth straight year. One-fifth of the total roundwood volume was hardwood. More than 71 percent of the hardwood came from soft-textured species such as sweetgum and yellow-poplar.

Table 2. *Round pulpwood production in the South, by State and species group, 1960*

State	All species	Pine	Soft hardwoods ¹	Hard hardwoods
- - - - Thousand cords - - - -				
Alabama	2,593.7	2,016.4	527.8	49.5
Arkansas	1,216.4	983.2	168.7	64.5
Florida	1,923.9	1,825.2	78.3	20.4
Georgia	4,410.1	4,004.7	305.3	100.1
Louisiana	1,645.6	1,290.9	271.6	83.1
Mississippi	1,774.3	956.0	744.4	73.9
North Carolina	1,887.9	1,486.2	194.8	206.9
Oklahoma	38.6	30.1	3.2	5.3
South Carolina	1,901.8	1,515.0	271.7	115.1
Tennessee	353.4	188.8	38.5	126.1
Texas	1,134.5	916.6	208.5	9.4
Virginia	1,715.3	1,277.8	106.4	331.1
All states	20,595.5	16,490.9	2,919.2	1,185.4

¹ Includes gums, cottonwood, willow, yellow-poplar, bay, magnolia, maples, basswood, sycamore, soft elm, hackberry.

Pine bolts were cut in 775 of the 927 southern counties; 172 counties showed an increase of 30 percent or more over their 1959 output. Hardwood cordage was produced in 723 counties, of which 321 marketed at least 30 percent more wood than in the previous year.

Nearly three-fourths of the roundwood was pulped in the State in which it was grown. Some 91 percent of Louisiana's harvest was used by in-State mills, the highest proportion

for any southern State. Less than 1 percent of all cordage was shipped out of the South.

Over 12 percent of the pulp industry's total wood supply was in the form of chips produced by other forest industries; in 1959 the proportion was 10 percent. The 1960 chip volume was 2,877,300 cords, an increase of 21 percent over the preceding year. As in the past, sawmills provided the great bulk of the chips, but 78,200 cords arrived at pulpmills as unchipped residues of veneer mills and wood preserving plants.

At least 896 sawmills, veneer mills, and other forest industries are currently equipped with chip-making machinery. Georgia leads the South here also, with 163 chipping installations; North Carolina is second with 147; Alabama ranks third with 141.

Table 3. Southern States with more than five pulpwood chipping installations

State	Pulpwood chipping installations ¹
	Number
Alabama	141
Arkansas	65
Florida	56
Georgia	163
Louisiana	54
Mississippi	73
North Carolina	147
South Carolina	107
Tennessee	8
Texas	35
Virginia	47
Total	896

¹ Excludes installations at pulpmills.

Pulping capacity in the South continues to rise. During the year total mill capabilities increased from 46,000 tons of pulp per day to 50,00 tons. Six new mills are planned or under construction.

Florida leads the States in pulping capacity with 17 percent of the South's total. Georgia ranks second and Louisiana a distant third.

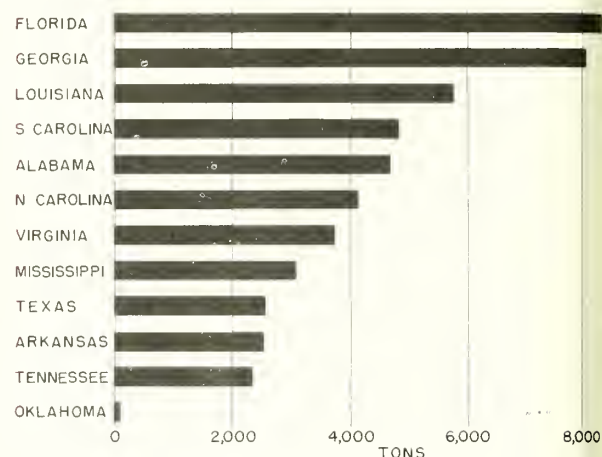


Figure 1. Pulping capacity by State, 1960.

The kraft or sulfate process, used at 52 mills, accounts for 76 percent of the region's daily capacity; 12 percent is in groundwood and other mechanical methods, and 10 percent in the semi-chemical process. Three mills with 2 percent of the capabilities employ the soda and sulfite process. Recent trends indicate that, although many mills are diversifying manufacturing methods, the sulfate process will probably continue to predominate for many years.

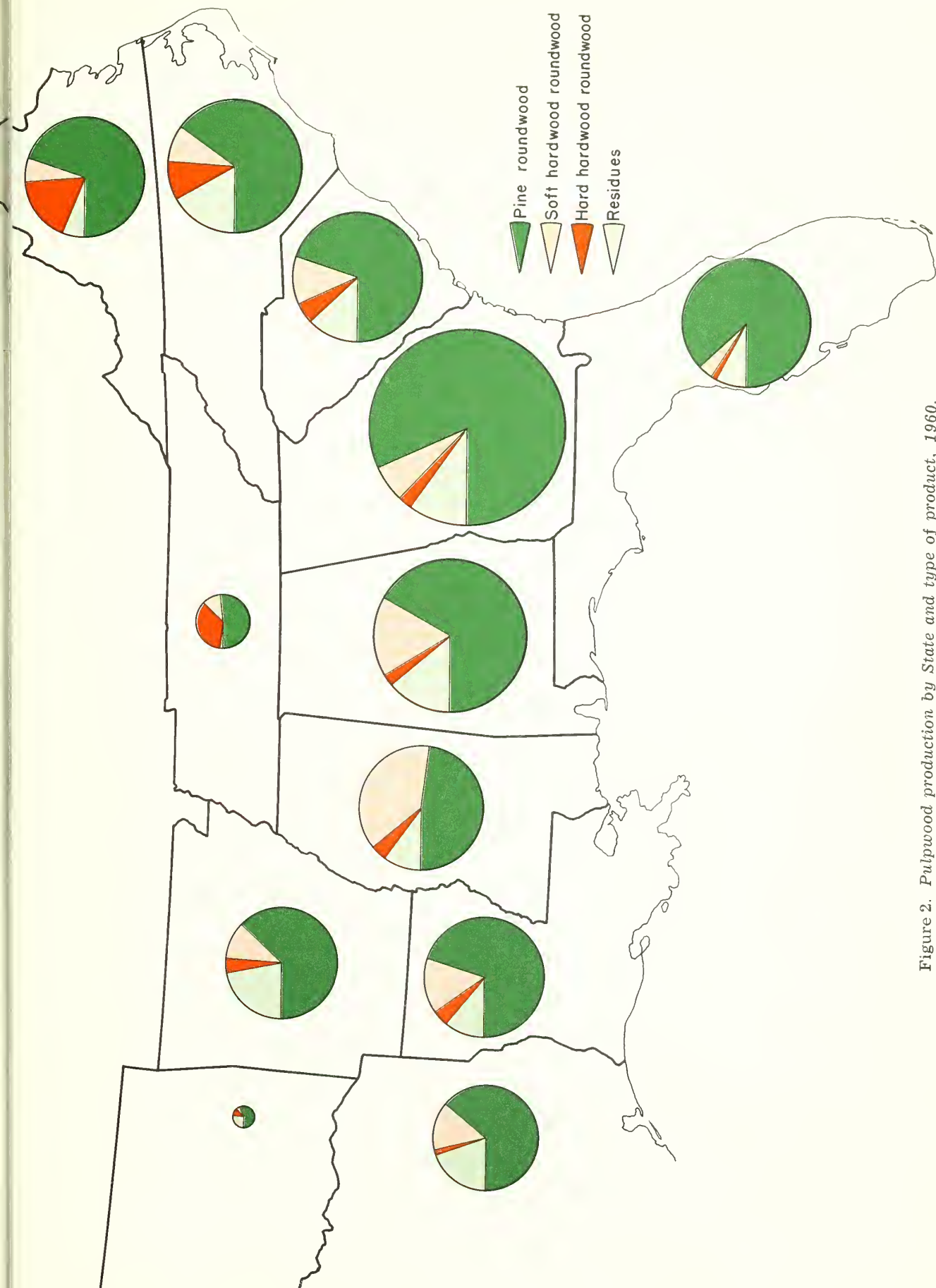
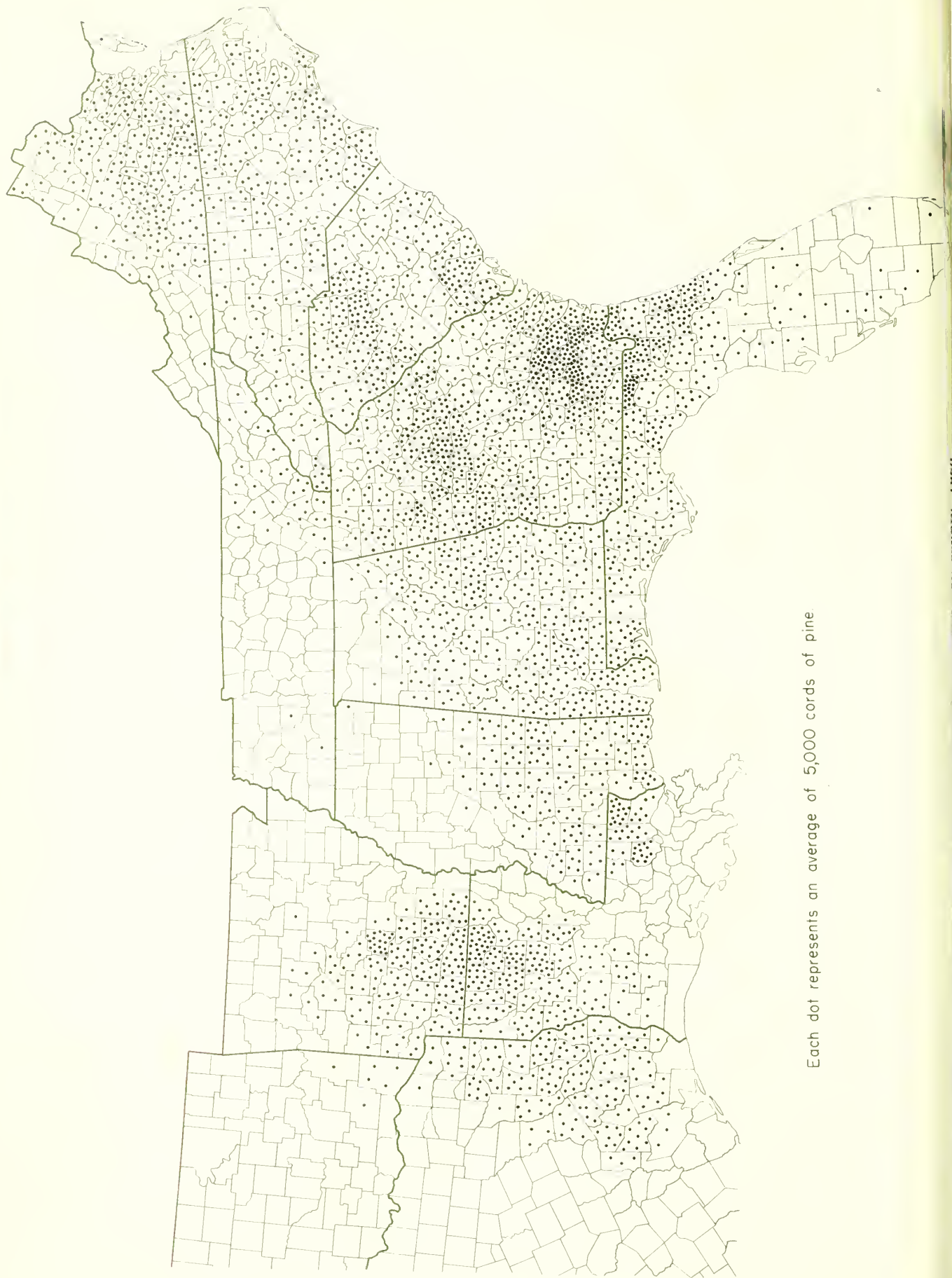


Figure 2. Pulpwood production by State and type of product, 1960.



Each dot represents an average of 5,000 cords of pine

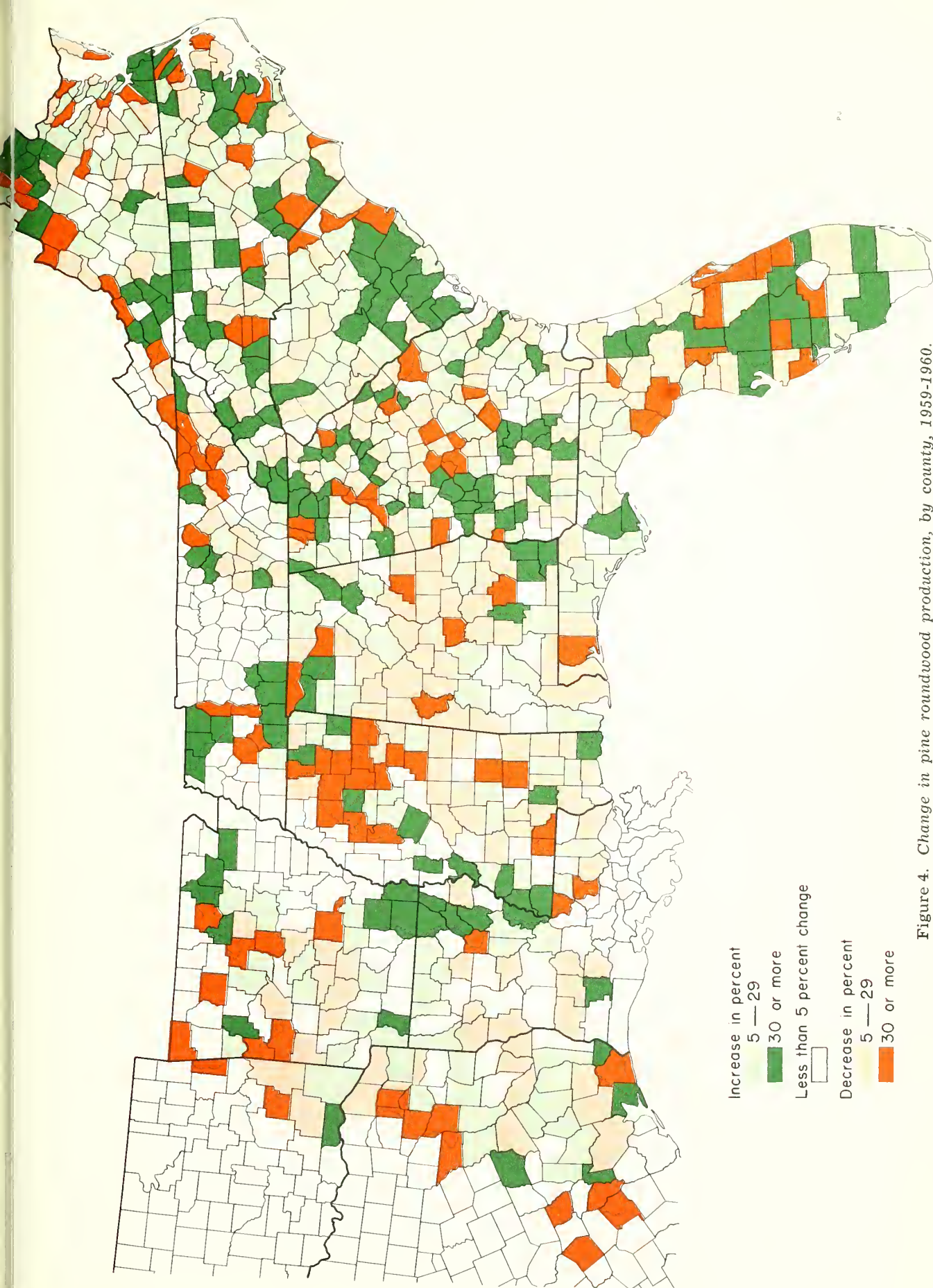
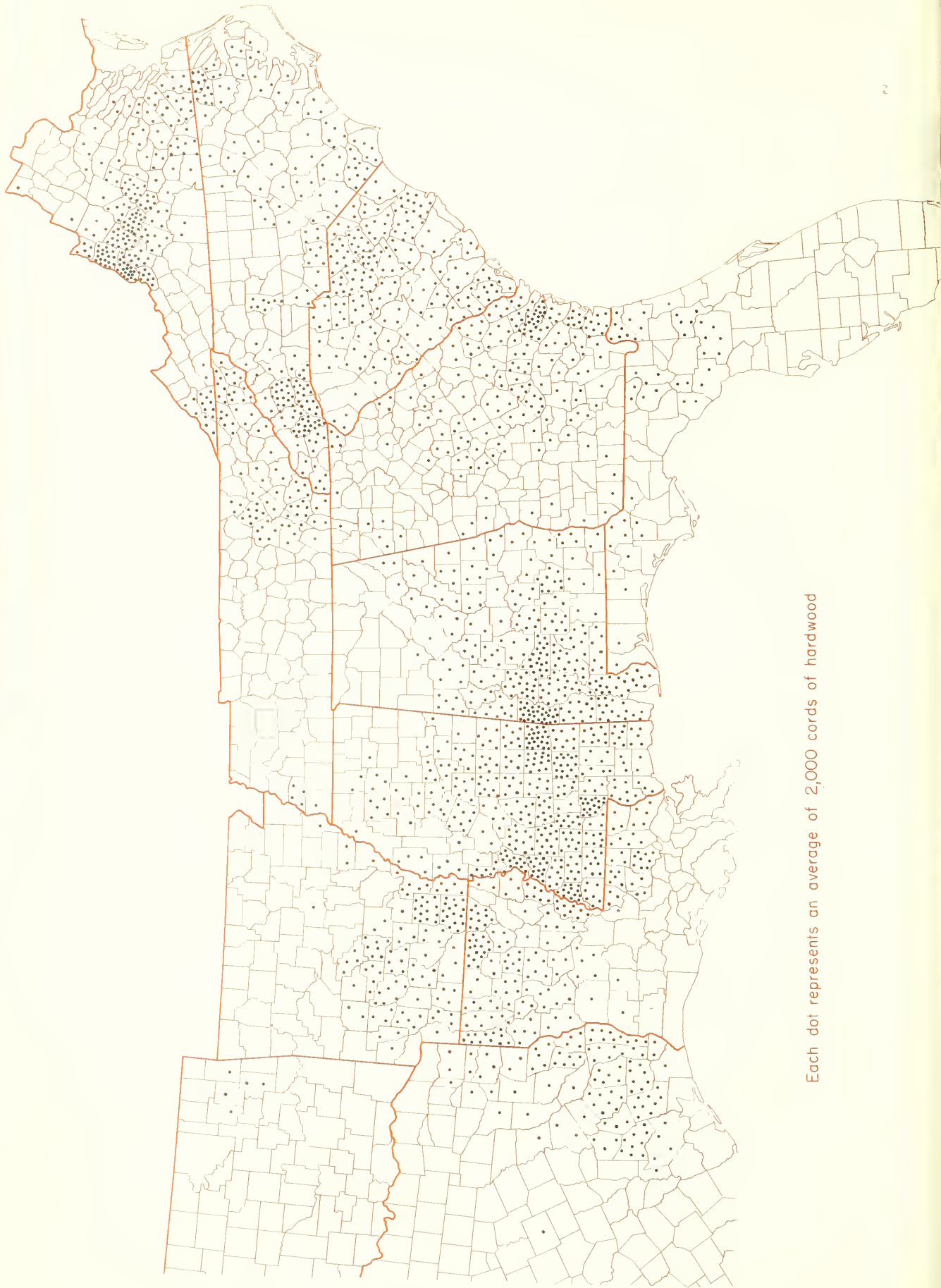


Figure 4. Change in pine roundwood production, by county, 1959-1960.



Each dot represents an average of 2,000 cords of hardwood

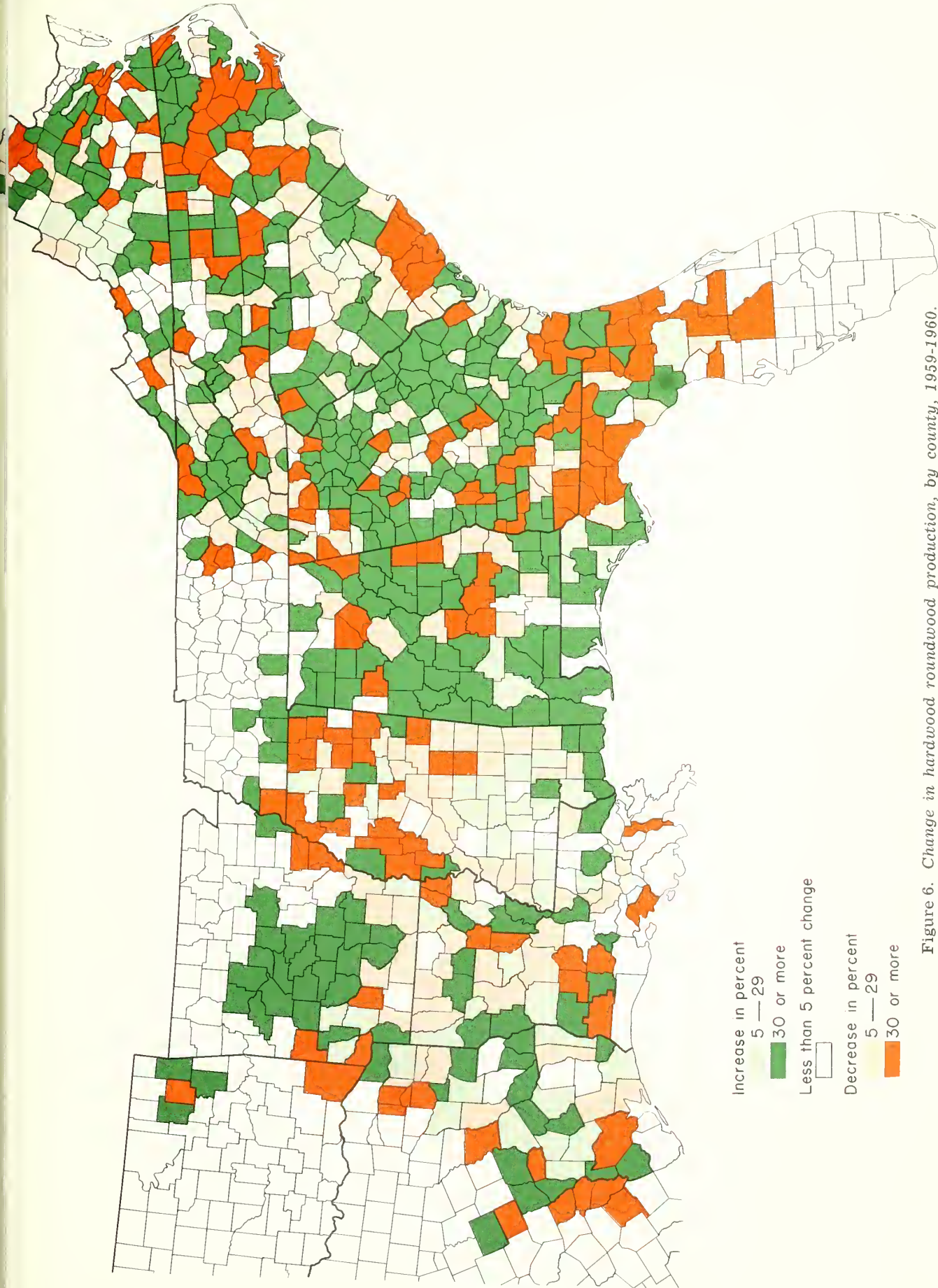
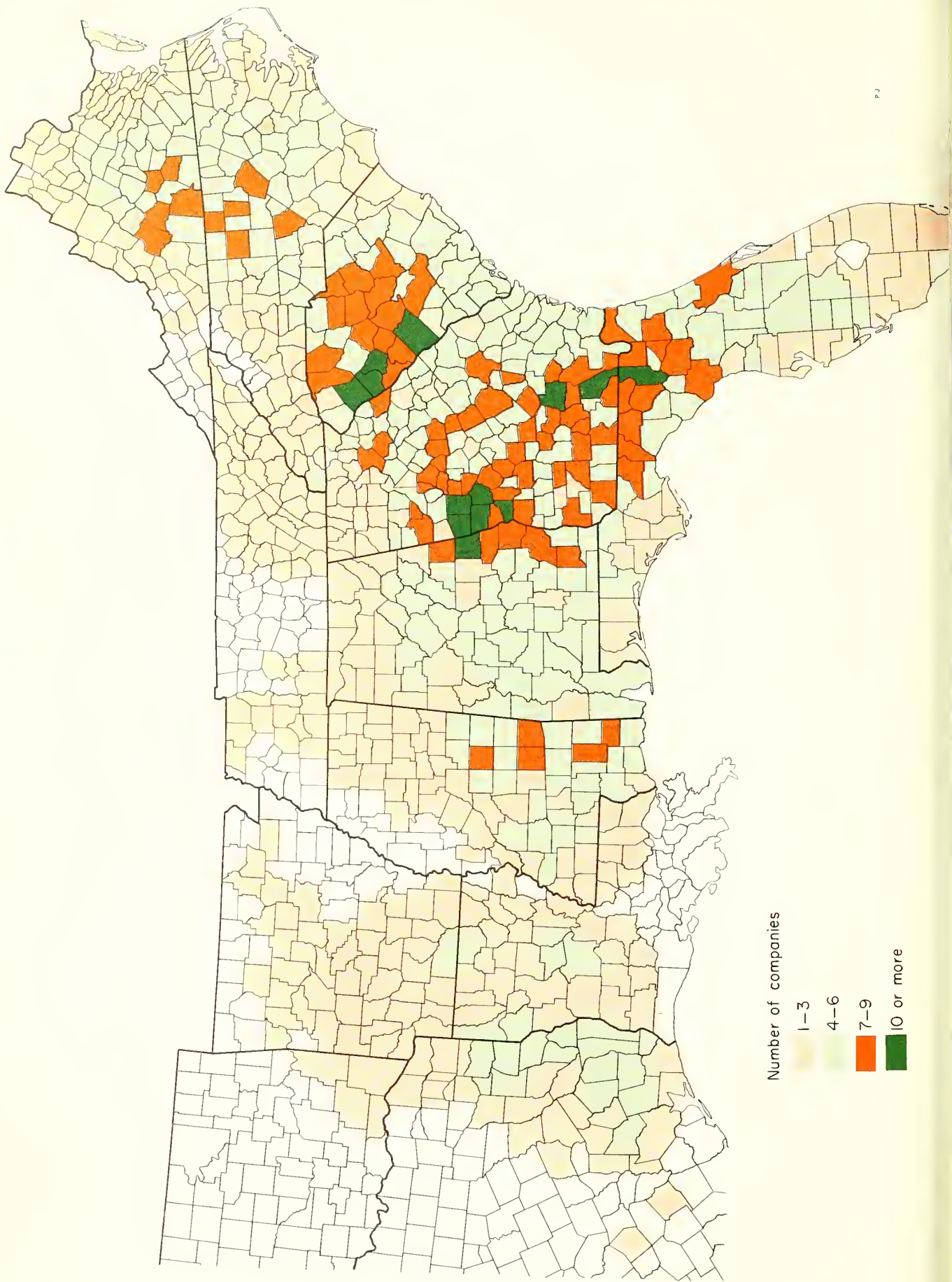


Figure 6. Change in hardwood roundwood production, by county, 1959-1960.



Number of companies

- 1-3
- 4-6
- 7-9
- 10 or more

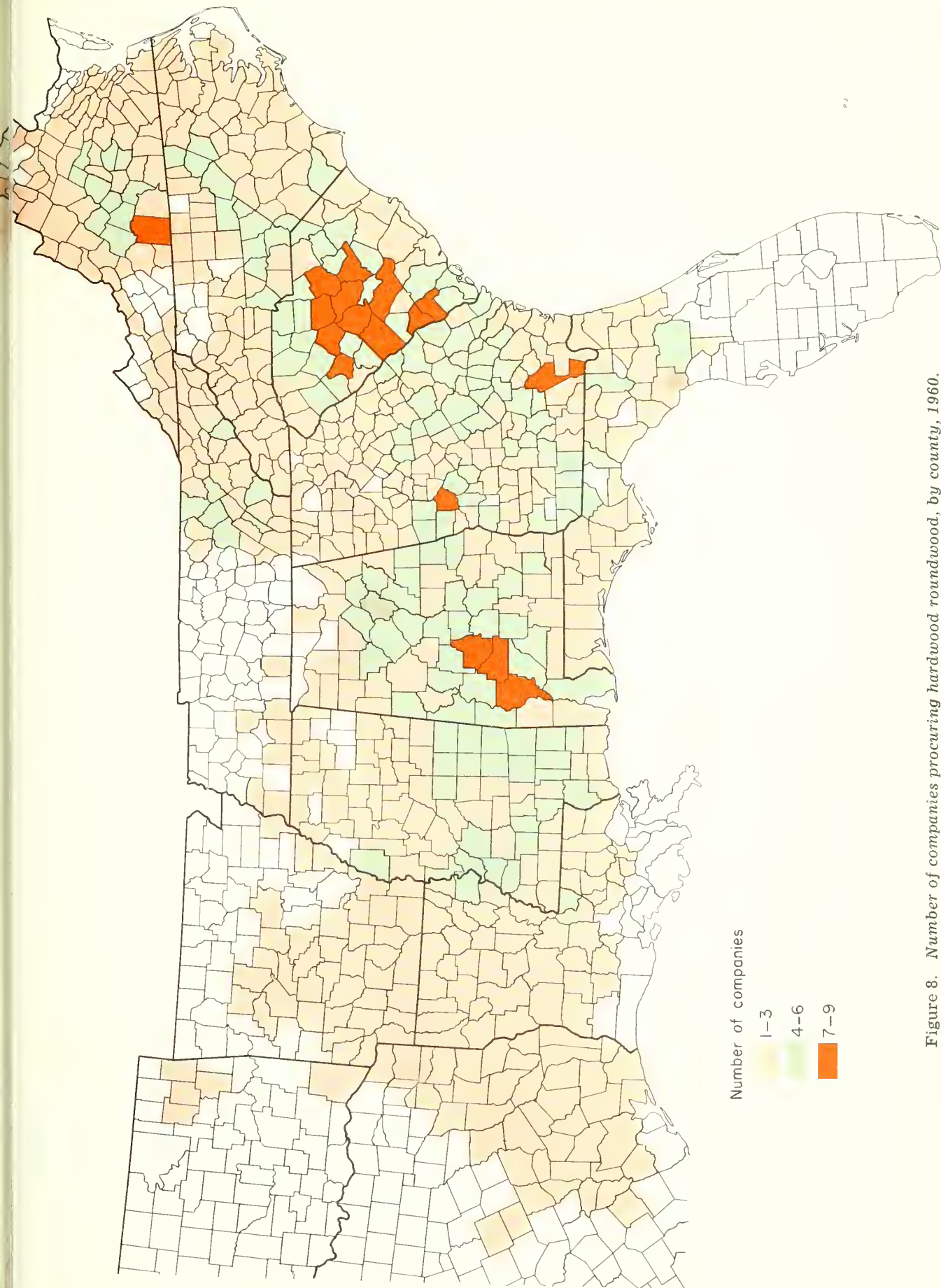


Figure 8. Number of companies procuring hardwood roundwood, by county, 1960.

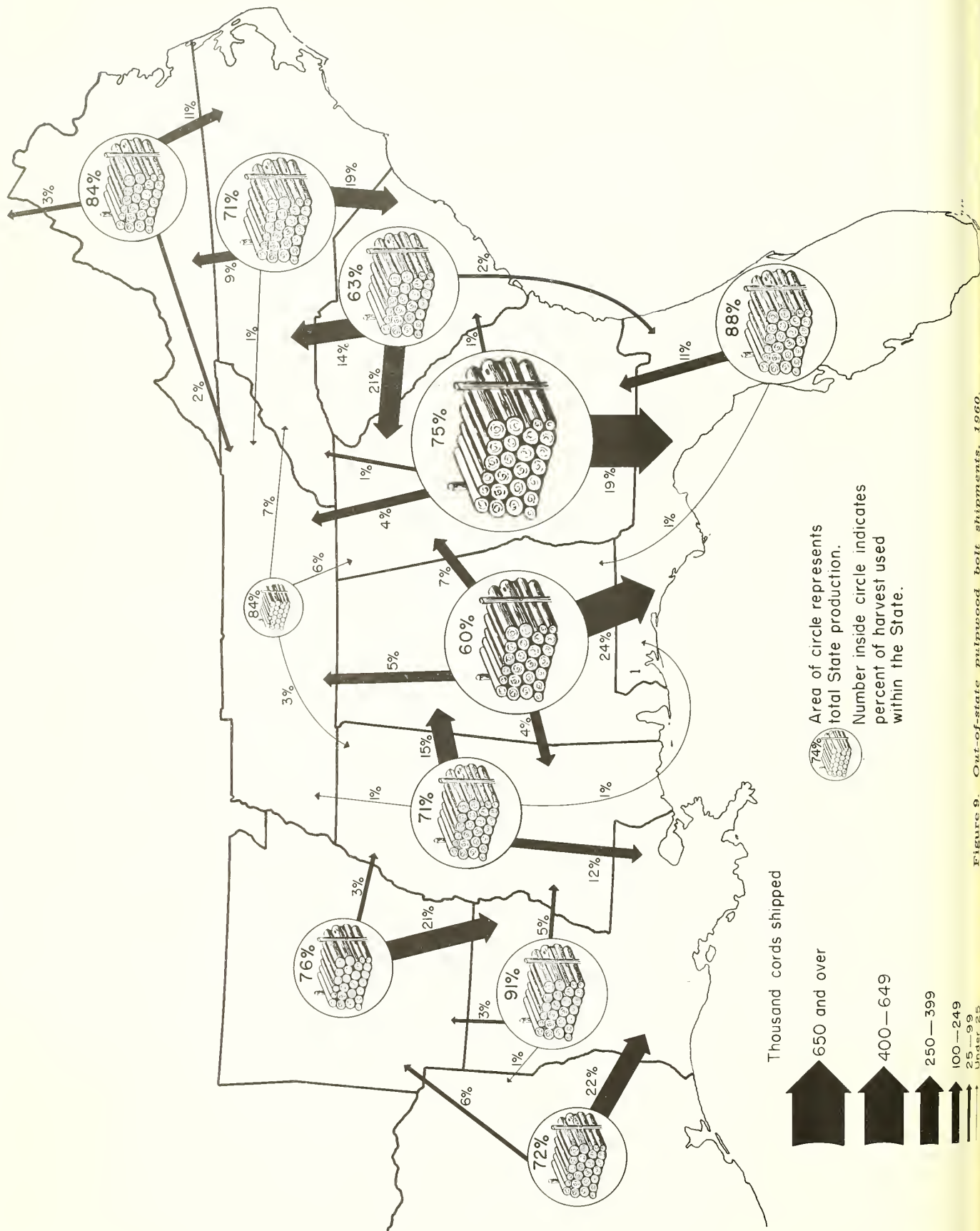


Figure 9. Out-of-state pulpwood bolt shipments, 1960.

DETAILED TABLES

Table 4. Round pulpwood production in the South, by State and species group, 1960 and 1959

State	Change from 1959	1960			1959		
		All species	Pine	Hardwood	All species	Pine	Hardwood
Percent		----- Thousand cords -----					
Alabama	(¹)	2,593.7	2,016.4	577.3	2,582.2	2,150.7	431.5
Arkansas	+ 2	1,216.4	983.2	233.2	1,192.4	1,002.0	190.4
Florida	— 3	1,923.9	1,825.2	98.7	1,979.3	1,882.5	96.8
Georgia	+ 1	4,410.1	4,004.7	405.4	4,354.5	4,009.0	345.5
Louisiana	+ 2	1,645.6	1,290.9	354.7	1,612.1	1,297.4	314.7
Mississippi	— 5	1,774.3	956.0	818.3	1,875.5	1,024.3	851.2
North Carolina	+ 3	1,887.9	1,486.2	401.7	1,834.1	1,429.5	404.6
Oklahoma	+ 1	38.6	30.1	8.5	38.1	29.1	9.0
South Carolina	+11	1,901.8	1,515.0	386.8	1,709.9	1,342.1	367.8
Tennessee	+ 2	353.4	188.8	164.6	346.1	200.8	145.3
Texas	+ 1	1,134.5	916.6	217.9	1,120.0	906.3	213.7
Virginia	+ 4	1,715.3	1,277.8	437.5	1,643.8	1,241.8	402.0
All states	+ 2	20,595.5	16,490.9	4,104.6	20,288.0	16,515.5	3,772.5

¹ Negligible.

Table 5. Wood residues used for pulp manufacture in the South, by State and species group, 1960 and 1959

State	Change from 1959	1960			1959		
		All species	Pine	Hardwood	All species	Pine	Hardwood
<i>Percent</i>		<i>Thousand cords</i>					
Alabama	+22	426.0	354.6	71.4	348.8	294.4	54.4
Arkansas	+ 2	339.5	329.5	10.0	331.9	323.4	8.5
Florida	+32	176.5	164.0	12.5	134.1	123.2	10.9
Georgia	+30	495.7	439.7	56.0	380.6	353.7	26.9
Louisiana	+13	211.3	182.4	28.9	187.5	160.2	27.3
Mississippi	+42	199.3	152.7	46.6	140.3	93.6	46.7
North Carolina	+24	385.7	325.0	(¹) 60.7	311.7	275.5	(²) 36.2
Oklahoma	-13	14.5	14.5	..	16.7	16.7	..
South Carolina	+29	288.6	239.0	49.6	223.4	192.1	31.3
Tennessee	+22	8.4	1.1	7.3	6.9	.7	6.2
Texas	- 1	291.9	276.1	15.8	295.6	279.0	16.6
Virginia	+40	118.1	105.0	13.1	84.6	73.9	10.7
All states	+20	2,955.5	2,583.6	371.9	2,462.1	2,186.4	275.7

¹ Includes 223 cords of hemlock.

² Includes 525 cords of hemlock.

Table 6. Wood residues used for pulp manufacture in the South, by State and type of residue, 1960

State	All types	Chips			Other residues ¹		
		All species	Pine	Hardwood	All species	Pine	Hardwood
----- <i>Thousand cords</i> -----							
Alabama	426.0	418.2	351.9	66.3	7.8	2.7	5.1
Arkansas	339.5	336.8	328.0	8.8	2.7	1.5	1.2
Florida	176.5	173.5	163.7	9.8	3.0	.3	2.7
Georgia	495.7	477.7	437.4	40.3	18.0	2.3	15.7
Louisiana	211.3	209.3	182.2	27.1	2.0	.2	1.8
Mississippi	199.3	191.4	152.2	39.2	7.9	.5	7.4
North Carolina	385.7	364.6	324.5	40.1	21.1	.5	(²) 20.6
Oklahoma	14.5	14.5	14.5	.	..	.	.
South Carolina	288.6	279.3	238.6	40.7	9.3	.4	8.9
Tennessee	8.4	7.8	1.1	6.7	.6	(³)	.6
Texas	291.9	288.7	275.9	12.8	3.2	.2	3.0
Virginia	118.1	115.5	105.0	10.5	2.6	..	2.6
All states	2,955.5	2,877.3	2,575.0	302.3	78.2	8.6	69.6

¹ Veneer cores, pole and piling trim, cull crosssties, secondary residues.

² Includes 223 cords of hemlock.

³ Negligible.

Table 7. Southern pulpwood production by State and survey region, 1960

Round pulpwood and residues	Survey region ¹	All species	Pine	Hardwood	Round pulpwood and residues	Survey region ¹	All species	Pine	Hardwood
Number		Standard cords			Number		Standard cords		
SOUTH					SOUTHERN STATION				
					ALABAMA				
Roundwood		20,595,515	16,490,979	4,104,536	Roundwood	1	473,153	356,608	116,545
Wood residues		2,955,521	2,583,663	371,858		2	611,527	381,347	230,180
All pulpwood		23,551,036	19,074,642	4,476,394		3	738,180	608,645	129,535
						4	255,115	201,731	53,384
						5	477,432	430,730	46,702
						6	38,257	37,299	958
					Total		2,593,664	2,016,360	577,304
					Wood residues		426,034	354,620	71,414
					All pulpwood		3,019,698	2,370,980	648,718
SOUTHEASTERN STATION					ARKANSAS				
					Roundwood	1	53,901	18,998	34,903
Roundwood	1	1,230,490	1,160,178	70,312		2	2,344	64	2,280
	2	523,554	495,328	28,226		3	987,181	808,180	179,001
	3	121,092	120,954	138		4	134,398	121,276	13,122
	4	48,756	48,756			5	38,536	34,740	3,796
Total		1,923,892	1,825,216	98,676	Total		1,216,360	983,258	233,102
Wood residues		176,534	164,006	12,528	Wood residues		339,561	329,494	10,067
All pulpwood		2,100,426	1,989,222	111,204	All pulpwood		1,555,921	1,312,752	243,169
					LOUISIANA				
					Roundwood	1	109,378	34,759	74,619
						2	20,386	6,729	13,657
Roundwood	1	1,860,776	1,608,941	251,835		3	371,785	323,826	47,959
	2	487,642	457,396	30,246		4	316,363	251,737	64,626
	3	1,236,181	1,159,894	76,287		5	827,687	673,912	153,775
	4	621,962	597,429	24,533	Total		1,645,599	1,290,963	354,636
	5	203,567	181,047	22,520	Wood residues		211,342	182,394	28,948
Total		4,410,128	4,004,707	405,421	All pulpwood		1,856,941	1,473,357	383,584
Wood residues		495,710	439,728	55,982	MISSISSIPPI				
All pulpwood		4,905,838	4,444,435	461,403	Roundwood	1	90,947	7,413	83,534
						2	108,844	39,751	69,093
GEORGIA						3	555,582	331,466	224,116
Roundwood	1	1,860,776	1,608,941	251,835		4	613,447	387,567	225,880
	2	487,642	457,396	30,246		5	405,533	189,869	215,664
	3	1,236,181	1,159,894	76,287	Total		1,774,353	956,066	818,287
	4	621,962	597,429	24,533	Wood residues		199,268	152,681	46,587
	5	203,567	181,047	22,520	All pulpwood		1,973,621	1,108,747	864,874
Total		4,410,128	4,004,707	405,421	OKLAHOMA ²				
Wood residues		495,710	439,728	55,982	Roundwood		38,593	30,097	8,496
All pulpwood		4,905,838	4,444,435	461,403	Wood residues		14,462	14,462	
NORTH CAROLINA					All pulpwood		53,055	44,559	8,496
Roundwood	1	609,614	517,577	92,037	TENNESSEE				
	2	467,386	388,912	78,474	Roundwood	1	18,939	8,088	10,851
	3	505,023	427,422	77,601		2	2,120	2,105	15
	4	305,793	152,282	153,511		3			
Total		1,887,816	1,486,193	401,623		4	74,951	38,730	36,221
Wood residues		385,748	324,995	60,753		5	257,412	139,831	117,581
All pulpwood		2,273,564	1,811,188	462,376	Total		353,422	188,754	164,668
SOUTH CAROLINA					Wood residues		8,356	1,133	7,223
Roundwood	1	491,731	404,712	87,019	All pulpwood		361,778	189,887	171,891
	2	619,939	417,434	202,505	TEXAS				
	3	790,187	692,892	97,295	Roundwood	1	701,575	528,353	173,222
Total		1,901,857	1,515,038	386,819		2	411,375	371,819	39,556
Wood residues		288,582	238,981	49,601		3	21,567	16,375	5,192
All pulpwood		2,190,439	1,754,019	436,420	Total		1,134,517	916,547	217,970
VIRGINIA					Wood residues		291,860	276,111	15,749
Roundwood	1	596,638	507,951	88,687	All pulpwood		1,426,377	1,192,658	233,719
	2	530,615	446,196	84,419					
	3	290,887	225,339	65,548					
	4	245,459	81,361	164,098					
	5	51,715	16,933	34,782					
Total		1,715,314	1,277,780	437,534					
Wood residues		118,064	105,058	13,006					
All pulpwood		1,833,378	1,382,838	450,540					

¹For location of survey region, see figure 10.²All units.

Table 8. Southern pulpwood production by Experiment Station territory, 1960

Station and source of wood	All species	Pine	Hardwood
--- Standard cords ---			
Southeastern			
Roundwood	11,839,007	10,108,934	1,730,073
Residues	1,464,638	1,272,768	191,870
Total	13,303,645	11,381,702	1,921,943
Southern			
Roundwood	8,756,508	6,382,045	2,374,463
Residues	1,490,883	1,310,895	179,988
Total	10,247,391	7,692,940	2,554,451
All pulpwood	23,551,036	19,074,642	4,476,394

Table 9. Round pulpwood production in Alabama, 1960

County	All species	Pine	Hardwood	County	All species	Pine	Hardwood
--- Standard cords ---				--- Standard cords ---			
Autauga	10,048	8,723	1,325	Houston	19,376	15,949	3,427
Baldwin	154,694	112,041	42,653	Jackson	5,836	5,836	
Barbour	36,133	30,824	5,309	Jefferson	43,299	41,167	2,132
Bibb	32,535	25,405	7,130	Lamar	13,138	12,361	777
Blount	15,689	15,274	415	Lauderdale	16	16	
Bullock	31,356	27,886	3,470	Lawrence	793	781	12
Butler	55,836	39,425	16,411	Lee	45,771	39,510	6,261
Calhoun	25,214	22,263	2,951	Limestone	1,436	1,436	
Chambers	36,060	33,677	2,383	Lowndes	52,818	39,456	13,362
Cherokee	21,768	18,001	3,767	Macon	24,817	24,025	792
Chilton	26,243	22,884	3,359	Madison	1,617	1,583	34
Choctaw	111,156	50,080	61,076	Marengo	88,737	54,698	34,039
Clarke	100,115	61,851	38,264	Marion	6,569	6,331	238
Clay	35,841	30,235	5,606	Marshall	7,243	7,161	82
Cleburne	27,497	25,667	1,830	Mobile	120,163	88,070	32,093
Coffee	31,621	27,096	4,525	Monroe	100,387	76,134	24,253
Colbert	1,003	999	4	Montgomery	35,440	26,206	9,234
Conecuh	75,738	60,039	15,699	Morgan	3,236	3,236	
Coosa	67,709	59,387	8,322	Perry	30,305	20,261	10,044
Covington	42,413	37,967	4,446	Pickens	42,974	31,366	11,608
Crenshaw	24,243	17,687	6,556	Pike	44,101	24,827	19,274
Cullman	14,426	14,407	19	Randolph	49,065	47,113	1,952
Dale	32,543	30,307	2,236	Russell	39,905	36,455	3,450
Dallas	31,490	22,446	9,044	St. Clair	31,760	28,090	3,670
De Kalb	13,648	12,829	819	Shelby	45,353	39,325	6,028
Elmore	29,020	27,460	1,560	Sumter	44,243	27,164	17,079
Escambia	62,245	48,403	13,842	Talladega	35,703	30,378	5,325
Etowah	28,617	26,659	1,958	Tallapoosa	66,748	58,039	8,709
Fayette	23,521	22,885	636	Tuscaloosa	53,649	44,058	9,591
Franklin	3,429	3,422	7	Walker	27,937	25,409	2,528
Geneva	14,757	13,487	1,270	Washington	93,638	70,127	23,511
Greene	29,084	21,985	7,099	Wilcox	91,151	51,381	39,770
Hale	23,340	17,079	6,261	Winston	7,554	7,355	199
Henry	49,854	42,276	7,578	All counties	2,593,664	2,016,360	577,304

Table 10. Round pulpwood production in Arkansas, 1960

County	All species	Pine	Hardwood	County	All species	Pine	Hardwood
--- Standard cords ---				--- Standard cords ---			
Arkansas	...	...	...	Lincoln	9,567	6,896	2,671
Ashley	94,042	61,517	32,525	Little River	13,449	13,149	300
Baxter	...	...	...	Logan	7,738	7,670	68
Benton	...	...	...	Lonoke	...	...	...
Boone	...	...	...	Madison	...	...	...
Bradley	56,742	49,065	7,677	Marion	...	...	...
Calhoun	53,273	50,345	2,928	Miller	27,582	24,900	2,682
Carroll	...	...	...	Mississippi	...	...	...
Chicot	10,669	130	10,539	Monroe	...	...	...
Clark	56,201	42,601	13,600	Montgomery	28,883	25,283	3,600
Clay	...	...	...	Nevada	21,394	19,650	1,744
Cleburne	3,650	3,650	...	Newton	4	4	...
Cleveland	33,246	28,237	5,009	Ouachita	63,604	53,709	9,895
Columbia	65,936	58,881	7,055	Perry	19,694	19,538	156
Conway	5,582	4,716	866	Phillips	1,954	...	1,954
Craighead	19	19	...	Pike	24,250	19,244	5,006
Crawford	2,211	2,211	...	Poinsett	...	...	...
Crittenden	2,280	...	2,280	Polk	8,336	8,336	...
Cross	...	...	...	Pope	12,440	11,592	848
Dallas	63,373	52,149	11,224	Prairie	...	...	...
Desha	11,265	...	11,265	Pulaski	3,844	3,758	86
Drew	60,291	32,754	27,537	Randolph	...	...	...
Faulkner	559	267	292	St. Francis	...	...	...
Franklin	536	536	...	Saline	29,000	21,835	7,165
Fulton	...	...	...	Scott	696	696	...
Garland	20,086	18,616	1,470	Searcy	...	...	...
Grant	97,095	82,654	14,441	Sebastian	...	...	...
Greene	...	...	...	Sevier	17,305	15,909	1,396
Hempstead	31,175	22,134	9,041	Sharp	58	58	...
Hot Spring	43,979	34,180	9,799	Stone	276	276	...
Howard	20,371	16,654	3,717	Union	106,229	100,651	5,578
Independence	2,056	2,056	...	Van Buren	198	198	...
Izard	...	...	...	Washington	...	...	...
Jackson	...	...	...	White	3,662	1,903	1,759
Jefferson	16,044	11,972	4,072	Woodruff	...	...	...
Johnson	7,304	7,273	31	Yell	16,121	15,544	577
Lafayette	37,644	29,797	7,847	All counties	1,216,360	983,258	233,102
Lawrence	45	45	...				
Lee	4,402	...	4,402				

Table 11. Round pulpwood production in Florida, 1960

County	All species	Pine	Hardwood	County	All species	Pine	Hardwood
--- Standard cords ---				--- Standard cords ---			
Alachua	47,658	47,585	73	Lake	12,141	12,141	
Baker	93,851	93,719	132	Lee	6,379	6,379	
Bay	36,780	36,546	234	Leon	27,746	27,746	
Bradford	44,506	44,326	180	Levy	35,674	31,604	4,070
Brevard	6,997	6,997		Liberty	20,243	19,317	926
Broward	27	27		Madison	46,648	46,212	436
Calhoun	27,601	24,106	3,495	Manatee	2,472	2,472	
Charlotte	10,461	10,461		Marion	69,299	57,773	11,526
Citrus	4,880	4,880		Martin	850	850	
Clay	59,279	58,606	673	Monroe			
Collier	8,931	8,931		Nassau	101,948	87,914	14,034
Columbia	78,171	71,561	6,610	Okaloosa	15,056	14,781	275
Dade	12,401	12,401		Okeechobee	985	985	
De Soto	6,426	6,426		Orange	1,032	1,032	
Dixie	35,988	32,988	3,000	Osceola	17,287	17,287	
Duval	53,065	47,463	5,602	Palm Beach	2,722	2,722	
Escambia	61,857	59,836	2,021	Pasco	4,772	4,772	
Flagler	66,623	65,940	683	Pinellas	477	477	
Franklin	22,640	22,634	6	Polk	24,872	24,872	
Gadsden	28,898	26,063	2,835	Putnam	115,609	105,060	10,549
Gilchrist	11,079	7,055	4,024	St. Johns	71,819	69,528	2,291
Glades	427	427		St. Lucie	1,101	1,101	
Gulf	17,720	16,804	916	Santa Rosa	64,148	63,095	1,053
Hamilton	102,931	99,663	3,268	Sarasota	753	753	
Hardee	4,916	4,916		Seminole	9,335	9,335	
Hendry	6,558	6,558		Sumter	3,479	3,341	138
Hernando	8,753	8,753		Suwannee	30,084	27,050	3,034
Highlands	2,411	2,411		Taylor	86,816	86,689	127
Hillsborough	8,003	8,003		Union	13,052	13,052	
Holmes	30,587	27,904	2,683	Volusia	48,983	48,983	
Indian River				Wakulla	24,547	24,227	320
Jackson	41,597	33,029	8,568	Walton	49,609	47,176	2,433
Jefferson	23,055	22,784	271	Washington	31,476	29,280	2,190
Lafayette	17,407	17,407		All counties	1,923,892	1,825,216	98,676

Table 12. Round pulpwood production in Georgia, 1960

County	All species	Pine	Hardwood	County	All species	Pine	Hardwood
--- Standard cords ---				--- Standard cords ---			
Appling	96,698	92,045	4,653	Hall	19,569	19,383	186
Atkinson	67,083	64,062	3,021	Hancock	49,560	48,359	1,201
Bacon	53,615	51,561	2,054	Haralson	15,650	14,996	654
Baker	4,498	4,354	144	Harris	58,324	56,367	1,957
Baldwin	30,014	26,607	3,407	Hart	5,556	5,405	151
Banks	2,478	2,474	4	Heard	13,379	13,045	334
Barrow	9,997	9,880	117	Henry	26,500	26,057	443
Bartow	18,061	16,194	1,867	Houston	30,097	26,421	3,676
Ben Hill	23,831	22,517	1,314	Irwin	16,660	16,140	520
Berrien	59,255	53,714	5,541	Jackson	16,524	14,725	1,799
Bibb	9,654	7,047	2,607	Jasper	63,344	59,262	4,082
Bleckley	5,234	3,855	1,379	Jeff Davis	50,860	48,233	2,627
Brantley	87,705	82,156	5,549	Jefferson	19,772	16,787	2,985
Brooks	18,923	18,202	721	Jenkins	16,172	11,005	5,167
Bryan	64,678	52,019	12,659	Johnson	4,383	3,940	443
Bulloch	43,144	33,163	9,981	Jones	53,965	48,220	5,745
Burke	17,921	14,913	3,008	Lamar	18,643	17,464	1,179
Butts	25,724	25,588	136	Lanier	30,407	28,953	1,454
Calhoun	8,584	8,229	355	Laurens	38,223	29,728	8,495
Camden	126,694	105,862	20,832	Lee	5,135	5,115	20
Candler	11,588	10,676	912	Liberty	83,077	43,063	40,014
Carroll	47,501	46,760	741	Lincoln	10,020	9,602	418
Catoosa	2,174	1,673	501	Long	52,988	44,973	8,015
Charlton	82,374	79,106	3,268	Lowndes	34,627	33,662	965
Chatham	18,916	12,034	6,882	Lumpkin	5,671	5,632	39
Chattahoochee	27,174	26,942	232	Mc Duffie	34,509	33,115	1,394
Chattooga	8,903	8,175	728	Mc Intosh	36,052	27,574	8,478
Cherokee	14,878	13,898	980	Macon	21,850	20,949	901
Clarke	5,584	5,547	37	Madison	10,757	10,693	64
Clay	11,081	10,071	1,010	Marion	19,091	18,883	208
Clayton	9,447	9,387	60	Meriwether	38,693	37,944	749
Clinch	86,157	84,984	1,173	Miller	12,566	12,566	
Cobb				Mitchell	18,264	17,304	960
Coffee	62,260	57,712	4,548	Monroe	66,794	61,397	5,397
Colquitt	34,250	32,266	1,984	Montgomery	15,412	12,555	2,857
Columbia	33,281	31,183	2,098	Morgan	27,385	27,162	223
Cook	17,295	17,271	24	Murray	6,305	5,533	772
Coweta	26,433	25,792	641	Muscogee	14,952	14,333	619
Crawford	27,984	24,973	3,011	Newton	35,571	34,308	1,263
Crisp	10,629	9,579	1,050	Oconee	26,483	25,644	839
Dade	721	721		Oglethorpe	15,261	14,348	913
Dawson	3,273	3,231	42	Paulding	24,389	23,950	439
Decatur	39,289	37,543	1,746	Peach	13,383	12,330	1,053
De Kalb	2,661	2,661		Pickens	18,117	17,465	652
Dodge	51,158	46,599	4,559	Pierce	81,457	80,374	1,083
Dooly	14,443	13,629	814	Pike	15,546	15,406	140
Dougherty	21,422	21,351	71	Polk	16,487	15,465	1,022
Douglas	29,977	29,069	908	Pulaski	5,339	5,065	274
Early	13,284	11,066	2,218	Putnam	48,448	45,579	2,869
Echols	20,151	20,101	50	Quitman	4,885	4,364	521
Effingham	45,328	37,536	7,792	Rabun	10,513	2,483	8,030
Elbert	28,156	21,345	6,811	Randolph	19,682	17,815	1,867
Emanuel	42,045	36,959	5,086	Richmond	9,227	8,645	582
Evans	15,193	12,880	2,313	Rockdale	3,862	3,862	
Fannin	8,700	7,098	1,602	Schley	13,466	12,766	700
Fayette	31,669	31,507	162	Screven	27,867	17,522	10,345
Floyd	36,137	32,760	3,377	Seminole	19,509	18,444	1,065
Forsyth	4,543	4,380	163	Spalding	19,307	19,059	248
Franklin	10,936	10,337	599	Stephens	6,245	5,427	818
Fulton	8,728	8,129	599	Stewart	48,938	47,705	1,233
Gilmer	11,328	11,328		Sumter	25,668	25,250	418
Glascokk	3,439	3,215	224	Talbot	49,320	47,405	1,915
Glynn	53,042	37,286	15,756	Taliaferro	11,906	10,806	1,100
Gordon	18,164	16,758	1,406	Tattall	33,382	27,768	5,614
Grady	31,623	28,729	2,894	Taylor	19,272	18,310	962
Greene	49,273	45,115	4,158				
Gwinnett	28,343	27,717	626				
Habersham	10,954	10,796	158				

Table 12. Round pulpwood production in Georgia, 1960 (Continued)

County	All species	Pine	Hardwood	County	All species	Pine	Hardwood
--- Standard cords ---				--- Standard cords ---			
Telfair	41,889	30,462	11,427	Walton	23,386	23,186	200
Terrell	4,915	4,807	108	Ware	130,074	126,246	3,828
Thomas	20,436	18,898	1,538	Warren	12,928	11,820	1,108
Tift	13,592	11,851	1,741	Washington	37,440	34,532	2,908
Toombs	36,766	26,499	10,267	Wayne	122,569	114,478	8,091
Towns				Webster	16,283	16,283	
Treutlen	15,436	11,833	3,603	Wheeler	46,340	35,947	10,393
Troup	48,099	44,450	3,649	White	1,674	1,666	8
Turner	16,219	14,422	1,797	Whitfield	9,076	7,907	1,169
Twiggs	26,478	24,564	1,914	Wilcox	23,944	22,345	1,599
				Wilkes	33,444	31,569	1,875
Union	2,715	2,672	43	Wilkinson	35,294	32,808	2,486
Upson	36,129	35,464	665	Worth	14,098	13,941	157
Walker	9,958	9,630	328	All counties	4,410,128	4,004,707	405,421

Table 13. Round pulpwood production in Louisiana, 1960

Parish	All species	Pine	Hardwood	Parish	All species	Pine	Hardwood
--- Standard cords ---				--- Standard cords ---			
Acadia	4,370	4,264	106	Madison	6,799	127	6,672
Allen	29,216	27,909	1,307	Morehouse	46,186	24,081	22,105
Ascension	254		254	Natchitoches	74,308	60,449	13,859
Assumption				Orleans	31	31	
Avoyelles	1,889	1,546	343	Ouachita	32,557	23,752	8,805
Beauregard	18,123	15,603	2,520	Plaquemines			
Bienville	91,784	79,652	12,132	Pointe Coupee	2,659		2,659
Bossier	53,947	44,909	9,038	Rapides	49,874	39,674	10,200
Caddo	37,439	11,061	26,378	Red River	21,375	14,809	6,566
Calcasieu	9,837	9,837		Richland	795	227	568
Caldwell	27,862	24,939	2,923	Sabine	59,891	53,095	6,796
Cameron				St. Bernard			
Catahoula	15,750	8,489	7,261	St. Charles			
Claiborne	77,473	72,932	4,541	St. Helena	18,721	12,092	6,629
Concordia	18,014	3	18,011	St. James	473		473
De Soto	59,316	48,839	10,477	St. John the Baptist	579		579
East Baton Rouge	5,043	220	4,823	St. Landry	424	191	233
East Carroll	3,257		3,257	St. Martin			
East Feliciana	25,707	16,590	9,117	St. Mary			
Evangeline	7,932	7,699	233	St. Tammany	43,509	33,931	9,578
Franklin	3,849	1,626	2,223	Tangipahoa	58,417	49,279	9,138
Grant	35,470	28,547	6,923	Tensas	13,937		13,937
Iberia				Terrebonne			
Iberville	617		617	Union	146,295	113,566	32,729
Jackson	77,867	64,142	13,725	Vermilion	41,295	39,228	2,067
Jefferson				Vernon	81,988	75,589	6,399
Jefferson Davis	3,396	2,830	566	Washington	45,306	34,510	10,796
Lafayette	10		10	Webster	3,173		3,173
Lafourche				West Baton Rouge	791	206	585
La Salle	42,443	38,955	3,488	West Carroll	5,907	697	5,210
Lincoln	49,411	45,345	4,066	West Feliciana	107,055	95,456	11,599
Livingston	82,978	64,036	18,942	Winn			
				All parishes	1,645,599	1,290,963	354,636

Table 14. Round pulpwood production in Mississippi, 1960

County	All species	Pine	Hardwood	County	All species	Pine	Hardwood
--- Standard cords ---				--- Standard cords ---			
Adams	31,457	5,068	26,389	Lincoln	50,583	32,715	17,868
Alcorn	2,048	2,032	16	Lowndes	5,581	3,538	2,043
Amite	37,695	19,109	18,586	Madison	16,572	6,884	9,688
Attala	23,134	9,893	13,241	Marion	55,141	21,608	33,533
Benton	95	35	60	Marshall	6,350	2,114	4,236
Bolivar	7,592		7,592	Monroe	1,399	1,259	140
Calhoun	2,443	169	2,274	Montgomery	5,697	1,728	3,969
Carroll	13,026	2,458	10,568	Neshoba	25,663	14,186	11,477
Chickasaw	465	281	184	Newton	39,058	28,878	10,180
Choctaw	12,123	5,021	7,102	Noxubee	11,659	10,609	1,050
Claiborne	36,926	8,770	28,156	Oktibbeha	4,223	1,177	3,046
Clarke	89,541	46,378	43,163	Panola	10,306		10,306
Clay	1,821	213	1,608	Pearl River	33,868	17,350	16,518
Coahoma				Perry	32,757	25,701	7,056
Copiah	56,178	27,323	28,855	Pike	29,545	15,282	14,263
Covington	32,133	19,999	12,134	Pontotoc	2,306	2,306	
De Soto	53		53	Prentiss	2,402	2,402	
Forrest	24,829	16,174	8,655	Quitman	293		293
Franklin	47,535	31,643	15,892	Rankin	46,055	28,636	17,419
George	32,034	19,025	13,009	Scott	32,077	20,090	11,987
Greene	52,182	33,693	18,489	Sharkey	1,516	16	1,500
Grenada	4,665	364	4,301	Simpson	43,121	24,196	18,925
Hancock	40,239	34,792	5,447	Smith	33,661	21,076	12,585
Harrison	32,168	28,127	4,041	Stone	25,520	19,586	5,934
Hinds	37,016	12,567	24,449	Sunflower	137		137
Holmes	21,829	6,120	15,709	Tallahatchie	4,233	196	4,037
Humphreys	2,729		2,729	Tate			
Issaquena	13,179		13,179	Tippah	306	278	28
Itawamba	833	833		Tishomingo	6,310	6,253	57
Jackson	68,132	57,399	10,733	Tunica	1,980		1,980
Jasper	67,868	40,804	27,064	Union	3,506	1,867	1,639
Jefferson	37,929	20,164	17,765	Walthall	13,079	6,254	6,825
Jefferson Davis	9,556	5,740	3,816	Warren	26,639	997	25,642
Jones	58,893	23,929	34,964	Washington	5,422		5,422
Kemper	41,842	28,943	12,899	Wayne	37,540	19,808	17,732
Lafayette	5,903	396	5,507	Webster	11,237	3,721	7,516
Lamar	27,255	19,142	8,113	Wilkinson	24,097	10,344	13,753
Lauderdale	44,258	28,477	15,781	Winston	18,654	9,010	9,644
Lawrence	38,121	19,240	18,881	Yalobusha	5,705	1,265	4,440
Leake	38,991	20,290	18,701	Yazoo	4,706	84	4,622
Lee	41	41		All counties	1,774,353	956,066	818,287
Leflore	692		692				

Table 15. Round pulpwood production in North Carolina, 1960

County	All species	Pine	Hardwood	County	All species	Pine	Hardwood
--- Standard cords ---				--- Standard cords ---			
Alamance	3,407	3,071	336	Lee	8,759	7,257	1,502
Alexander	4,070	4,031	39	Lenoir	12,632	12,026	606
Alleghany	17		17	Lincoln	2,466	2,176	290
Anson	40,578	30,178	10,400	Mc Dowell	15,789	12,441	3,348
Ashe				Macon	14,029	3,389	10,640
Avery	1,448		1,448	Madison	9,350	5,388	3,962
Beaufort	63,026	56,773	6,253	Martin	23,622	22,729	893
Bertie	18,654	12,786	5,868	Mecklenburg	28,609	22,892	5,717
Bladen	47,834	39,896	7,938	Mitchell	1,359		1,359
Brunswick	64,169	55,018	9,151	Montgomery	6,639	6,237	402
Buncombe	55,248	20,781	34,467	Moore	25,397	23,847	1,550
Burke	18,635	16,317	2,318	Nash	16,958	13,771	3,187
Cabarrus	5,746	5,286	460	New Hanover	4,189	3,848	341
Caldwell	17,597	14,691	2,906	Northampton	17,813	16,289	1,524
Camden	4,184	3,384	800	Onslow	66,791	60,846	5,945
Carteret	32,476	32,063	413	Orange	10,359	9,768	591
Caswell	3,030	2,953	77	Pamlico	10,396	8,994	1,402
Catawba	2,683	1,931	752	Pasquotank	1,435	1,183	252
Chatham	38,877	28,676	10,201	Pender	57,116	47,827	9,289
Cherokee	54,239	44,837	9,402	Perquimans	3,570		3,570
Chowan	6,691	3,576	3,115	Person	13,422	13,422	
Clay	7	4	3	Pitt	52,727	52,312	415
Cleveland	11,068	10,862	206	Polk	13,448	5,863	7,585
Columbus	77,054	56,833	20,221	Randolph	10,764	10,395	369
Craven	25,973	22,087	3,886	Richmond	26,868	19,155	7,713
Cumberland	22,239	16,622	5,617	Robeson	20,597	14,690	5,907
Currituck	3,400	3,000	400	Rockingham	16,299	15,903	396
Dare				Rowan	5,494	5,274	220
Davidson	3,574	3,574		Rutherford	17,603	12,714	4,889
Davie	4,089	3,625	464	Sampson	42,929	39,293	3,636
Duplin	24,836	22,491	2,345	Scotland	14,814	11,105	3,709
Durham	15,711	15,625	86	Stanly	13,149	12,274	875
Edgecombe	8,986	8,775	211	Stokes	3,349	3,329	20
Forsyth	7,175	7,091	84	Surry	15,577	15,577	
Franklin	28,810	24,365	4,445	Swain	7,383	4,750	2,633
Gaston	8,849	8,018	831	Transylvania	17,226	4,295	12,931
Gates	35,363	19,500	15,863	Tyrrell	22,466	17,764	4,702
Graham	4,843	1,659	3,184	Union	18,579	14,296	4,283
Granville	16,224	14,520	1,704	Vance	14,221	13,767	454
Greene	1,495	1,431	64	Wake	42,361	38,894	3,467
Guilford	11,933	11,590	343	Warren	24,964	23,920	1,044
Halifax	40,046	39,664	382	Washington	14,660	10,089	4,571
Harnett	20,196	18,896	1,300	Watauga	37		37
Haywood	13,919	3,007	10,912	Wayne	11,204	11,131	73
Henderson	25,908	6,946	18,962	Wilkes	5,858	5,858	
Hertford	29,020	16,964	12,056	Wilson	13,058	11,112	1,946
Hoke	7,961	7,470	491	Yadkin	1,780	1,780	
Hyde	22,862	16,097	6,765	Yancey	358		358
Iredell	40,116	23,545	16,571	All counties	1,887,816	1,486,193	401,623
Jackson	42,543	7,919	34,624				
Johnston	13,512	11,640	1,872				
Jones	39,022	36,255	2,767				

Table 16. Round pulpwood production in Oklahoma, 1960

County ¹	All species	Pine	Hardwood
--- Standard cords ---			
Cherokee	3,036		3,036
Choctaw	1,551	1,551	
Delaware	2,385		2,385
Le Flore	5,971	5,971	
Mc Curtain	19,119	19,030	89
Mayes	1,493		1,493
Pushmataha	3,545	3,545	
Rogers	1,493		1,493
All counties	38,593	30,097	8,496

¹ Counties with no pulpwood production are omitted.

Table 17. Round pulpwood production in South Carolina, 1960

County	All species	Pine	Hardwood	County	All species	Pine	Hardwood
--- Standard cords ---				--- Standard cords ---			
Abbeville	45,088	43,250	1,838	Jasper	60,514	48,846	11,668
Aiken	43,063	36,062	7,001	Kershaw	79,709	59,349	20,360
Allendale	26,721	19,892	6,829	Lancaster	64,579	50,618	13,961
Anderson	29,722	27,804	1,918	Laurens	48,051	40,457	7,594
Bamberg	17,419	10,394	7,025	Lee	24,013	8,922	15,091
Barnwell	16,042	11,630	4,412	Lexington	29,967	24,705	5,262
Beaufort	25,981	16,923	9,058	Mc Cormick	22,645	21,576	1,069
Berkeley	70,601	62,721	7,880	Marion	16,084	9,236	6,848
Calhoun	12,525	9,769	2,756	Marlboro	9,110	3,193	5,917
Charleston	49,377	44,119	5,258	Newberry	85,172	76,535	8,637
Cherokee	19,045	17,806	1,239	Oconee	24,340	19,193	5,147
Chester	67,740	57,113	10,627	Orangeburg	40,062	29,369	10,693
Chesterfield	43,828	21,618	22,210	Pickens	7,422	6,643	779
Clarendon	22,552	15,355	7,197	Richland	50,990	38,731	12,259
Colleton	126,720	118,275	8,445	Saluda	23,191	21,765	1,426
Darlington	32,896	12,408	20,488	Spartanburg	38,095	32,838	5,257
Dillon	10,894	6,784	4,110	Sumter	26,847	16,737	10,110
Dorchester	45,830	41,093	4,737	Union	40,981	38,426	2,555
Edgefield	52,574	44,420	8,154	Williamsburg	54,323	33,592	20,731
Fairfield	112,419	97,532	14,887	York	41,365	33,356	8,009
Florence	37,040	23,379	13,661	All counties	1,901,857	1,515,038	386,819
Georgetown	61,059	39,082	21,977				
Greenville	23,073	22,739	334				
Greenwood	44,685	40,821	3,864				
Hampton	46,887	37,754	9,133				
Horry	30,616	22,208	8,408				

Table 18. Round pulpwood production in Tennessee, 1960

County	All species	Pine	Hardwood	County	All species	Pine	Hardwood
--- Standard cords ---				--- Standard cords ---			
Anderson	7,467	4,767	2,700	Lauderdale	...	...	...
Bedford	...	...	...	Lawrence	275	267	8
Benton	1,438	1,438	...	Lewis	55	55	...
Bledsoe	3,505	1,650	1,855	Lincoln	...	...	...
Blount	11,689	8,455	3,234	Loudon	1,788	728	1,060
Bradley	12,702	7,784	4,918	McMinn	28,176	15,182	12,994
Campbell	5,936	5,439	497	McNairy	54	34	20
Cannon	...	...	...	Macon	...	...	...
Carroll	252	252	...	Madison	20	20	...
Carter	7,896	...	7,896	Marion	3,140	3,140	...
Cheatham	...	...	...	Marshall	...	...	...
Chester	119	119	...	Maury	...	...	...
Claiborne	2,387	2,218	169	Meigs	10,047	6,051	3,996
Clay	...	...	...	Monroe	29,060	19,100	9,960
Cocke	15,210	11,438	3,772	Montgomery	...	...	...
Coffee	...	...	...	Moore	...	...	...
Crockett	...	...	...	Morgan	21,777	5,714	16,063
Cumberland	16,912	5,077	11,835	Obion	640	640	...
Davidson	...	...	...	Overton	1,539	1,507	32
Decatur	129	129	...	Perry	...	...	...
De Kalb	...	...	...	Pickett	...	...	...
Dickson	...	...	...	Polk	16,108	12,259	3,849
Dyer	...	...	...	Putnam	928	928	...
Fayette	...	...	...	Rhea	11,362	5,203	6,159
Fentress	3,728	3,129	599	Roane	8,005	3,582	4,423
Franklin	...	...	...	Robertson	...	...	...
Gibson	...	...	...	Rutherford	...	...	...
Giles	...	...	...	Scott	11,859	6,544	5,315
Grainger	1,370	635	735	Sequatchie	1,555	1,530	25
Greene	10,010	4,499	5,511	Sevier	8,324	6,788	1,536
Grundy	2,342	2,342	...	Shelby	2,656	...	2,656
Hamblen	641	340	301	Smith	...	...	...
Hamilton	8,705	7,524	1,181	Stewart	...	...	...
Hancock	503	232	271	Sullivan	13,991	1,855	12,136
Hardeman	3,183	3,167	16	Sumner	...	...	...
Hardin	129	122	7	Tipton	8,141	...	8,141
Hawkins	15,257	3,798	11,459	Trousdale	...	...	...
Haywood	...	...	...	Unicoi	4,535	...	4,535
Henderson	3,598	3,580	18	Union	8,279	6,190	2,089
Henry	258	258	...	Van Buren	346	346	...
Hickman	89	89	...	Warren	1,038	1,038	...
Houston	...	...	...	Washington	13,635	6,411	7,224
Humphreys	...	...	...	Wayne	5	5	...
Jackson	...	...	...	Weakley	18	18	...
Jefferson	387	74	313	White	346	346	...
Johnson	1,324	...	1,324	Williamson	...	...	...
Knox	8,554	4,718	3,836	Wilson	...	...	...
Lake	...	...	...	All counties	353,422	188,754	164,668

Table 19. Round pulpwood production in Texas,
1960

County ¹	All species	Pine	Hardwood
--- Standard cords ---			
Anderson	14,498	12,920	1,578
Angelina	47,007	44,715	2,292
Austin	26	...	26
Bastrop	22	22	...
Bowie	11,552	11,345	207
Brazos	56	...	56
Camp	2,083	1,343	740
Cass	35,822	32,376	3,446
Chambers	2,483	1,693	790
Cherokee	41,250	39,405	1,845
Colorado	42	20	22
Falls	487	...	487
Fort Bend	867	...	867
Franklin	583	583	...
Gregg	8,817	7,536	1,281
Grimes	15,753	15,302	451
Hardin	42,747	27,383	15,364
Harris	25,593	16,987	8,606
Harrison	32,801	27,637	5,164
Houston	37,447	32,626	4,821
Jasper	75,976	59,509	16,467
Jefferson	1,165	27	1,138
Leon	257	108	149
Liberty	49,837	32,654	17,183
Mc Lennan	1,189	...	1,189
Madison	22	...	22
Marion	19,520	14,840	4,680
Montgomery	60,927	42,989	17,938
Morris	7,969	6,768	1,201
Nacogdoches	54,599	53,102	1,497
Newton	52,595	31,766	20,829
Orange	9,126	5,886	3,240
Panola	29,530	26,282	3,248
Polk	74,216	57,595	16,621
Red River	6,836	6,836	...
Robertson	273	...	273
Rusk	34,473	32,707	1,766
Sabine	35,133	27,387	7,746
San Augustine	46,511	34,344	12,167
San Jacinto	17,770	12,200	5,570
Shelby	66,820	57,223	9,597
Smith	8,694	6,850	1,844
Titus	464	464	...
Trinity	39,022	36,053	2,969
Tyler	43,902	30,924	12,978
Upshur	35,064	33,602	1,462
Walker	40,118	33,615	6,503
Waller	2,472	923	1,549
Washington	101	...	101
All counties	1,134,517	916,547	217,970

¹ Counties with no pulpwood production are omitted.

Table 20. Round pulpwood production in Virginia, 1960

County	All species	Pine	Hardwood	County	All species	Pine	Hardwood
--- Standard cords ---				--- Standard cords ---			
Accomack	5,993	5,993		Lancaster	12,982	12,982	
Albemarle	26,151	24,383	1,768	Lee	6,127		6,127
Alleghany	49,091	9,019	40,072	Loudoun	488	488	
Amelia	23,325	21,703	1,622	Louisa	14,803	13,091	1,712
Amherst	67,431	32,308	35,123	Lunenburg	18,492	17,241	1,251
Appomattox	43,117	28,457	14,660	Madison	3,943	3,890	53
Arlington	30	30		Mathews	2,228	2,028	200
Augusta	13,914	5,102	8,812	Mecklenburg	20,268	18,345	1,923
Bath	39,355	3,389	35,966	Middlesex	10,626	9,626	1,000
Bedford	53,702	38,610	15,092	Montgomery	4,328	4,328	
Bland	100	48	52	Nansemond	17,725	10,636	7,089
Botetourt	25,974	10,131	15,843	Nelson	30,029	18,235	11,794
Brunswick	87,017	71,568	15,449	New Kent	25,693	22,710	2,983
Buchanan				Norfolk	611	482	129
Buckingham	68,727	43,940	24,787	Northampton	98	98	
Campbell	61,858	53,553	8,305	Northumberland	3,852	3,852	
Caroline	29,970	27,660	2,310	Nottoway	26,466	20,643	5,823
Carroll	1,840	1,840		Orange	9,485	8,024	1,461
Charles City	20,263	16,895	3,368	Page	606	375	231
Charlotte	29,069	27,011	2,058	Patrick	4,879	4,879	
Chesterfield	24,709	19,379	5,330	Pittsylvania	39,828	36,474	3,354
Clarke				Powhatan	14,335	13,560	775
Craig	22,333	7,147	15,186	Prince Edward	30,106	28,390	1,716
Culpeper	9,926	9,104	822	Prince George	31,410	27,008	4,402
Cumberland	17,617	15,460	2,157	Prince William	25,318	25,266	52
Dickenson				Princess Anne	218	218	
Dinwiddie	43,539	39,315	4,224	Pulaski			
Elizabeth City	186	146	40	Rappahannock	65	65	
Essex	10,012	9,012	1,000	Richmond	12,472	12,472	
Fairfax	8,068	8,068		Roanoke	4,181	4,110	71
Fauquier	4,123	4,123		Rockbridge	43,327	10,663	32,664
Floyd	732	732		Rockingham	9,561	7,528	2,033
Fluvanna	24,350	18,328	6,022	Russell	495		495
Franklin	28,061	27,434	627	Scott	16,954		16,954
Frederick	16,677	15,136	1,541	Shenandoah	6,278	5,784	494
Giles	69		69	Smyth	18		18
Gloucester	15,409	14,612	797	Southampton	40,924	27,280	13,644
Goochland	21,789	19,794	1,995	Spotsylvania	25,755	21,246	4,509
Grayson	1		1	Stafford	15,252	15,215	37
Greene	3,881	3,681	200	Surry	19,267	12,697	6,570
Greensville	31,251	28,503	2,748	Sussex	42,139	33,534	8,605
Halifax	28,283	28,098	185	Tazewell			
Hanover	17,142	16,967	175	Warren	2,832	2,522	310
Henrico	5,631	5,531	100	Warwick	552	532	20
Henry	22,482	22,398	84	Washington	7,561	2,959	4,602
Highland	11,330	455	10,875	Westmoreland	9,257	9,257	
Isle of Wight	10,832	6,586	4,246	Wise	6,464		6,464
James City	6,276	5,818	458	Wythe	7,026	7,026	
King and Queen	27,572	26,072	1,500	York	8,340	8,040	300
King George	20	20		All counties	1,715,314	1,277,780	437,534
King William	22,422	20,422	2,000				

Table 21. Mills using southern pulpwood in 1960, by process and capacity

Location	Map code ¹	Company	Pulp capacity, 24 hours ²				
			All processes	Sulfate	Groundwood and other mechanical	Semi- chemical	Soda and sulfite
----- Tons -----							
ALABAMA							
Brewton	(1)	Container Corp. of America	300	300			
Coosa Pines	(2)	Coosa River Newsprint Co.	960	320	640		
Demopolis	(3)	Gulf States Paper Corp.	400	400			
Tuscaloosa	(4)	Gulf States Paper Corp.	400	400			
Mobile	(5)	International Paper Co.	1,315	1,015	300		
Naheola	(6)	Marathon Southern Corp.	420	420			
Mobile	(7)	National Gypsum Co.	300		150	150	
Mobile	(8)	The Ruberoid Co.	48		48		
Mobile	(9)	Scott Paper Co.	550	550			
Total			4,693	3,405	1,138	150	
ARKANSAS							
Crossett	(10)	Crossett Paper Mills	655	575		80	
Pine Bluff	(11)	Dierks Paper Co.	150	150			
Camden	(12)	International Paper Co.	615	615			
Pine Bluff	(13)	International Paper Co.	1,105	745	360		
Total			2,525	2,085	360	80	
FLORIDA							
Pensacola	(14)	Armstrong Cork Co.	130		130		
Foley	(15)	The Buckeye Cellulose Corp.	880	880			
Fernandina	(16)	Container Corp. of America	650	650			
Palatka	(17)	Hudson Pulp and Paper Corp.	850	850			
Panama City	(18)	International Paper Co.	1,620	1,620			
Jacksonville	(19)	Owens-Illinois Glass Co.	500	500			
Fernandina	(20)	Rayonier, Inc.	350				350
Port St. Joe	(21)	St. Joe Paper Co.	1,200	1,200			
Jacksonville	(22)	St. Regis Paper Co.	1,500	1,500			
Pensacola	(23)	St. Regis Paper Co.	750	750			
Total			8,430	7,950	130		350
GEORGIA							
Macon	(24)	Armstrong Cork Co.	200		200		
Brunswick	(25)	Brunswick Pulp and Paper Co	550	550			
Savannah	(26)	Certain-teed Products Corp.	65		65		
Augusta	(27)	Continental Can Co.	475	350		125	
Savannah	(28)	Continental Can Co.	600	600			
Macon	(29)	Georgia Kraft Co.	675	675			
Valdosta	(30)	Owens-Illinois Glass Co.	630	630			
Jesup	(31)	Rayonier, Inc.	675	675			
Rome	(32)	Rome Kraft Co.	740	740			
Savannah	(33)	The Ruberoid Co.	100		100		
St. Marys	(34)	St. Marys Kraft Corp.	800	800			
Savannah	(35)	Union Bag-Camp Paper Corp.	2,575	2,175		400	
Total			8,085	7,195	365	525	
ILLINOIS							
Alton	(36)	Alton Box Board Co.	250			250	
Wilmington	(37)	Lehon Company	70			70	
Total			320			320	
LOUISIANA							
Shreveport	(38)	Bird and Son	60			60	
Elizabeth	(39)	Calcasieu Paper Co.	240	240			
Hodge	(40)	Continental Can Co., Inc.	640	500		140	
Bogalusa	(41)	Crown Zellerbach Corp.	1,175	1,040		135	
New Orleans	(42)	Flintcote Co.	60		60		
Bastrop	(43)	International Paper Co. (Bastrop Mill)	590			590	
Bastrop	(44)	International Paper Co. (Louisiana Mill)	615	580	35		
Springhill	(45)	International Paper Co.	1,500	1,500			
West Monroe	(46)	Olin Mathieson Chemical Corp.	650	650			
St. Francisville	(47)	St. Francisville Paper Co.	235		235		
Total			5,765	4,510	330	925	
MARYLAND							
Luke	(48)	West Virginia Pulp and Paper Co.	600	600			
Total			600	600			

Table 21. Mills using southern pulpwood in 1960, by process and capacity (Continued)

Location	Map code ¹	Company	Pulp capacity, 24 hours ²				
			All processes	Sulfate	Groundwood and other mechanical	Semi- chemical	Soda and sulfite
----- Tons -----							
MISSISSIPPI							
Meridian	(49)	Flintkote Co.	133	...	133	...	...
Moss Point	(50)	International Paper Co.	650	650	...	...	...
Natchez	(51)	International Paper Co.	900	900	...	...	...
Natchez	(52)	Johns-Manville Products Corp.	350	...	230	120	...
Meridian	(53)	Kroehler Mfg. Co. of Miss., Inc. ³	80	...	80	...	...
Laurel	(54)	Masonite Corporation	800	...	800	...	...
Greenville	(55)	United States Gypsum Co.	180	...	180	...	...
Total			3,093	1,550	1,423	120	...
NORTH CAROLINA							
Canton	(56)	Champion Paper and Fibre Co.	980	930	...	50	...
Roanoke							
Rapids	(57)	Halifax Paper Co.	750	750	...	...	...
Sylva	(58)	The Mead Corporation	225	...	...	225	...
Acme	(59)	Riegel Carolina Corp.	725	645	...	80	...
Plymouth	(60)	Weyerhaeuser Co., N. C. Div.	1,450	1,125	...	325	...
Total			4,130	3,450	...	680	...
OHIO							
Cincinnati	(61)	Philip Carey Mfg. Co.	200	...	200	...	...
Chillicothe	(62)	The Mead Corporation	210	...	...	...	210
Total			410	...	200	...	210
OKLAHOMA							
Pryor	(63)	Bestwall Gypsum Co.	90	...	...	90	...
Total			90	...	...	90	...
PENNSYLVANIA							
York Haven	(64)	International Paper Co.	65	...	20	...	45
Spring Grove	(65)	P. H. Glatfelter Co.	190	190	...	...	...
Total			255	190	20	...	45
SOUTH CAROLINA							
Catawba	(66)	Bowater Board Co.	200	...	200	...	...
Catawba	(67)	Bowaters Carolina Corp.	400	400	...	...	...
Georgetown	(68)	International Paper Co.	1,990	1,455	...	535	...
Hartsville	(69)	Sonoco Products Co.	700	...	...	700	...
Charleston	(70)	West Virginia Pulp and Paper Co.	1,550	1,290	...	260	...
Total			4,840	3,145	200	1,495	...
TENNESSEE							
Calhoun	(71)	Bowaters Southern Paper Corp.	1,375	450	750	...	175
Harriman	(72)	The Mead Corporation	112	...	...	112	...
Kingsport	(73)	The Mead Corporation	240	...	...	...	240
Knoxville	(74)	Southern Extract Co.	139	...	...	130	...
Counce	(75)	Tennessee River Pulp & Paper Co.	500	500	...	...	...
Total			2,357	950	750	242	415
TEXAS							
Pasadena	(76)	Champion Paper and Fibre Co.	720	670	50	...	...
Evadale	(77)	East Texas Pulp and Paper Co.	425	425	...	...	...
Dallas	(78)	The Ruberoid Co.	40	...	40	...	...
Diboll	(79)	Southern Pine Lumber Co.	130	...	...	130	...
Lufkin	(80)	Southland Paper Mills	1,250	400	850	...	...
Total			2,565	1,495	940	130	...
VIRGINIA							
West Point	(81)	The Chesapeake Corp. of Virginia	675	675	...	...	...
Hopewell	(82)	Continental Can Co., Inc.	850	700	...	150	...
Columbia	(83)	James River Pulp Corp.	25	...	25	...	...
Lynchburg	(84)	The Mead Corporation	175	...	...	175	...
Big Island	(85)	Owens-Illinois Glass Co.	235	...	...	235	...
Jarratt	(86)	Southern Johns-Manville Products Corp.	200	...	200	...	...
Franklin	(87)	Union Bag-Camp Paper Co.	600	600	...	...	...
Covington	(88)	West Virginia Pulp and Paper Co.	980	660	...	320	...
Total			3,740	2,635	225	880	...
All states			51,898	39,160	6,081	5,637	1,020

¹ Corresponds to numbers at mill locations in figures 10 and 11.² Southern Pulp and Paper Manufacturer, vol. 23, no. 10 (Oct. 1, 1960); and other sources.³ Operate exclusively on secondary wood residues.

Table 22. *Pulpmills under construction or announced in the South*

State and plant location	Map code ¹	Company	Pulp capacity 24 hrs. ²
ALABAMA			
Phenix City	(89)	Dixie Pulp and Paper Co.	300
FLORIDA			
Port St. Joe	(90)	Florida Gulf Fibre Co.	450
GEORGIA			
Cedar Springs	(91)	Southern Land, Timber, and Pulp Corp.	600
LOUISIANA			
Baton Rouge	(92)	Noralyn Paper Mills, Inc.	150
MISSISSIPPI			
Lumberton	(93)	Lumberton Pulp Co.	100
OKLAHOMA			
Haileyville	(94)	Dierks Forests, Inc.	

¹ Corresponds to numbers at mill locations in figure 10.

² Southern Pulp and Paper Manufacturer, vol. 23, no. 10 (Oct. 1, 1960); and other sources.

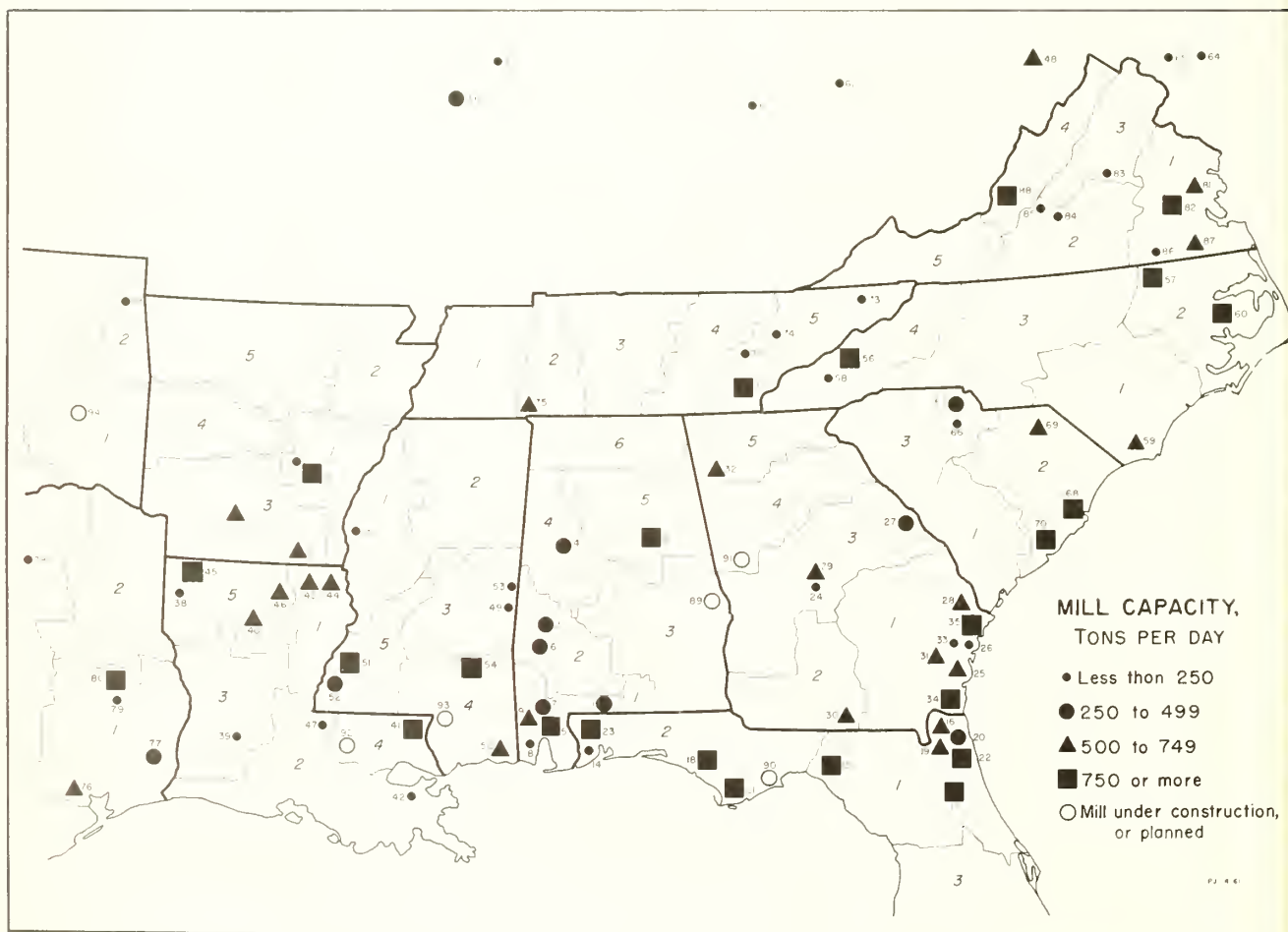


Figure 10.—Mills using southern pulpwood in 1960, and those planned or under construction. Numbered areas are Forest Survey regions. Small numbers at mill locations correspond to numbers in tables 21 and 22.

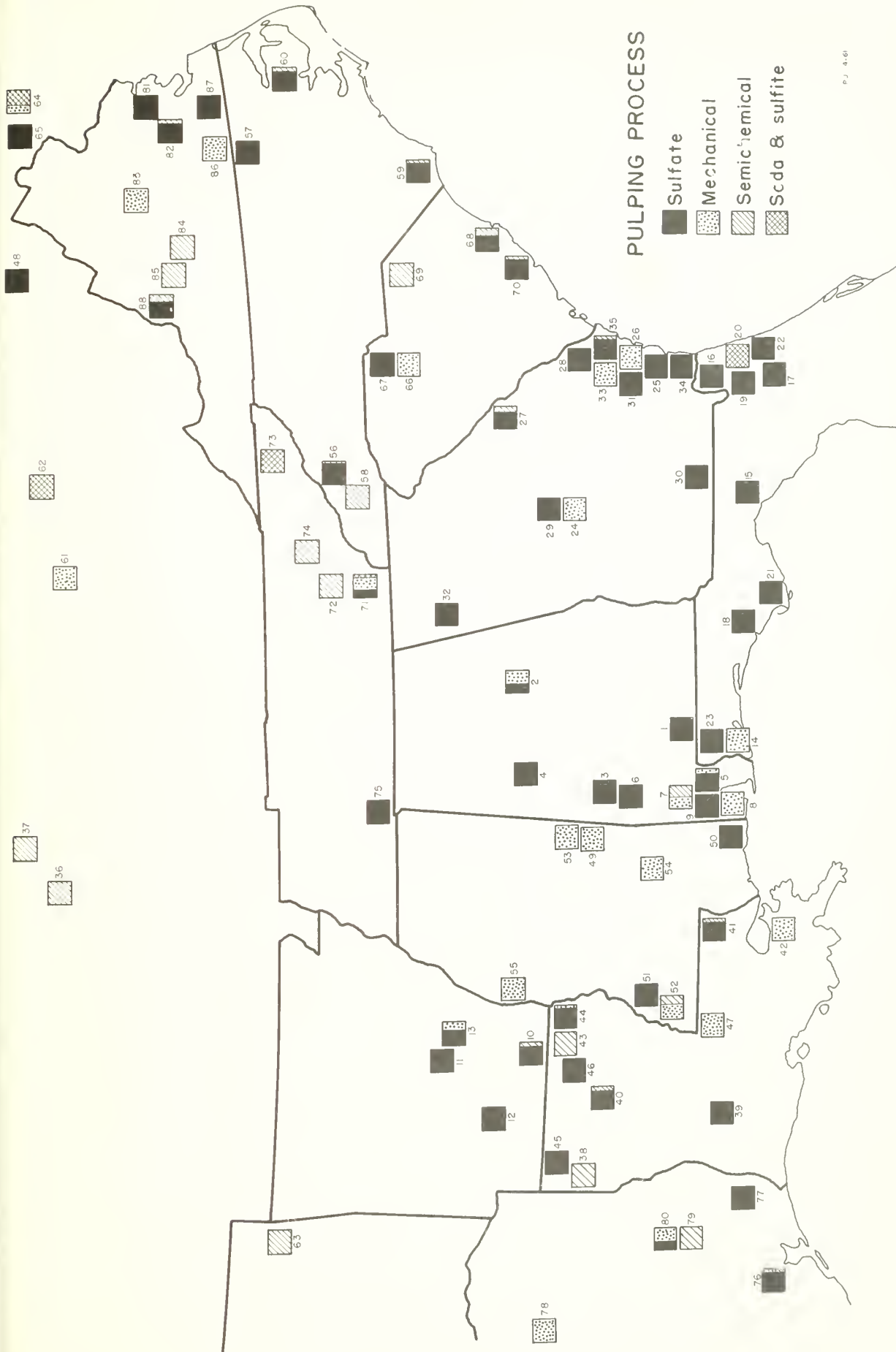


Figure 11.— Mills using southern pulpwood in 1960, by process. Numbers correspond to those in table 21.

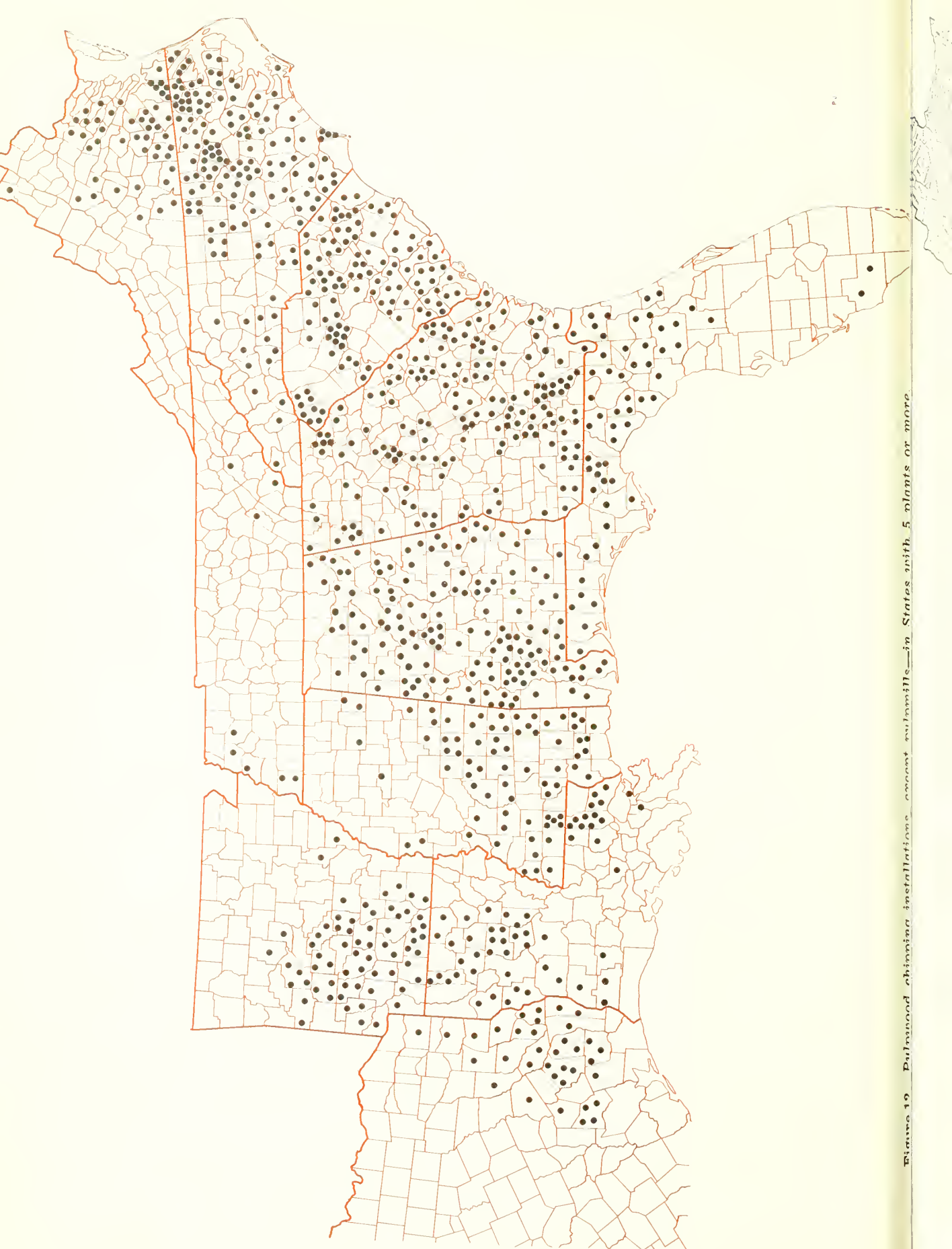


FIGURE 19 Pulverized chipping installations—except sawmills—in States with 5 plants or more

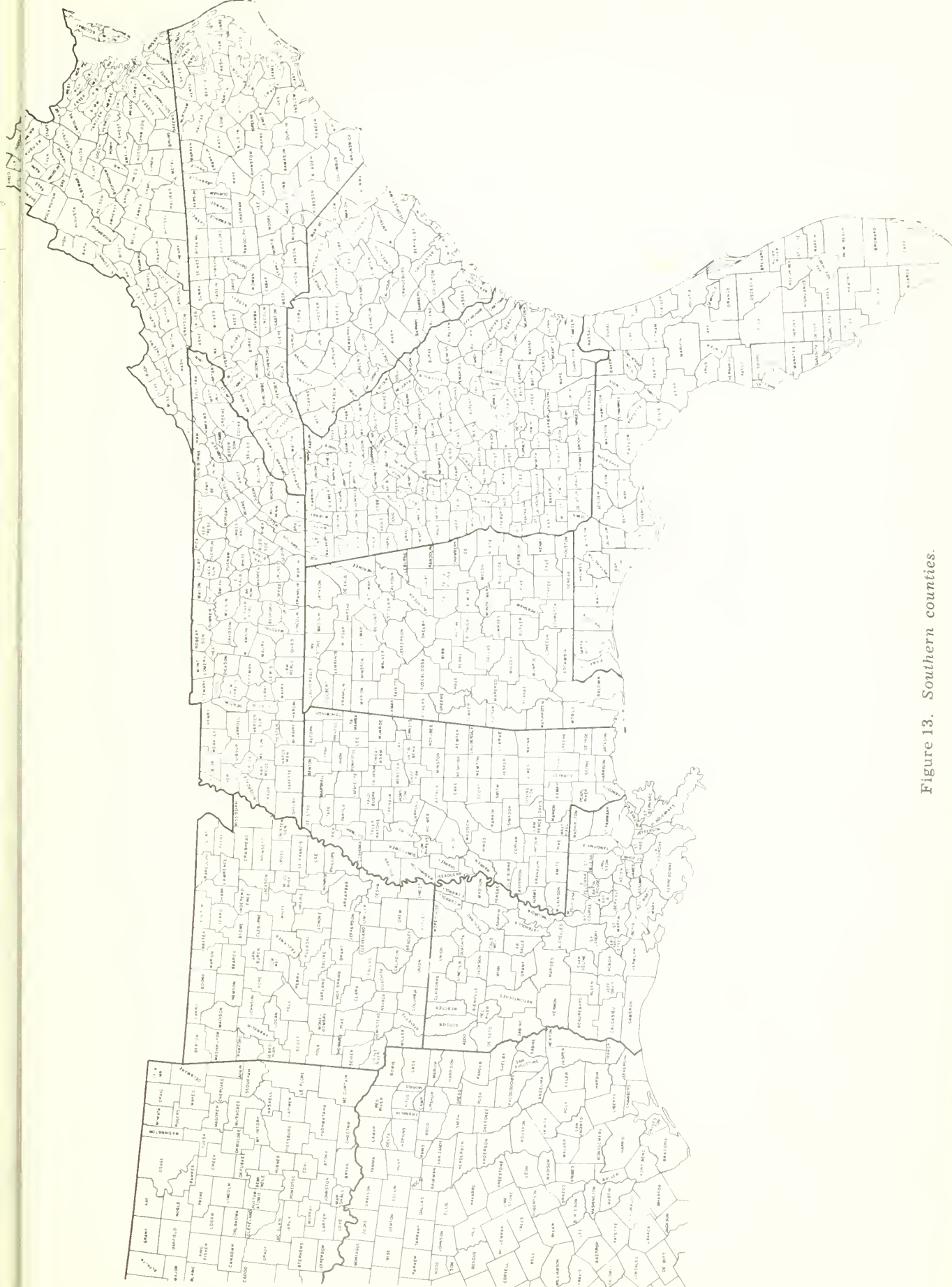


Figure 13. Southern counties.



FOREST SURVEY RELEASE 85

SOUTHERN FOREST EXPERIMENT STATION

New Orleans, Louisiana

Forest Service, U.S. Department of Agriculture

1961

TENNESSEE FORESTS



Foreword

This report presents the principal findings of the second Forest Survey of Tennessee, made in 1960-61 by the Southern Forest Experiment Station. The survey, which was undertaken as one phase of the nationwide inventory being conducted by the U. S. Forest Service, provides up-to-date information on the kind, amount, and condition of forest resources; the industries they support; and the possibilities for improving wood production. Comparison with the inventory that was completed in 1950 helps to clarify timber trends.

Generous assistance from public and private organizations made it possible to keep the field work for the new inventory ahead of the schedule that could have been maintained with regularly allotted funds. The very material aid of the organizations listed below, and of the individuals in them, is gratefully acknowledged:

Tennessee Valley Authority

Nickey Brothers, Incorporated

Hiwassee Land Company

Tennessee River Pulp and Paper Company

TENNESSEE FORESTS

Herbert S. Sternitzke

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE



SOUTHERN FOREST EXPERIMENT STATION
New Orleans, Louisiana

1962

*Photos by
Tennessee Conservation Department*

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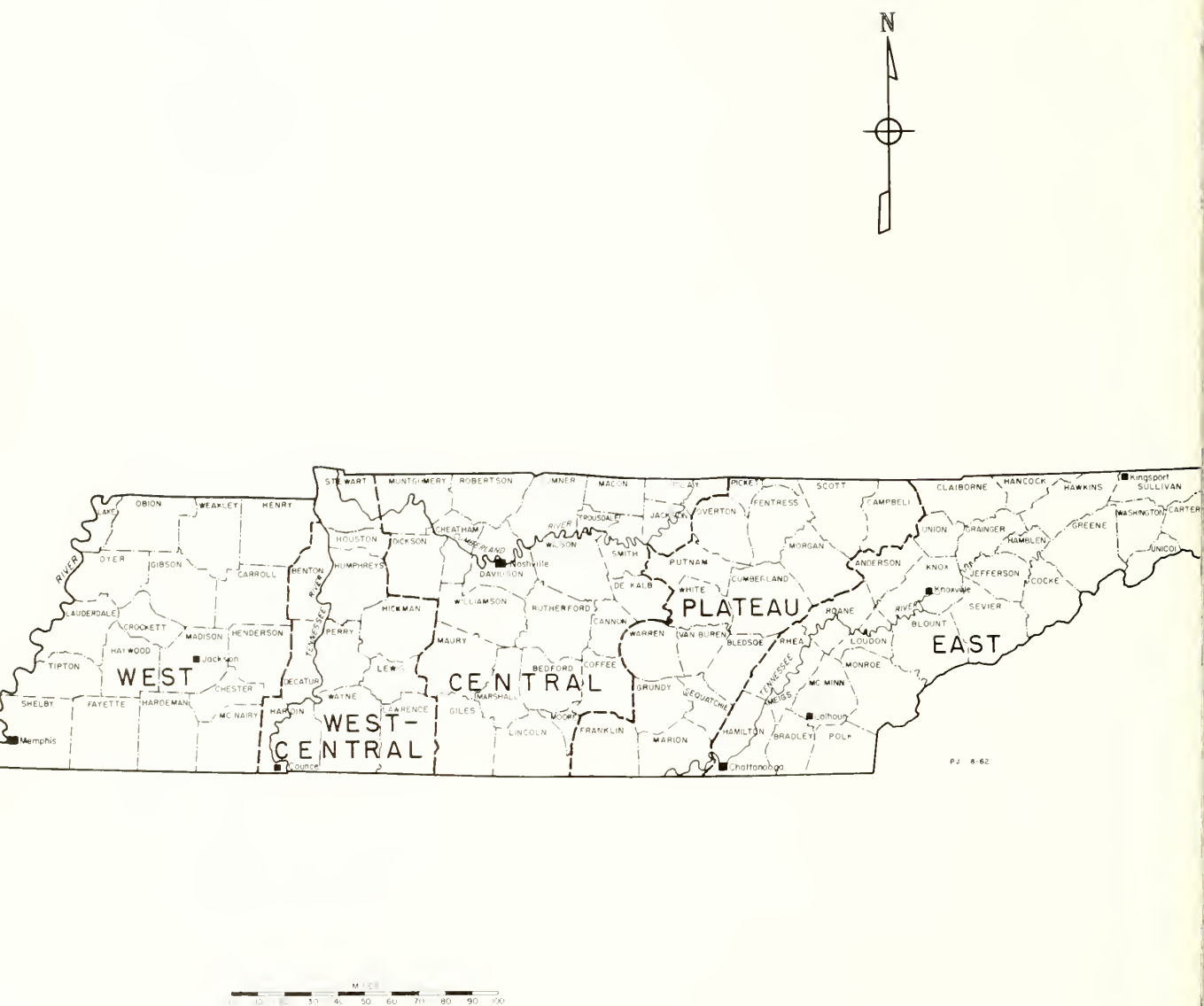


Figure 1. Forest Survey regions in Tennessee.



Tennessee

Timber Highlights

A new forest survey of Tennessee was completed in 1961. During the years since the earlier survey of 1950, both forest conditions and the timber industry changed considerably.

Pulpwood production nearly tripled as Tennessee joined other southern States in a tremendous expansion of the pulp and paper industry. Not only were existing facilities enlarged, but two new multi-million dollar plants were established at Calhoun and Counce (fig. 1). Along with the rapid expansion of pulping facilities, the composition of the annual pulpwood harvest shifted. Today the bulk of the pulpwood output is pine; prior to 1954 it was hardwood. Although many portable sawmills shut down or moved out of the State, the average annual output of those that survived rose sharply; mills cutting in excess of 3 million board feet each year increased in number. Overall, the production of sawlogs, pulpwood, and other industrial roundwood in Tennessee is greater now than at the time of the previous survey.

The outlook for the timber resource has also brightened. Both pine and hardwood sawtimber volumes have increased significantly. The improvement largely reflects ingrowth of young trees into sawtimber sizes, in response partly to better fire protection and partly to improved timber management practices. Forest management programs have been expanded and intensified in many parts of the State, especially on public and industrial holdings. Moreover, both public agencies and forest industries are sponsoring programs of technical assistance to stimulate better practices on small owner-ships.

The area of forest land is about a million acres more than in 1950. Woodland acreage now exceeds the area devoted to all other land uses in Tennessee, and there are signs of additional forest acreage gains in the decade ahead.

Other aspects of the forest situation are less encouraging. Several million acres that are capable of growing pine, for example, are dominated by other species. One in every five hardwoods is a cull—a waster of growing space that could be devoted to thrifty timber. The current growth of timber is scarcely a third of the potential. And stocking in many stands is far less than most forest managers might desire.

The greatest possibilities for enhancing forest productivity in Tennessee are in raising the level of pine stocking and in applying stand improvement practices to all sites capable of growing high-quality hardwoods rapidly. The most promising remedial measures are to plant pine sites on which adequate natural regeneration is not likely; to remove culls and other low-value trees that are interfering with the growth or establishment of desirable ones; and, on hardwood lands especially, to plan timber harvests in a way that will insure a build-up in trees of the quality, size, and utility normally demanded for industrial purposes.



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Forest Resource Trends

TRENDS IN FOREST AREA

Woodland Area Greater Than In 1950

Forests dominate the Tennessee landscape. All together, they now occupy 52 percent of the State's total land. Commercial forests total over 13.4 million acres. Another 264 thousand wooded acres are reserved from timber cutting. Most of the reserved area—set aside chiefly for recreational use—is in the Great Smoky Mountains.

In 1950 commercial forests made up less than 12.4 million acres. The recent gain in forest area is apparently related to Tennessee's changing farm economy. Land in farms, for example, dropped some 13 percent between 1950 and 1959. At the same time, average farm size rose to 102 acres, a 28-percent increase. In addition to consolidating their holdings, farmers have been releasing from cultivation acreage that is eroding or in other ways submarginal. Woodland on farms increased from 25 to 33 acres per farm during the fifties.

Increases in forest area have been quite general over the State. The smallest regional gain, 4 percent, was in the Cumberland Plateau, which has long been the most heavily wooded section of Tennessee. The largest gain, 14 percent, was in the counties to the east of the Plateau. Statewide, the net effect of land-use shifts is that current forest acreage is 9 percent greater than in 1950 (table I).

Table I.—Commercial forest land (1961) and change since 1950

Region	Commercial forest	Change
	Thd. acres	Percent
West	1,899.3	6
West-central	2,302.7	9
Central	2,580.5	10
Plateau	3,178.0	14
East	3,471.9	14
Total	13,432.4	9

Associated with land-use changes have been notable shifts in population. Woodland expansion was accompanied by a 7-percent drop in Tennessee's rural population between 1950 and 1960. By contrast, urban areas experienced a 28-percent gain. Implicit in these trends is a better adjustment of people to resources as rural residents seek employment in expanding industrial centers.

Further gains in forest area seem likely. The new survey revealed, for example, that some 750 thousand acres, or 6 percent of the nonforest acreage, is made up of old fields that have been out of cultivation for 5 or more years. It can be reasonably assumed that a fair share of this area will either be planted to trees or else will revert naturally to forest. One recent study¹ estimated that forest acreage in the Tennessee Valley, which encompasses most of the State, might increase by more than one million acres during the next few decades.

More Pineland

Unlike most of the States to the south of it, Tennessee is predominantly a hardwood region. Nearly three-fourths of the commercial forest land is occupied by various upland hardwood types, chiefly oak and hickory in mixture with other species. Southern pine types are found largely in the Cumberland Plateau and in the Great Valley of eastern Tennessee. Bottomland forests are conspicuous only in the extreme western counties that drain into the Mississippi River. Redcedar prevails in the Central Basin.

Between surveys there was some shifting of acreages in the major forest types. The extensive upland hardwood types as well as forests

¹ Forest Resource Trends in the Tennessee Valley, Tenn. Valley Authority, 4 pp. illus. Norris, Tenn. 1961

in which at least 25 percent of the stand is southern pine each gained 11 percent. Redcedar types dropped 23 percent, mainly because of localized land clearing and heavy cutting of this species from mixed cedar-hardwood stands. Acreage of bottom-land forests remained virtually unchanged (fig. 2).

The modest expansion of acreage supporting southern pines is especially encouraging to the pulp and paper industry, whose use of these species is steadily increasing. Nevertheless, several million additional forest acres that are capable of growing pine are still dominated by low-value hardwoods.

Better Stocking

Forest land in Tennessee is noticeably better stocked today than it was a decade ago. Much of the change is attributable to the improvement and extension of public fire protection. For the 5 years ending in 1950 the average annual burn was 3.9 percent of the total forest area. From 1956 to 1960 it was 0.4 percent. This means that less than 49 thousand acres are now burning annually, as compared with 488 thousand acres a decade ago. The effect of improved protection is most discernible in the smaller trees sizes. Stocking of saplings, for example, has increased by more than 40 percent since 1950.

The proportion of land that is well stocked differs sharply among the major types of forest. On lands supporting southern pine, half the acreage has at least 70 percent of the number of growing stock trees needed to make full use of the site. The redcedar types, which have been heavily picked over and which are slowest to recover from cutting, are the least well stocked.

Not only is stocking increasing, but basal area in cull trees has declined nearly a fifth. One in every five trees of poletimber size and larger, however, is still a cull. Some of these trees, of course, might serve as fuelwood or other farm-use products if demand were sufficient. But the quantity is so large—nearly 1.5 billion cubic feet—that investment in deadening seems to be the only means of effectively reducing this huge volume.

The size of the cull-removal job may be estimated from table II, which shows the average number of culls per acre by tree diameter.

Thus, to rid the typical stand of all culls 5.0 inches and larger in d.b.h. would mean killing 21 trees per acre, most of them under 9 inches in diameter. Ax-girdling the culls in the average stand would take almost one man-hour per acre; machine-girdling would require only half as much time. Culls 10 inches and larger in diameter will usually need only girdling; control of smaller ones will generally entail use of sprout-inhibiting chemicals.

Table II.—Number of cull trees per acre by diameter group, 1961

Tree diameter (inches)	Cull trees No.
6 — 8	14
10 — 12	4
14 — 16	2
18 +	1
Total	21

TRENDS IN TIMBER VOLUME

Big Gain In Softwood

The volume of softwood growing stock has risen sharply since 1950. It currently totals 1.2 billion cubic feet, a 33-percent increase (table III). Nearly three-fourths is southern pine. Eastern redcedar, cypress, white pine, and hemlock make up the rest (fig. 3).

Table III.—Growing stock volume (1961) and change since 1950

Region	Softwood		Hardwood	
	Volume Million cu. ft.	Per- cent	Volume Million cu. ft.	Per- cent
West	80.4	+ 2	1,038.8	+ 14
West-central	52.5	+ 29	1,113.4	+ 38
Central	23.2	- 52	977.5	+ 2
Plateau	363.9	+ 59	1,463.4	+ 32
East	716.0	+ 34	1,380.3	+ 26
Total	1,236.0	+ 33	5,973.4	+ 22

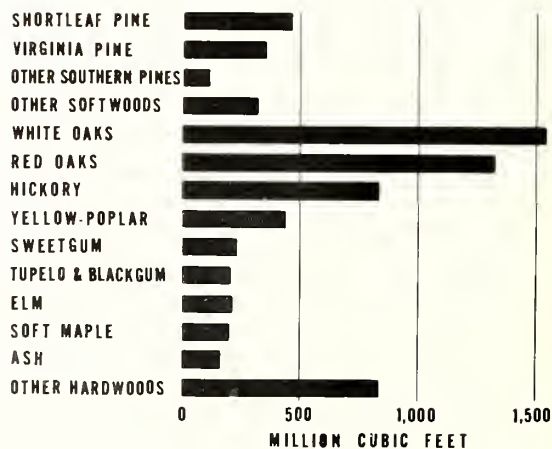


Figure 3. Growing stock by species.

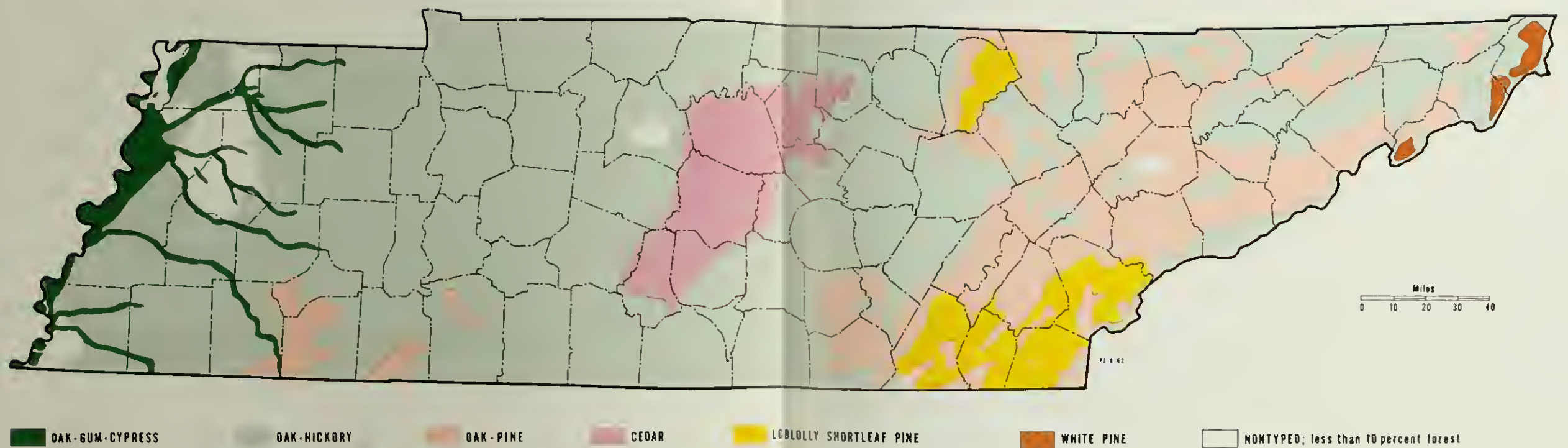


Figure 2. Major forest types in Tennessee.



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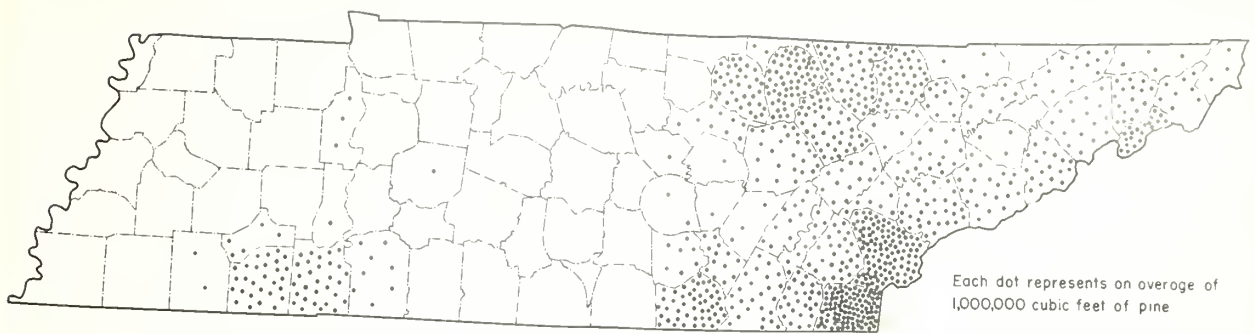


Figure 4. Generalized distribution of southern pine growing stock in Tennessee.

The biggest gains have taken place in the Plateau region and east Tennessee, which together have over 90 percent of the total southern pine volume (fig. 4). In the central part of the State, where softwood growing stock has been greatly reduced, virtually all of the volume is redcedar. A decline of cypress volume in west Tennessee moderated the gains of other softwood species in that region.

Statewide, board-foot volume of softwood has increased from 3.0 to 4.1 billion. Some 30 percent is concentrated on the one million acres in public ownership, mainly in the Cherokee National Forest. Another 7 percent is owned by forest industries. The rest is held by farmers and other private owners.

Much of the recent sawtimber gain is due to the ingrowth of poletimber-size trees. As

shown in figure 5, for example, the increase between surveys in numbers of softwoods 10 inches in diameter exceeded that of any other size class. Furthermore, 28 percent of the entire softwood sawtimber volume in Tennessee is now found in this single diameter class. For southern pines alone, the proportion is even higher, 38 percent. Trees 16 inches and larger in diameter contain less than 20 percent of the southern pine sawtimber.

All together, southern pine types in Tennessee contain about 5 cords of pine per acre. Additionally, there are several cords of hardwood in the average stand. To provide annual one-cord harvests of a combination of forest products, pine types would probably have to support more than 12 cords per acre.

Hardwood Quality Has Improved

Hardwood growing stock now stands at 6.0 billion cubic feet. This is 22 percent, or one billion cubic feet, more than in 1950.

Although some of the increase is in little-used species, the preferred hardwoods have gained also. The generally excellent form, fast growth, and desirable technical properties of yellow-poplar, for example, make it one of the most highly prized species in Tennessee. In 1961, the volume sampled of yellow-poplar totaled 435 million cubic feet, an increase of 15 percent since 1950. Hickory volume rose from 696 to 831 million cubic feet between surveys. Growth of hickory is well in excess of the cut and volume is rapidly accumulating. Effective utilization of this widely distributed hardwood could greatly enhance timber management opportunities.

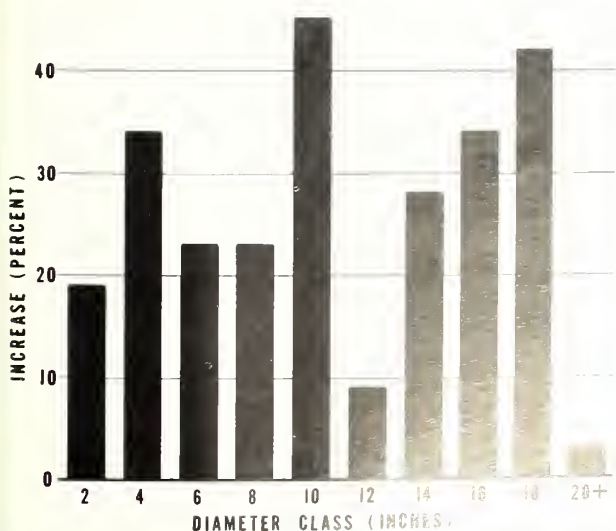


Figure 5. Percentage change in number of softwood growing stock trees between surveys.

Sawtimber trends parallel those for growing stock (table IV). The net change in sawtimber volume for all hardwoods amounts to an 18-percent rise, or 2.4 billion board feet. As figure 6 indicates, the change is largely accounted for by trees under 16 inches in diameter. The relatively modest increase in 18-inch and larger trees is noteworthy, though. These large trees are the main source of the annual harvest of sawtimber—the indispensable part of the inventory from the viewpoint of traditional hardwood industries.

Table IV.—Sawtimber volume (1961) and change since 1950

Region	Softwood		Hardwood	
	Volume	Change	Volume	Change
	Million bd. ft.	Per- cent	Million bd. ft.	Per- cent
West	326.0	— 1	3,052.9	+ 5
West-central	133.6	+ 36	2,248.3	+ 31
Central	27.9	— 56	2,594.9	— 3
Plateau	1,067.6	+ 53	4,072.0	+ 32
East	2,573.7	+ 40	3,984.9	+ 26
Total	4,128.8	+ 37	15,953.0	+ 18

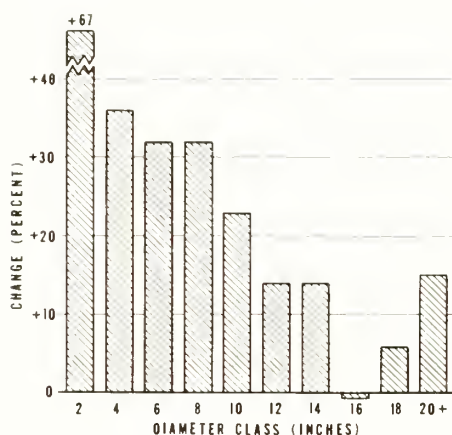


Figure 6. Percentage change in number of hardwood growing stock trees between surveys.

Another promising aspect of the hardwood situation is sawlog quality, as expressed by grades that take into account the diameter, length, and amount of defects in individual logs. Of the net board-foot increase, 1.1 billion is in logs of standard factory lumber grades 1 and 2 (table V). Such logs are most generally in demand because they yield much high-quality material. Moreover, some two-fifths of the increase of 1.3 billion board feet in lower grade logs is suitable for conversion into standard lumber, in the sense that it will yield practical proportions of clear cuttings. The rest consists

of tie and timber logs—those with so many sound defects that they will not produce worthwhile amounts of clear boards, when sawn wholly into lumber. They are presently suited for low-value uses such as crating and crossties.

Table V.—Sawtimber volume by log grade and tree diameter, 1961

Species group and d. b. h. class (inches)	All grades	Grade 1 ¹	Grade 2	Lower grades
----- Million board feet -----				
Softwood:				
10 to 12	2,064.1	83.1	35.0	1,946.0
14 to 18	1,640.7	25.7	241.9	1,373.1
20 and up	424.0	34.3	39.6	350.1
Total	4,128.8	143.1	316.5	3,669.2
Hardwood:				
12	3,781.2		53.3	3,727.9
14 to 18	8,195.7	500.7	2,258.5	5,436.5
20 and up	3,976.1	1,044.6	1,087.7	1,843.8
Total	15,953.0	1,545.3	3,399.5	11,008.2

¹ All cedar sawlogs were graded as No. 1.

TIMBER GROWTH AND CUT

Annual Growth Is Increasing

Yearly timber mortality ascribed to forest fires, insect pests, tree diseases, and other natural causes exceeds 53 million cubic feet. The loss is equivalent to 17 percent of the net growth of growing stock, and is much higher in hardwoods than in softwoods. After allowance is made for mortality, net annual growth is 256 million cubic feet of hardwood growing stock and 66 million of softwood. This equals 24 cubic feet per acre a year, or about 0.35 cord. At this rate, the forests are growing wood at only one-third of their productive capacity.

For sawtimber alone, growth totals 733 million board feet of hardwood and 248 million of softwood. Nearly half of the hardwood growth is on oaks. The more valuable red and white oaks—cherrybark, Shumard, northern red, white, swamp chestnut, swamp white, and chinkapin oak—make up 42 percent of all oak sawtimber growth and the less desirable ones 58 percent. Of the softwood sawtimber growth, two-thirds is southern pine. Overall, the current growth of sawtimber in Tennessee forests is some 10 percent greater than at the time of the earlier survey.

Sawtimber Growth Exceeds Cut

Timber cutting removed 162 million cubic feet of hardwood growing stock and 45 million

cubic feet of softwood from commercial forest land in 1960. Four-fifths of all the softwood was southern pine. Of the hardwoods, oak made up 62 percent. Other hard hardwoods accounted for 21 percent, soft hardwoods, like yellow-poplar, comprised the remaining 17 percent.

Tennessee's primary wood-using industries are largely dependent upon material harvested from sawtimber trees—softwoods at least 9 inches in diameter, and hardwoods 11 inches and larger in d.b.h. For the State as a whole, sawtimber growth exceeded the 1960 cut by 26 percent (fig. 7). The ratios of growth to cut have improved markedly since 1950. Whereas the growth of softwood sawtimber was less than two-thirds of the cut in 1949, it is estimated to be nearly 50 percent greater than the 1960 cut. For hardwoods, sawtimber growth was slightly less than the 1949 cut, but in 1960 it exceeded the cut by some 20 percent. Both in softwoods and hardwoods this favorable

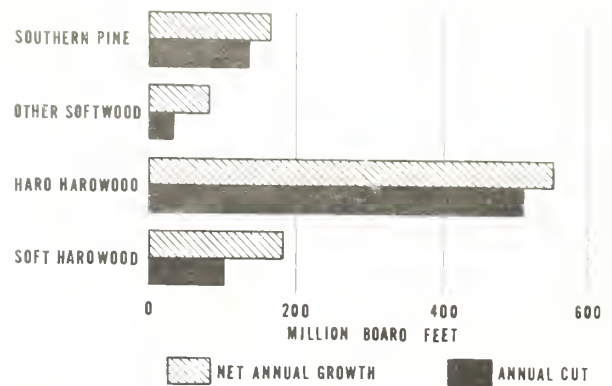


Figure 7. Growth and cut of sawtimber, 1960.

balance has been achieved by reduced cutting, as well as increased growth. The encouraging trends in growth-cut ratios must be tempered by realization that much of the excess growth is needed to further build up stocking, if Tennessee's forest lands are to more nearly approach their full productive capacity.



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Timber Products Output

Production of industrial roundwood in Tennessee totaled 145 million cubic feet in 1960. Output of domestic-use products, chiefly fuelwood, was 39 million.

The composition of Tennessee's timber output changed sharply during the past decade. In 1949 half of the annual output was for domestic use. Today about 20 percent is for these purposes. Although domestic timber use declined drastically, the harvest of industrial roundwood is 16 percent greater than in 1949. Sawlogs and pulpwood now make up 88 percent of the industrial output. The rest is largely veneer logs, cooperage bolts, poles, piling, posts, and mine timbers.

MORE LARGE SAWMILLS

Tennessee is a leading hardwood manufacturer. The most recent census ranked it second among all States in the production of hardwood lumber.

In 1960 the production of logs for lumber totaled nearly 634 million board feet, of which three-fourths was hardwood. Red and white oaks supplied nearly half of the hardwood; yellow-poplar, sweetgum, blackgum, and tupelo made up most of the remainder. Southern pine accounted for the great bulk of the softwood, but some cypress, redcedar, white pine, and hemlock was also sawn.

As in neighboring States, the sawmill industry has undergone striking changes since the close of World War II. In 1946, when the last complete mill canvass was made, 2,789 sawmills were reported active. Mills cutting more than 3 million board feet annually numbered 19 at that time and produced about a tenth of the lumber manufactured in the State. In 1960, 1,135 sawmills were operating. The losses were entirely among small, generally portable

mills; large mills increased in number from 19 to 20. The heaviest concentration of large mills is at Memphis. Output from the large mills is mainly hardwood; most of the pine is still sawn by small mills.

While the number of mills has dropped sharply, average annual output per mill nearly doubled between 1946 and 1960. Moreover, it is estimated that mills sawing more than 3 million board feet annually now process about a fifth of the State's lumber output. In contrast to the small mills, which obtain practically all of their logs from nearby woodlots, the large mills reach across the State boundaries for at least a fourth of their log requirements.

PULPWOOD AT RECORD HIGH

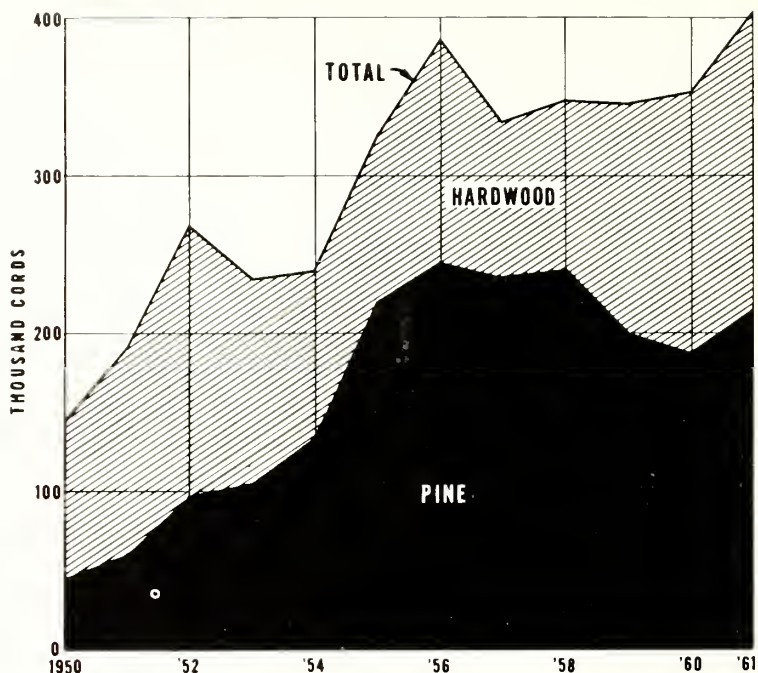
The tremendous growth in pulpwood cutting is undoubtedly the most noteworthy forestry development in Tennessee within the past several years. It is enabling more and more landowners to improve their stands by marketing trees that are not needed for more exacting products.

Pulpwood bolt output surged from 144 thousand cords in 1950 to 353 thousand in 1960. In 1961, it hit an all-time high of 404 thousand cords (fig. 8). Although sawlogs still account for the lion's share of the industrial roundwood output, the pulpwood segment jumped from 10 to 19 percent between 1949 and 1960.

Pulpwood is now mostly southern pine. Prior to 1954, it was chiefly hardwood. The shift reflects large-scale local expansion of pulping processes for which the use of pine is favored. The use of hardwood is also increasing, however, and output is nearly double that of 1950.

Establishment of two new pulp mills, as well as expansion of existing facilities, boosted

Figure 8.
Production of pulp-
wood bolts, 1950-
61.



Tennessee's daily pulping capability from 358 tons in 1950 to 2,357 tons in 1960. Tennessee's five pulp mills presently account for 11 percent of the total mill capacity in the seven Midsouth States. Manufacturing capacity of the average mill is about 471 tons per day, as compared to 90 tons a decade earlier. Individual mill capability ranges from 112 tons to 1,375 tons daily.

Further gains can be expected during the decade ahead. Net 1960 imports of pulpwood cordage totaled 262 thousand, a volume equivalent to three-fourths of Tennessee's pulpwood harvest in that year. As the inventory of standing timber (especially pine) rises further, it should be feasible for the industry to draw a substantially larger share of its wood requirements from local sources.

VENEER IS MAINLY HARDWOOD

About a third of the veneer logs processed in Tennessee are converted into containers of various kinds. The rest are largely cut into commercial veneers—chiefly for cores, crossbands, and backs of plywood.

Less than half of the logs received by veneer plants are cut within the State. The harvest of veneer logs in 1960 totaled 11.1 million board

feet, of which 2.2 million were shipped to other States. Some 11.4 million board feet were imported. Domestic imports were drawn from 11 States, the most distant of which were New York and Pennsylvania. Foreign imports included lauan (Philippine mahogany) and khaya (African mahogany) logs. The 9 veneer mills in the State thus consumed an average of more than 2.2 million board feet per plant (fig. 9). The 14 plants active in 1949 used an average of 1.5 million per plant.

Practically all of the volume consumed by the veneer industry was obtained through open-market dealings. More than 90 percent was bought as logs from sawmills, contract loggers, and other sources. The rest was largely acquired by stumpage purchases; volume cut on company-owned forests was negligible.

All but 3 percent of the veneer logs made in Tennessee are hardwood. Most of the softwood is redcedar. Hardwood logs are about equally divided between soft- and hard-hardwood species. Gums and yellow-poplar, which made up nearly 60 percent of the veneer log production in 1949, supplied only a third of the 1960 total. The decline apparently reflects the limited availability of suitable timber in these preferred veneer species.

OTHER PRODUCTS

Cooperage is a leading specialty item in Tennessee. In 1960, 33 mills were cutting tight cooperage; 4 slack cooperage mills were engaged in making tobacco hogsheads. Production of cooperage roundwood totaled 25.6 million board feet, of which 3.3 million was shipped to nearby States for processing. Another 4.9 million board feet was brought into Tennessee for manufacture. Of the roundwood used by the cooperage industry in 1960, 24 million board feet was for tight cooperage, made exclusively from white oak. Oak and hickory furnished the great bulk of the slack cooperage, but other species, including southern pine, were used.

Production of roundwood fuel in Tennessee

plunged from 1.7 million cords in 1949 to 0.4 million in 1960, a 75-percent decline. Use of mill residues (mainly sawmill slabs) for fuel also dropped some 29 percent; 1960 output from these sources totaled 271 thousand cords. The decline is largely due to the substitution of more convenient fuels for heating and cooking in rural areas. Rising urbanization and per capita income are expected to further reduce domestic fuelwood consumption. Moreover, it appears that an increasing proportion of the volume consumed will be derived from mill residues rather than roundwood.

All other timber products harvested in 1960 supplied 11 percent of the total roundwood output in Tennessee. Their volume, 20.3 million cubic feet, was mostly in fence posts and chemical wood.

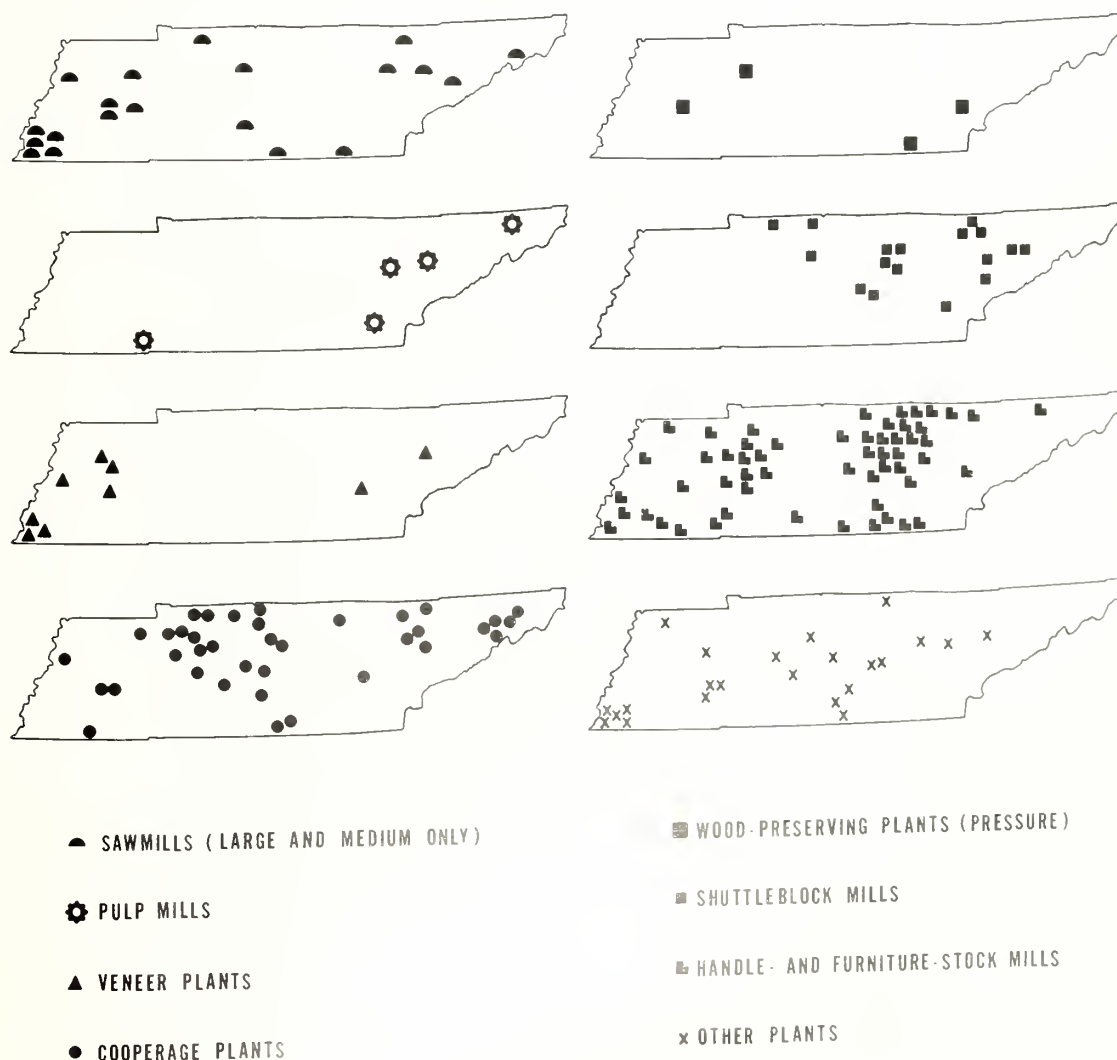
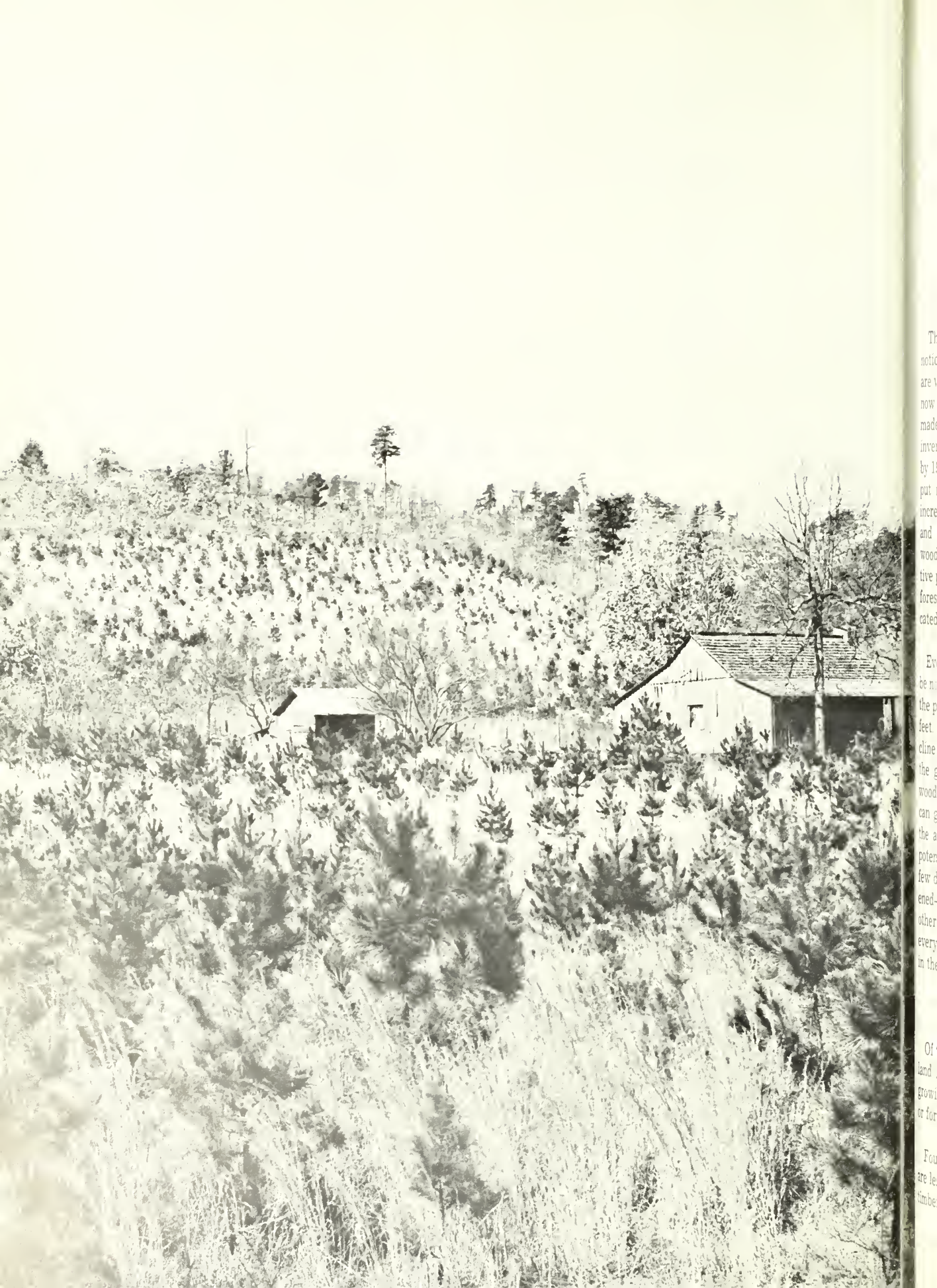


Figure 9 Location of primary wood-using plants in Tennessee, 1960.



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Outlook For Timber Supplies

The timber outlook in Tennessee brightened noticeably during the past decade. Not only are volumes of both pine and hardwood greater now than in 1950, but under the assumptions made for one possible projection, the timber inventory could rise to 12.4 billion cubic feet by 1991. The assumptions are that timber output in the United States and Tennessee will increase with anticipated gains in population and gross national product; that industrial wood products will largely maintain their relative position in the national economy; and that forestry progress will continue at the rate indicated by recent trends.

Even so, the future timber cut is assumed to be not much more than 20 percent greater than the present annual harvest of 208 million cubic feet. This is partly because the expected decline in fuelwood cutting will offset some of the gain anticipated in the use of industrial wood. Yet, as noted earlier, Tennessee's forests can grow far more wood than is indicated by the assumed cut. It is apparent that if their potential is to be fully realized within the next few decades, forestry efforts must be strengthened—especially on the farm woodlands and other small holdings that make up 4 out of every 5 acres of privately owned timberland in the State.

BUILDING UP PINE STOCKING

Of the 13.4 million acres of commercial forest land in Tennessee, 5 million are suitable for growing pine—as evidenced by pine's present or former occurrence.

Four million acres of the potential pine sites are less than 40 percent stocked with desirable timber—that is, thrifty trees that are presently

or potentially capable of yielding high-quality sawlogs and other forest products. Very little of the latter acreage—scarcely 53 thousand acres—is expected to restock itself adequately without cultural measures within the next 10 years. On 0.5 million acres, planting alone is likely to improve future harvest yields. Most of this acreage is east of the Highland Rim. Another 0.7 million acres requires removal of culls or other undesirable trees in order to assure successful establishment of natural pine reproduction. But on the majority of pine sites—2.7 million acres—restoration may be more expensive. Here, both planting and removal of undesirable trees will be needed if timber yields are to be effectively increased.

Not included in the above estimates are several hundred thousand acres of fields that have been out of cultivation for a number of years but have not yet reverted to forest. Some of these areas are of course highly plantable for timber production.

About 0.9 million acres of pine sites are already 40 to 70 percent stocked with desirable trees. Thus the opportunity to improve the productivity of this area is especially favorable. Some 0.5 million acres of the total is encumbered with trees whose defects limit their present or prospective use. Removal of this material will not only create openings for reproduction, but also encourage the more rapid development of desirable trees already established.

The remaining 0.1 million acres of pine sites are more than 70 percent stocked with desirables. Given adequate protection from fire and premature cutting, these stands can be expected to produce excellent crops of pine.

IMPROVING HARDWOOD STANDS

Tennessee has 8.4 million acres of commercial forest that appear to be primarily suited to growing hardwood. The management possibilities of these forests have only recently been recognized. Although hardwood volume is now increasing, most stands are still deficient in timber of the quality, size, and utility demanded by the distinctive hardwood industries. Furthermore, the typical hardwood stand contains a high proportion of trees that are undesirable as future growing stock. All told, the productivity of some 7.5 million acres of hardwood sites is noticeably hampered by culls and other trees that are of little potential value.

After merchantable components of this overburden have been removed, the greatest re-

turns per dollar of expenditure will probably be realized by concentrating improvement efforts on large dominant culls. Restricting cull-tree control to the larger trees will not improve areas covered with thickets of small weed trees or shrubs. These areas need some kind of blanket treatment, but further study is required to develop economical methods of handling such situations.

Although there are many aspects of hardwood culture on which additional research is urgently needed, sufficient experience and technical data have been accumulated to put many of the essentials of management into practice. The future of industries dependent upon hardwoods in Tennessee largely hinges on the efforts that landowners direct towards increasing yields of desirable trees.

Appendix

ACCURACY OF THE SURVEY

The data on forest acreage and timber volume in this report were secured by a systematic sampling method involving a forest-nonforest classification on aerial photographs and on-the-ground measurements of trees at sample locations. The sample locations were at the intersections of a grid of lines spaced 4.2 miles apart. At each location, 10 small plots were systematically distributed on an area of about one acre.

Accuracy of the estimates may be affected by two types of errors. The first stems from the use of a sample to estimate the whole and from variability of the items being sampled. This type is termed sampling error; it is susceptible to a mathematical evaluation of the probability of error. The second type—often referred to as reporting or estimating error—derives from mistakes in measurement, judgment, arithmetic, or recording, and limitations of method or equipment. Its effects cannot be appraised mathematically, but the Forest Survey constantly attempts to hold such error to a minimum by proper training and good supervision, and by emphasis on careful work.

Statistical analysis of the data indicates a sampling error of plus or minus 0.3 percent for the estimate of total forest area, 2.4 percent for total cubic volume, and 3.5 percent for total board-foot volume. As these totals are broken down by forest type, species, tree diameter, and other subdivisions, the possibility of error increases and is greatest for the smallest items. The order of this increase is suggested in the following tabulation, which shows the sampling error to which the estimates are liable, two chances out of three.

Forest area	Sampling error ¹	Cubic volume	Sampling error ²	Board-foot volume	Sampling error ²
Thousand acres	Percent	Million cu. ft.	Percent	Million bd. ft.	Percent
13,695.9	0.3	..	..	..	..
1,232.6	1.0	..	..	..	..
308.2	2.0	7,209.4	2.4	..	..
137.0	3.0	4,614.0	3.0	20,081.8	3.5
77.0	4.0	2,595.4	4.0	15,375.1	4.0
49.3	5.0	1,661.0	5.0	9,840.1	5.0
12.3	10.0	415.3	10.0	2,460.0	10.0
5.5	15.0	184.6	15.0	1,093.3	15.0
3.1	20.0	103.8	20.0	615.0	20.0
2.0	25.0	66.4	25.0	390.0	25.0

¹ By random-sampling formula.

² Estimated by use of a procedure described by R. DeLury in *Values and Integrals of the Orthogonal Polynomials up to n = 26*. Univ. Toronto Press, 33 pp. Toronto, Ont. 1950.

Growth estimates were derived from radial-growth measurements and mortality data taken at sample locations. No attempt was made to calculate sampling error in these estimates.

Estimates of annual timber cut are based on studies conducted during the period of forest inventory. The sampling error to which the estimates are liable, on a probability of two chances out of three, are:

Cubic volume	Sampling error ¹	Board-foot volume	Sampling error ¹
Million cu. ft.	Percent	Million bd. ft.	Percent
207.7	5.5	779.4	6.0
62.8	10.0	280.6	10.0
27.9	15.0	124.7	15.0
15.7	20.0	70.1	20.0
10.1	25.0	44.9	25.0

¹ By random-sampling formula.

In computing changes in timber volumes since 1950, data from the earlier survey were adjusted to make them closely comparable to those from the latest survey. This was necessary because of certain basic differences between the two sets of data. In every case, the data from the earlier survey were adjusted to conform to the standards of the latest survey before the change was computed.

DEFINITIONS OF TERMS

Forest Land Class

Forest land.—Land at least 10 percent stocked by forest trees of any size, or formerly having such tree cover, and not currently developed for non-forest use.

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

Productive-reserved forest land.—Productive public forest land withdrawn from timber utilization through statute or administrative regulation.

Unproductive forest land.—Forest land incapable of yielding crops of industrial wood because of adverse site conditions.

Tree Species

Commercial species.—Tree species presently or prospectively suitable for industrial wood products;

excludes so-called weed species, such as blackjack oak and blue beech.

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

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

Forest Type

White-red-jack pine.—Forests in which 50 percent or more of the stand is eastern white pine, red pine, or jack pine, singly or in combination. Common associates include hemlock, aspen, birch, and maple.

Spruce-fir.—Forests in which 50 percent or more of the stand is spruce or true firs, singly or in combination. Common associates include white cedar, tamarack, maple, birch, and hemlock.

Loblolly-shortleaf pine.—Forests in which 50 percent or more of the stand is loblolly pine, shortleaf pine, or other southern yellow pines except longleaf or slash pine, singly or in combination. Common associates include oak, hickory, and gum.

Oak-pine.—Forests in which 50 percent or more of the stand is hardwoods, usually upland oaks, but in which southern pines make up 25-49 percent of the stand. Common associates include gum, hickory, and yellow-poplar.

Cedar.—Forests in which 25 percent or more of the stand is redcedar. Common associates include oak and hickory.

Oak-hickory.—Forests in which 50 percent or more of the stand is upland oaks or hickory, singly or in combination, except where pines comprise 25-49 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 50 percent or more of the stand is tupelo, blackgum, sweetgum, oaks, or southern cypress, singly or in combination, except where pines comprise 25-49 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 50 percent or more of the stand is elm, ash, or cottonwood, singly or in combination. Common associates include willow, sycamore, beech, and maple.

Maple-beech-birch.—Forests in which 50 percent or more of the stand is maple, beech, or yellow birch, singly or in combination. Common associates include hemlock, elm, basswood, and white pine.

Class of Timber

Growing-stock trees.—Sawtimber trees, pole-timber trees, saplings, and seedlings; that is, all live trees except cull trees.

Desirable trees.—Growing-stock trees that have no serious defects to limit present or prospective use, are of relatively high vigor, and contain no pathogens that may result in death or serious deterioration before rotation age. They comprise the type of trees that forest managers aim to grow, that is, the trees left in silvicultural cutting or favored in cultural operations.

Acceptable trees.—Trees meeting the specifications for growing stock but not qualifying as desirable trees.

Sawtimber trees.—Live trees of commercial species, 9.0 inches and larger in diameter at breast height for softwoods and 11.0 inches and larger for hardwoods, and containing at least one sawlog.

Poletimber trees.—Live trees of commercial species, 5.0 to 9.0 inches in d.b.h. for softwoods and 5.0 to 11.0 inches for hardwoods, and of good form and vigor.

Saplings.—Live trees of commercial species, 1.0 inch to 5.0 inches in d.b.h. and of good form and vigor.

Cull trees.—Live trees of sawtimber or poletimber size that are unmerchantable for sawlogs now or prospectively because of defect, rot, or species.

Salvable dead trees.—Standing or down dead trees that are considered currently or potentially merchantable.

Stand-Size Class

Sawtimber stands.—Stands at least 10 percent stocked with growing-stock trees, and with sawtimber trees making up a plurality of this stocking.

Poletimber stands.—Stands at least 10 percent stocked with growing-stock trees, and with poletimber trees making up a plurality of this stocking.

Sapling-seedling stands.—Stands at least 10 percent stocked with growing-stock trees, and with saplings and/or seedlings making up a plurality of this stocking.

Nonstocked areas.—Commercial forest lands less than 10 percent stocked with growing-stock trees.

Stocking

A measure of area occupancy by trees of specified classes. Three categories of stocking are considered in the Survey: (1) all live trees, (2) growing-stock trees, and (3) desirable trees. Stocking in terms of all trees is used in the delineation of forest land and forest types. Stocking in terms of growing-stock trees is used in stand-size and age classifications. Stocking in terms of desirable trees is used in delineating area-condition and stand-treatment classes.

Volume

Volume of sawtimber.—Net volume of the sawlog portion of live sawtimber trees, in board feet of the International rule, 1/4-inch kerf.

Volume of growing stock.—Volume of sound wood in the bole of sawtimber and poletimber trees from stump to a minimum 4.0-inch top outside bark or to the point where the central stem breaks into limbs.

Volume of timber.—The volume of sound wood in the bole of growing stock, cull, and salvable dead trees 5.0 inches and larger in d.b.h., from stump to a minimum 4.0-inch top outside bark or to the point where the central stem breaks into limbs.

Softwood Log Grades

Softwood log grades are based on the value yield per unit outturn of yard lumber. The value of lumber yield may be expressed relative to the value of No. 2 Common lumber taken as 100 percent. Expressed thus, studies have shown that lumber from grade 1 logs has a value 244 percent as great as No. 2 Common lumber, while the corresponding percentages are 189 percent for grade 2 logs, 142 percent for grade 3 logs, and 107 percent for grade 4 logs. For detailed specifications of log grades, see **Interim log grades for southern pine**, U. S. Forest Service, Southern Forest Experiment Station, 18 pp. 1953.

Hardwood Log Grades

Specifications for standard lumber logs (hardwood log grades 1, 2, and 3) are based on suitability for standard factory lumber. Studies have shown that, for nearly all species tested, the yield of No. 1 Common and better lumber in grade 1 logs varies from 65 to 80 percent; in grade 2 logs from 40 to 64 percent; and in grade 3 logs from 13 to 36 percent. For detailed specifications of log grades, see **Hardwood log grades for standard lumber: proposals and results**, U. S. Forest Products Laboratory D1737. 1949.

Tie and timber logs are suitable for ties, timber, and certain other construction lumber items. Specifications for tie and timber logs are based chiefly on knot size and log soundness; clear cuttings are not required.

Area-Condition Class

Class 1.—Areas 70 percent or more stocked with desirable trees.

Class 2.—Areas 40 to 70 percent stocked with desirable trees and with 30 percent or less of the area controlled by other trees and/or inhibiting vegetation or surface conditions that will prevent occupancy by desirable trees.

Class 3.—Areas 40 to 70 percent stocked with desirable trees and with more than 30 percent of the area controlled by other trees and/or inhibiting vegetation or surface conditions that will prevent occupancy by desirable trees.

Class 4.—Areas less than 40 percent stocked with desirable trees and with adequate seed source and seedbed favorable to natural regeneration.

Class 5.—Areas less than 40 percent stocked with desirable trees and with inadequate seed source and/or seedbed unfavorable to natural regeneration.

Stand-Treatment Class

No treatment.—Stands ready for harvest, stands in highly productive condition, stands where there is little or no practical opportunity to increase harvest yields by cultural measures, and areas where prompt natural regeneration is expected.

Stand improvement.—Stands where cleaning, thinning, cull-tree deadening, sanitation-salvage cutting, or pruning will effectively increase the volume and/or value of harvest yields.

Regeneration.—Areas where planting, seeding, scarification, removal of inhibiting vegetation, or other measures to obtain natural or artificial regeneration will be primarily effective in increasing yields of desirable trees.

Miscellaneous Definitions

D.b.h. (Diameter breast high).—Tree diameter in inches, outside bark, measured at 4-½ feet above ground.

Diameter classes.—The 2-inch diameter classes extend from 1.0 inch below to 0.9 inch above the stated midpoint. Thus, the 12-inch class includes trees 11.0 inches to and including 12.9 inches d.b.h.

Site classes.—A classification of forest land in terms of inherent capacity to grow crops of industrial wood.

Farmer-owned lands.—Lands owned by operators of farms.

Net annual growth of sawtimber.—The annual change in net board-foot volume of live sawtimber trees during a specified period resulting from natural causes.

Net annual growth of growing stock.—The annual change in volume of sound wood in live sawtimber and poletimber trees during a specified period resulting from natural causes.

Mortality of sawtimber.—The net board-foot volume of sawtimber trees dying annually from natural causes during a specified period.

Mortality of growing stock.—The volume of sound wood in live sawtimber and poletimber trees dying annually from natural causes during a specified period.

Timber cut from sawtimber.—The net board-foot volume of live sawtimber trees cut for forest products during a specified period, including both roundwood products and logging residues.

Timber cut from growing stock.—The volume of sound wood in live sawtimber and poletimber trees cut for forest products during a specified period, including both roundwood products and logging residues.

Timber products.—Roundwood products and by-products of wood manufacturing plants.

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STANDARD TABLES

Tables identical in format to those that follow will be found in all State reports issued by the Forest Survey. Their purpose is to facilitate compilation of data for various States and regions.

Table 1. *Area by land classes, Tennessee, 1961*

Land class	Area
	Thousand acres
Forest:	
Commercial	13,432.4
Productive-reserved	263.5
Total forest	13,695.9
Nonforest ¹	12,826.2
All land ²	26,522.1

¹ Includes some acreage of water according to survey standards of area classification but defined by Bureau of the Census as land.

² From U. S. Bureau of the Census, Land and Water Area of the United States, 1950.

Table 2. *Area of commercial forest land by ownership classes, Tennessee, 1961*

Ownership class	Area
	Thousand acres
Public:	
National forest	591.3
Miscellaneous federal	242.9
State	343.5
County and municipal	21.4
Total public	1,199.1
Private:	
Forest industry	945.9
Farmer	5,911.8
Miscellaneous private	5,375.6
Total private	12,233.3
All ownerships	13,432.4

Table 3. *Area of commercial forest land by stand-size and ownership classes, Tennessee, 1961*

Stand-size class	All ownerships	National forest	Other public	Forest industry	Farmer and misc. private
	Thousand acres				
Sawtimber	5,634.8	443.4	313.5	430.0	4,447.9
Poletimber	4,041.6	103.2	177.5	324.1	3,436.8
Sapling and seedling	3,591.3	44.7	116.8	191.8	3,238.0
Nonstocked areas	164.7				164.7
All classes	13,432.4	591.3	607.8	945.9	11,287.4

Table 4. *Area of commercial forest land by stand-volume classes for sawtimber and other stand-size classes, Tennessee, 1961*

Stand volumes per acre	All stands	Sawtimber stands	Other stands
	Thousand acres		
Less than 1,500 board feet	9,030.7	1,452.7	7,578.0
1,500 to 5,000 board feet	3,580.5	3,360.9	219.6
More than 5,000 board feet	821.2	821.2	
All classes	13,432.4	5,634.8	7,797.6

Table 5. *Area of commercial forest land by stocking classes based on alternative stand components, Tennessee, 1961*

Stocking percentage	Stocking classified in terms of		
	All trees	Growing stock trees	Desirable trees
	Thousand acres		
90 to 100	2,488.9	561.2	29.5
80 to 90	4,458.1	2,067.4	59.9
70 to 80	2,275.3	1,670.6	69.2
60 to 70	2,531.3	3,871.6	265.5
50 to 60	574.5	1,549.3	250.1
40 to 50	611.4	2,156.9	1,197.6
30 to 40	164.7	553.5	1,228.9
20 to 30	221.0	665.1	3,608.1
10 to 20	47.6	172.1	2,450.1
Less than 10	59.6	164.7	4,273.5
All areas	13,432.4	13,432.4	13,432.4

Table 6. *Area of commercial forest land by stocking classes of growing stock trees and by stand-size classes, Tennessee, 1961*

Stocking class	All stands	Saw-timber	Pole-timber	Sapling and seedling	Non-stocked
----- Thousand acres -----					
70 percent or more	4,299.2	2,369.3	1,258.7	671.2	.
40 to 70 percent	7,577.8	2,936.1	2,516.3	2,125.4	.
10 to 40 percent	1,390.7	329.4	266.6	794.7	.
Less than 10 percent	164.7	.	.	.	164.7
All classes	13,432.4	5,634.8	4,041.6	3,591.3	164.7

Table 7. *Area of commercial forest land by area-condition and ownership classes, Tennessee, 1961*

Area-condition class	All ownerships	National forest	Other public	Forest industry	Farmer and misc. private
----- Thousand acres -----					
1	158.6	10.9	34.3	.	113.4
2	548.8	21.9	9.8	29.5	487.6
3	1,164.4	71.8	66.9	67.0	958.7
4	717.7	31.9	23.0	19.9	642.9
5	10,842.9	454.8	473.8	829.5	9,084.8
All classes	13,432.4	591.3	607.8	945.9	11,287.4

Table 8. *Area of commercial forest land by area-condition and stand-treatment classes, Tennessee, 1961*

Area-condition class	All areas	No treatment	Stand improvement	Regeneration
----- Thousand acres -----				
1	158.6	158.6	.	..
2	548.8	548.8	.	...
3	1,164.4	.	1,164.4	...
4	717.7	717.7	..	...
5	10,842.9	.	..	10,842.9
All classes	13,432.4	1,425.1	1,164.4	10,842.9

Table 9. *Area of commercial forest land by site and ownership classes, Tennessee, 1961*

Site class	All ownerships	National forest	Other public	Forest industry	Farmer and misc. private
----- Thousand acres -----					
Potential per acre annual growth					
120 cu. ft. or more	774.6	103.7	63.6	55.1	552.2
85 to 120 cu. ft.	3,812.3	151.0	216.5	409.6	3,035.2
50 to 85 cu. ft.	6,754.7	247.9	293.8	425.2	5,787.8
Less than 50 cu. ft.	2,090.8	88.7	33.9	56.0	1,912.2
All classes	13,432.4	591.3	607.8	945.9	11,287.4

Table 10. *Area of commercial forest land by forest types and ownership classes, Tennessee, 1961*

Type	All ownerships	Public	Private
----- Thousand acres -----			
White-red-jack pine	84.6	17.9	66.7
Loblolly-shortleaf pine	1,113.0	151.9	961.1
Oak-pine	922.7	153.7	769.0
Cedar	637.0	32.7	604.3
Oak-hickory	9,591.0	743.2	8,847.8
Oak-gum-cypress	663.9	52.7	611.2
Elm-ash-cottonwood	220.8	13.1	207.7
Maple-beech-birch	199.4	33.9	165.5
All types	13,432.4	1,199.1	12,233.3

Table 11. *Area of noncommercial forest land by forest types, Tennessee, 1961*

Type	Area ¹
----- Thousand acres -----	
White-red-jack pine	55.8
Spruce-fir	15.6
Loblolly-shortleaf pine	12.3
Oak-pine	43.2
Oak-hickory	102.1
Oak-gum-cypress	1.2
Maple-beech-birch	33.3
All types	263.5

¹ All of the acreage is productive-reserved.

Table 12. *Number of growing-stock trees on commercial forest land by diameter classes and by softwoods and hardwoods, Tennessee, 1961*

D.b.h. class (inches)	All species	Softwood	Hardwood
----- Thousand trees -----			
1.0 — 2.9	4,056,900	526,100	3,530,800
3.0 — 4.9	1,077,590	240,600	836,990
5.0 — 6.9	490,830	114,210	376,620
7.0 — 8.9	273,840	56,060	217,780
9.0 — 10.9	164,820	31,120	133,700
11.0 — 12.9	87,160	11,660	75,500
13.0 — 14.9	49,330	6,430	42,900
15.0 — 16.9	23,640	2,660	20,980
17.0 — 18.9	12,910	1,190	11,720
19.0 and larger	14,670	910	13,760
All classes	6,251,690	990,940	5,260,750

Table 13. Number of cull and salvable dead trees on commercial forest land by diameter groups and by softwoods and hardwoods, Tennessee, 1961

D.b.h. class (inches)	Cull trees	Salvable dead trees
- Thousand trees -		
Softwood:		
5.0 - 8.9	6,100	1,536
9.0 - 18.9	1,530	493
19.0 and larger	50	9
Total	7,680	2,038
Hardwood:		
5.0 - 10.9	218,760	1,162
11.0 - 18.9	50,220	531
19.0 and larger	9,060	119
Total	278,040	1,812
All species	285,720	3,850

Table 14. Volume of timber on commercial forest land by class of timber and by softwoods and hardwoods, Tennessee, 1961

Class of timber	All species	Softwood	Hardwood
- - - Million cubic feet - - -			
Sawtimber trees:			
Sawlog portion	3,181.0	685.6	2,495.4
Upper stem portion	1,011.8	97.8	914.0
Total	4,192.8	783.4	3,409.4
Poletimber trees	3,016.6	452.6	2,564.0
All growing stock	7,209.4	1,236.0	5,973.4
Sound cull trees:			
Sawtimber-size	532.8	9.5	523.3
Poletimber-size	296.2	6.0	290.2
Total	829.0	15.5	813.5
Rotten cull trees:			
Sawtimber-size	526.5	2.3	524.2
Poletimber-size	138.8	1.7	137.1
Total	665.3	4.0	661.3
Salvable dead trees:			
Sawtimber-size	22.1	7.0	15.1
Poletimber-size	7.7	4.6	3.1
Total	29.8	11.6	18.2
All timber	8,733.5	1,267.1	7,466.4

Table 15. Volume of growing stock and sawtimber on commercial forest land by ownership classes and by softwoods and hardwoods, Tennessee, 1961

Ownership class	Growing stock			Sawtimber		
	All species	Soft-wood	Hard-wood	All species	Soft-wood	Hard-wood
	- Million cubic feet -			- Million board feet -		
Public:						
National forest	541.3	245.2	296.1	1,839.4	959.8	879.6
Other public	392.8	84.9	307.9	1,179.6	295.9	883.7
Total	934.1	330.1	604.0	3,019.0	1,255.7	1,763.3
Private:						
Forest industry	510.9	80.7	430.2	1,346.7	284.2	1,062.5
Farmer and misc. private	5,764.4	825.2	4,939.2	15,716.1	2,588.9	13,127.2
Total	6,275.3	905.9	5,369.4	17,062.8	2,873.1	14,189.7
All ownerships	7,209.4	1,236.0	5,973.4	20,081.8	4,128.8	15,953.0

Table 16. Volume of growing stock and sawtimber on commercial forest land by stand-size classes and by softwoods and hardwoods, Tennessee, 1961

Stand-size class	Growing stock			Sawtimber		
	All species	Soft-wood	Hard-wood	All species	Soft-wood	Hard-wood
	- Million cubic feet -			- Million board feet -		
Sawtimber	4,759.4	857.9	3,901.5	16,854.3	3,536.4	13,317.9
Poletimber	2,007.3	288.1	1,719.2	2,450.7	443.0	2,007.7
Sapling and seedling	442.3	89.6	352.7	775.5	148.1	627.4
Nonstocked areas	.4	.4	.	1.3	1.3	.
All classes	7,209.4	1,236.0	5,973.4	20,081.8	4,128.8	15,953.0

Table 17. Volume of growing stock on commercial forest land by species and diameter classes, Tennessee, 1961

Species	Diameter class (inches at breast height)								
	All classes	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 and larger
	----- Million cubic feet -----								
Softwood:									
Shortleaf and loblolly pines	495.9	82.4	127.9	117.8	59.7	45.8	39.4	15.9	7.0
Other yellow pines	421.7	67.3	97.8	112.1	70.8	47.2	14.5	4.1	7.9
White pine	115.2	5.4	15.6	10.0	9.8	20.3	15.8	19.0	19.3
Hemlock	99.4	5.4	6.0	6.2	17.9	20.2	17.5	7.7	18.5
Cypress	37.8	.5	.9	.9	6.9	2.5	2.4	7.8	15.9
Other softwoods	66.0	23.5	19.9	13.0	5.4	3.8	.4	.	.
Total	1,236.0	184.5	268.1	260.0	170.5	139.8	90.0	54.5	68.6
Hardwoods:									
Select white oaks ¹	817.4	78.6	133.5	165.1	140.5	116.4	55.4	41.9	86.0
Select red oaks ²	339.7	13.9	30.1	32.9	42.7	48.4	45.3	28.7	97.7
Other white oaks	726.7	72.2	126.0	143.8	106.0	80.3	76.6	31.2	90.6
Other red oaks	985.0	90.0	143.9	163.4	148.9	149.9	102.3	63.5	123.1
Hickory	830.6	88.3	129.2	171.8	139.8	111.7	65.0	39.3	85.5
Yellow birch	7.4	1.1	.8	.	.9	.	.	1.7	2.9
Hard maple	114.6	8.2	15.8	29.7	14.1	10.3	7.7	11.2	17.6
Soft maple	199.0	28.6	42.2	43.6	26.4	22.6	14.2	10.9	10.5
Beech	115.2	8.8	11.5	10.1	8.8	10.5	10.7	9.9	44.9
Sweetgum	229.5	18.5	37.2	40.6	30.9	31.8	25.3	14.6	30.6
Tupelo and blackgum	203.7	16.4	27.4	37.4	32.4	32.0	28.6	11.6	17.9
Ash	160.2	20.5	20.9	31.3	16.6	19.4	10.5	17.3	23.7
Cottonwood	64.4	.5	.	.	2.4	2.9	15.4	18.4	24.8
Basswood	45.3	3.4	6.8	7.4	10.6	1.4	5.0	4.8	5.9
Yellow-poplar	434.8	28.0	56.0	75.1	68.1	71.2	36.7	47.8	51.3
Black walnut	86.8	9.5	11.2	18.9	20.2	11.6	3.9	4.6	6.9
Other hardwoods	613.1	96.7	116.5	100.1	65.7	58.7	47.9	48.7	78.8
Total	5,673.4	563.8	909.0	1,071.2	875.0	779.1	550.5	406.1	798.7
All species	7,209.4	768.3	1,177.1	1,331.2	1,045.5	918.9	640.5	460.6	867.3

¹ Includes white, swamp white, and chinkapin oaks.

² Includes cherrybark, Shumard, and northern red oaks.

Table 18. Volume of sawtimber on commercial forest land by species and diameter classes, Tennessee, 1961

Species	Diameter class (inches at breast height)						
	All classes	9.0- 10.9	11.0- 12.9	13.0- 14.9	15.0- 16.9	17.0- 18.9	19.0 and larger
----- Million board feet -----							
Softwood:							
Shortleaf and loblolly pines	1,486.0	538.5	317.9	265.6	230.2	92.6	41.2
Other yellow pines	1,279.7	510.8	369.7	253.0	82.3	22.5	41.4
White pine	542.1	39.6	49.7	117.7	98.5	117.5	119.1
Hemlock	497.3	20.7	94.4	110.1	106.9	45.5	119.7
Cypress	218.8	2.3	37.4	14.7	14.3	47.5	102.6
Other softwoods	104.9	56.6	26.5	19.3	2.5	.	..
Total	4,128.8	1,168.5	895.6	780.4	534.7	325.6	424.0
Hardwood:							
Select white oaks ¹	2,053.2	.	615.6	544.9	257.4	204.0	431.3
Select red oaks ²	1,267.1	.	179.7	227.5	219.6	142.3	498.0
Other white oaks	1,745.3	.	451.1	362.5	355.5	147.4	428.8
Other red oaks	2,764.4	.	643.8	698.0	491.2	312.7	618.7
Hickory	1,998.4	.	600.4	502.0	301.2	185.0	409.8
Yellow birch	27.2	.	3.9	.	.	8.6	14.7
Hard maple	293.6	.	61.6	49.1	37.3	55.5	90.1
Soft maple	398.0	.	119.5	105.1	67.6	53.0	52.8
Beech	419.9	.	38.1	49.4	51.6	49.1	231.7
Sweetgum	627.6	.	136.3	147.5	120.5	71.7	151.6
Tupelo and blackgum	551.2	.	134.9	141.3	131.0	56.4	87.6
Ash	414.4	.	73.7	84.0	50.0	85.9	120.8
Cottonwood	321.1	.	10.2	13.1	77.1	94.3	126.4
Basswood	134.2	.	49.2	7.1	24.9	24.1	28.9
Yellow-poplar	1,310.6	.	295.9	337.9	180.0	234.2	262.6
Black walnut	218.0	.	88.1	55.4	18.1	21.7	34.7
Other hardwoods	1,408.8	.	279.2	275.4	228.2	238.4	387.6
Total	15,953.0	.	3,781.2	3,600.2	2,611.2	1,984.3	3,976.1
All species	20,081.8	1,168.5	4,676.8	4,380.6	3,145.9	2,309.9	4,400.1

¹ Includes white, swamp chestnut, swamp white, and chinkapin oaks.

² Includes cherrybark, Shumard, and northern red oaks.

Table 19. Volume of sawtimber on commercial forest land by species and log grade, Tennessee, 1961

Species	All grades	Grade 1 logs	Grade 2 logs	Grade 3 logs	Lower grade logs
----- Million board feet -----					
Softwood:					
Yellow pines	2,765.7	.	242.3	1,029.5	1,493.9
White pine	542.1	.	12.4	187.4	342.3
Other softwoods	821.0	143.1	61.8	242.5	373.6
Total	4,128.8	143.1	316.5	1,459.4	2,209.8
Hardwood:					
Select white and red oaks	3,320.3	427.3	717.5	1,797.3	378.2
Other white and red oaks	4,509.7	474.1	882.2	2,454.0	699.4
Hickory	1,998.4	117.8	386.7	1,046.1	447.8
Hard maple	293.6	30.9	39.8	167.6	55.3
Sweetgum	627.6	45.5	132.4	323.1	126.6
Ash, black walnut, and black cherry	660.6	40.0	147.4	395.1	78.1
Yellow-poplar	1,310.6	144.4	252.6	589.9	323.7
Other hardwoods	3,232.2	265.3	840.9	1,702.4	423.6
Total	15,953.0	1,545.3	3,399.5	8,475.5	2,532.7
All species	20,081.8	1,688.4	3,716.0	9,934.9	4,742.5

Table 20. Volume of salvable dead sawtimber-size trees on commercial forest land by softwoods and hardwoods, Tennessee, 1961

Species group	Volume
	Million board feet
Softwood	34.8
Hardwood	71.1
All species	105.9

Table 21. Net annual growth and cut of growing stock on commercial forest land by species, Tennessee, 1960

Species	Net annual growth	Annual timber cut
	Million cubic feet	
Softwood:		
Yellow pines	49.0	37.8
Other softwoods	16.9	7.6
Total	65.9	45.4
Hardwood:		
Select white and red oaks	49.6	42.2
Other white and red oaks	73.5	59.4
Hickory	35.6	11.9
Yellow-poplar	18.6	7.1
Other hardwoods	78.9	41.7
Total	256.2	162.3
All species	322.1	207.7

Table 22. Net annual growth and cut of growing stock on commercial forest land by ownership classes and by softwoods and hardwoods, Tennessee, 1960

Ownership class	Net annual growth			Annual timber cut		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	----- Million cubic feet -----					
Public	43.5	17.6	25.9	13.3	3.5	9.8
Forest industry	22.8	4.3	18.5	23.1	.8	22.3
Farmer and misc. private	255.8	44.0	211.8	171.3	41.1	130.2
All ownerships	322.1	65.9	256.2	207.7	45.4	162.3

Table 23. Net annual growth and cut of sawtimber on commercial forest land by species, Tennessee, 1960

Species	Net annual growth	Annual timber cut
	Million board feet	
Softwood:		
Yellow pines	166.2	135.9
Other softwoods	82.0	32.7
Total	248.2	168.6
Hardwood:		
Select white and red oaks	152.5	171.0
Other white and red oaks	207.0	215.0
Hickory	91.8	39.7
Yellow-poplar	60.2	24.4
Other hardwoods	221.0	160.7
Total	732.5	610.8
All species	980.7	779.4

Table 24. *Net annual growth and cut of sawtimber on commercial forest land by ownership classes and by softwoods and hardwoods, Tennessee, 1960*

Ownership class	Net annual growth			Annual timber cut		
	All species	Soft-wood	Hard-wood	All species	Soft-wood	Hard-wood
----- Million board feet -----						
Public	156.5	75.5	81.0	51.4	15.8	35.6
Forest industry	65.9	17.1	48.8	89.3	2.5	86.8
Farmer and misc. private	758.3	155.6	602.7	638.7	150.3	488.4
All ownerships	980.7	248.2	732.5	779.4	168.6	610.8

Table 25. *Annual mortality of growing stock and sawtimber on commercial forest land by species, Tennessee, 1960*

Species	Growing stock	Saw-timber
	Million cubic feet	Million board feet
Softwood:		
Yellow pines	6.4	16.6
Other softwoods	2.3	8.2
Total	8.7	24.8
Hardwood:		
Select white and red oaks	8.6	23.2
Other white and red oaks	12.7	31.5
Hickory	6.2	13.9
Yellow-poplar	3.2	9.2
Other hardwoods	13.8	33.7
Total	44.5	111.5
All species	53.2	136.3

Table 26. *Annual mortality of growing stock and sawtimber on commercial forest land by ownership classes and by softwoods and hardwoods, Tennessee, 1960*

Ownership class	Growing stock			Sawtimber		
	All species	Soft-wood	Hard-wood	All species	Soft-wood	Hard-wood
----- Million cubic feet ----- Million board feet -----						
Public	6.8	2.3	4.5	19.9	7.6	12.3
Forest industry	3.8	.6	3.2	9.1	1.7	7.4
Farmer and misc. private	42.6	5.8	36.8	107.3	15.5	91.8
All ownerships	53.2	8.7	44.5	136.3	24.8	111.5

Table 27. *Annual mortality of growing stock and sawtimber on commercial forest land by causes and by softwoods and hardwoods, Tennessee, 1960*

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	1.9	0.3	1.6	2.5	.	2.5
Insects	2.0	2.0	...	8.1	8.1	.
Disease	.1	.1	...	.6	.6	...
Other	16.0	4.4	11.6	42.9	9.4	33.5
Unknown	33.2	1.9	31.3	82.2	6.7	75.5
All causes	53.2	8.7	44.5	136.3	24.8	111.5

Table 28. Total output of timber products by product, by type of material used, and by softwoods and hardwoods, Tennessee, 1960

Product and species group	Total output in standard units		Output from roundwood		Output from plant by-products (standard units)
	Unit	Number	Standard units	M cubic feet	
Sawlogs:					
Softwood	M bd. ft. ¹	156,939	156,939	27,150	
Hardwood	M bd. ft. ¹	476,564	476,564	72,914	
Total	M bd. ft. ¹	633,503	633,503	100,064	
Veneer logs and bolts:					
Softwood	M bd. ft.	351	351	58	
Hardwood	M bd. ft.	10,713	10,713	1,500	
Total	M bd. ft.	11,064	11,064	1,558	
Cooperage logs and bolts:					
Softwood	M bd. ft.	115	115	20	
Hardwood	M bd. ft.	25,529	25,529	3,675	
Total	M bd. ft.	25,644	25,644	3,695	
Pulpwood:					
Softwood	Std. cords ²	189,887	188,754	14,232	1,133
Hardwood	Std. cords ²	171,891	164,668	12,811	7,223
Total	Std. cords ²	361,778	353,422	27,043	8,356
Piling:					
Softwood	M linear ft.	483	483	309	
Hardwood	M linear ft.				
Total	M linear ft.	483	483	309	
Poles:					
Softwood	M pieces	24	24	109	
Hardwood	M pieces				
Total	M pieces	24	24	109	
Mine timbers (round):					
Softwood	M cu. ft.	169	169	169	
Hardwood	M cu. ft.	1,286	1,286	1,286	
Total	M cu. ft.	1,455	1,455	1,455	
Misc. industrial wood: ³					
Softwood	M cu. ft.	997	312	312	685
Hardwood	M cu. ft.	17,008	10,871	10,871	6,137
Total	M cu. ft.	18,005	11,183	11,183	6,822
Posts (round and split):					
Softwood	M pieces	2,310	2,310	1,593	
Hardwood	M pieces	7,739	7,739	5,692	
Total	M pieces	10,049	10,049	7,285	
Fuelwood:					
Softwood	Std. cords	32,457	3,756	283	28,701
Hardwood	Std. cords	661,383	419,490	31,462	241,893
Total	Std. cords	693,840	423,246	31,745	270,594
All products:					
Softwood	M cu. ft.			44,235	
Hardwood	M cu. ft.			140,211	
Total	M cu. ft.			184,446	

¹ International 1/4-inch rule.

² Rough wood basis (for example, chips converted to equivalent standard cords).

³ Includes hewn ties, chemical wood, handle stock, furniture and other dimension, shuttleblocks, and miscellaneous domestic use. Additionally, byproducts include material used for livestock bedding, mulch, etc.

Table 29. Total output of roundwood products by source and by softwoods and hardwoods, Tennessee, 1960

Source	All species	Softwood	Hardwood
--- Thousand cubic feet ---			
Growing stock trees: ¹			
Sawtimber	121,760	30,909	90,851
Poletimber	42,540	11,577	30,963
Total	164,300	42,486	121,814
Cull trees ¹	5,534	16	5,518
Salvable dead trees ¹	4,299	183	4,116
Other sources ²	10,313	1,550	8,763
All sources	184,446	44,235	140,211

¹ On commercial forest land.

² Includes noncommercial forest land, nonforest land such as fence rows, trees less than 5.0 inches in diameter, and treetops and limbs.

Table 30. Annual timber cut from growing stock on commercial forest land by product and logging residues, and by softwoods and hardwoods, Tennessee, 1960

Product and residues	All species	Softwood	Hardwood
--- Thousand cubic feet ---			
Roundwood products:			
Sawlogs	98,321	26,837	71,484
Veneer logs and bolts	1,547	58	1,489
Cooperage logs and bolts	3,645	19	3,626
Pulpwood	24,221	13,024	11,197
Piling	310	310	
Poles	109	109	
Mine timbers	1,455	169	1,286
Miscellaneous industrial wood ¹	9,263	306	8,957
Posts	6,802	1,485	5,317
Fuelwood	18,627	169	18,458
All products	164,300	42,486	121,814
Logging residues	43,446	2,886	40,560
Timber cut	207,746	45,372	162,374

¹ Includes 714 M cu. ft. of miscellaneous farm products.

Table 31. Annual timber cut from live sawtimber on commercial forest land by product and logging residues, and by softwoods and hardwoods, Tennessee, 1960

Product and residues	All species	Softwood	Hardwood
-- Thousand board feet --			
Roundwood products:			
Sawlogs	584,397	145,482	438,915
Veneer logs and bolts	11,030	328	10,702
Cooperage logs and bolts	24,434	107	24,327
Pulpwood	44,957	16,799	28,158
Piling	1,686	1,686	
Poles	594	594	
Mine timbers	1,784	79	1,705
Miscellaneous industrial wood	30,774	166	30,608
Posts	3,575	185	3,390
Fuelwood	27,686		27,686
All products	730,917	165,426	565,491
Logging residues	48,519	3,132	45,387
Timber cut	779,436	168,558	610,878

Table 32. Volume of plant residues by industrial source and type of residue, and by softwoods and hardwoods, Tennessee, 1960

Industrial source	All species			Softwood			Hardwood		
	Total	Coarse ¹	Fine ²	Total	Coarse ¹	Fine ²	Total	Coarse ¹	Fine ²
----- Thousand cubic feet -----									
Lumber industry	26,984	11,092	15,892	10,219	5,664	4,555	16,765	5,428	11,337
Veneer and plywood industry	45	16	29	17	16	1	28		28
Other primary industries	1,938	411	1,527	18	7	11	1,920	404	1,516
All industries	28,967	11,519	17,448	10,254	5,687	4,567	18,713	5,832	12,881

¹ Unused material suitable for chipping, such as slabs, edgings, and veneer cores.

² Unused material not suitable for chipping, such as sawdust and shavings.

Table 33. Timber growth projections, Tennessee, 1961 to 1991 ¹

Period	Assumed cut			Projected growth		
	All species	Soft-wood	Hard-wood	All species	Soft-wood	Hard-wood

GROWING STOCK						
----- Thousand cubic feet -----						
1961 (year of inventory)	207,700	45,400	162,300	322,100	65,900	256,200
1971 (plus 10 years)	215,600	50,400	165,200	363,200	75,800	287,400
1981 (plus 20 years)	230,200	59,800	170,400	425,900	85,700	340,200
1991 (plus 30 years)	252,700	71,800	180,900	506,900	95,900	411,000

SAWTIMBER						
----- Thousand board feet -----						
1961 (year of inventory)	779,400	168,600	610,800	980,700	248,200	732,500
1971 (plus 10 years)	813,300	183,700	629,600	1,067,400	293,400	774,000
1981 (plus 20 years)	876,400	211,900	664,500	1,177,500	361,700	815,800
1991 (plus 30 years)	947,800	240,800	707,000	1,296,900	445,200	851,700

¹ Based on assumptions that timber output in the United States and Tennessee will increase with anticipated gains in population and gross national product; that industrial wood products will largely maintain their relative position in the national economy; and that forestry progress will continue at the rate indicated by recent trends.



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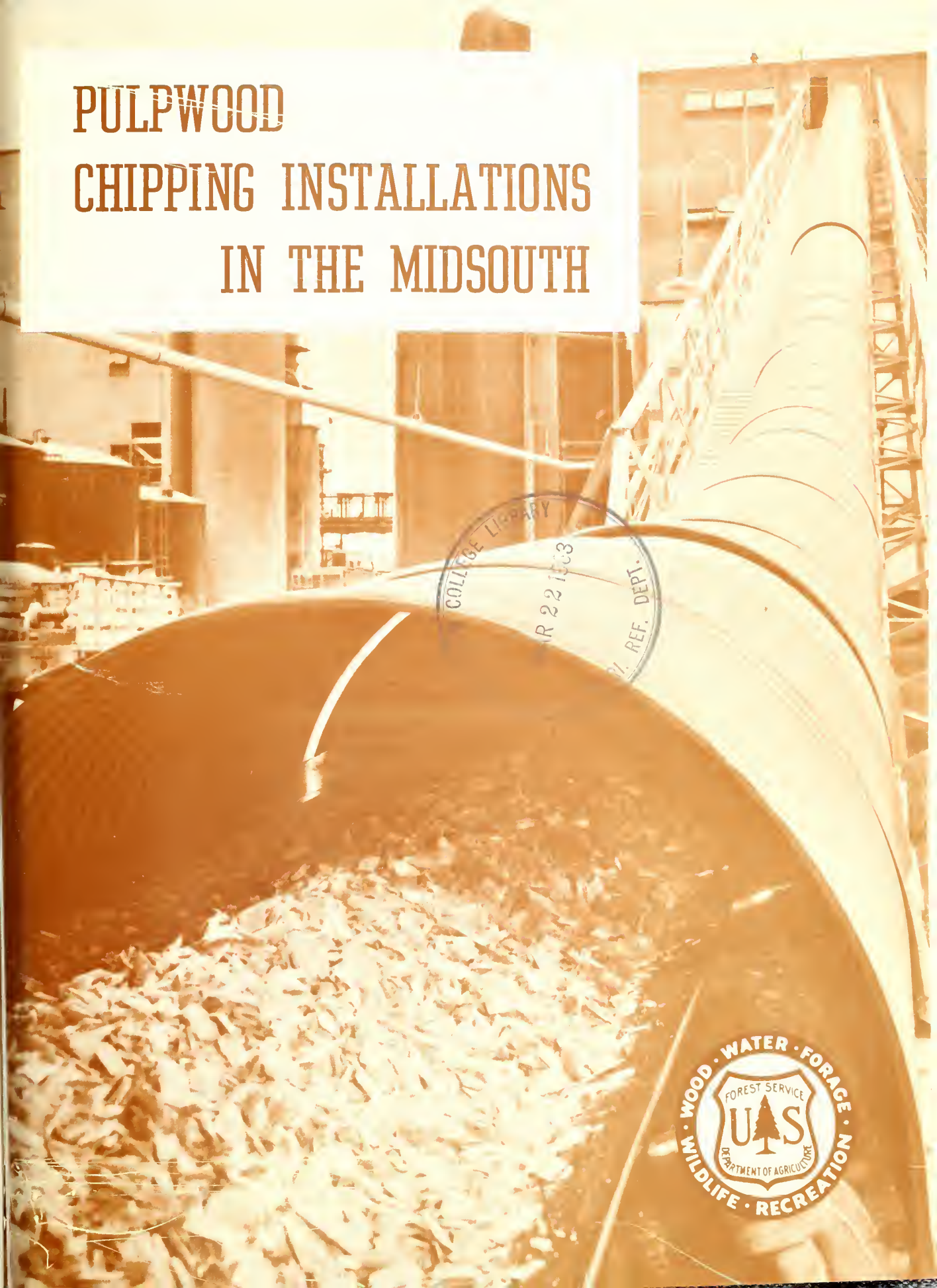
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New Orleans, Louisiana

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1962

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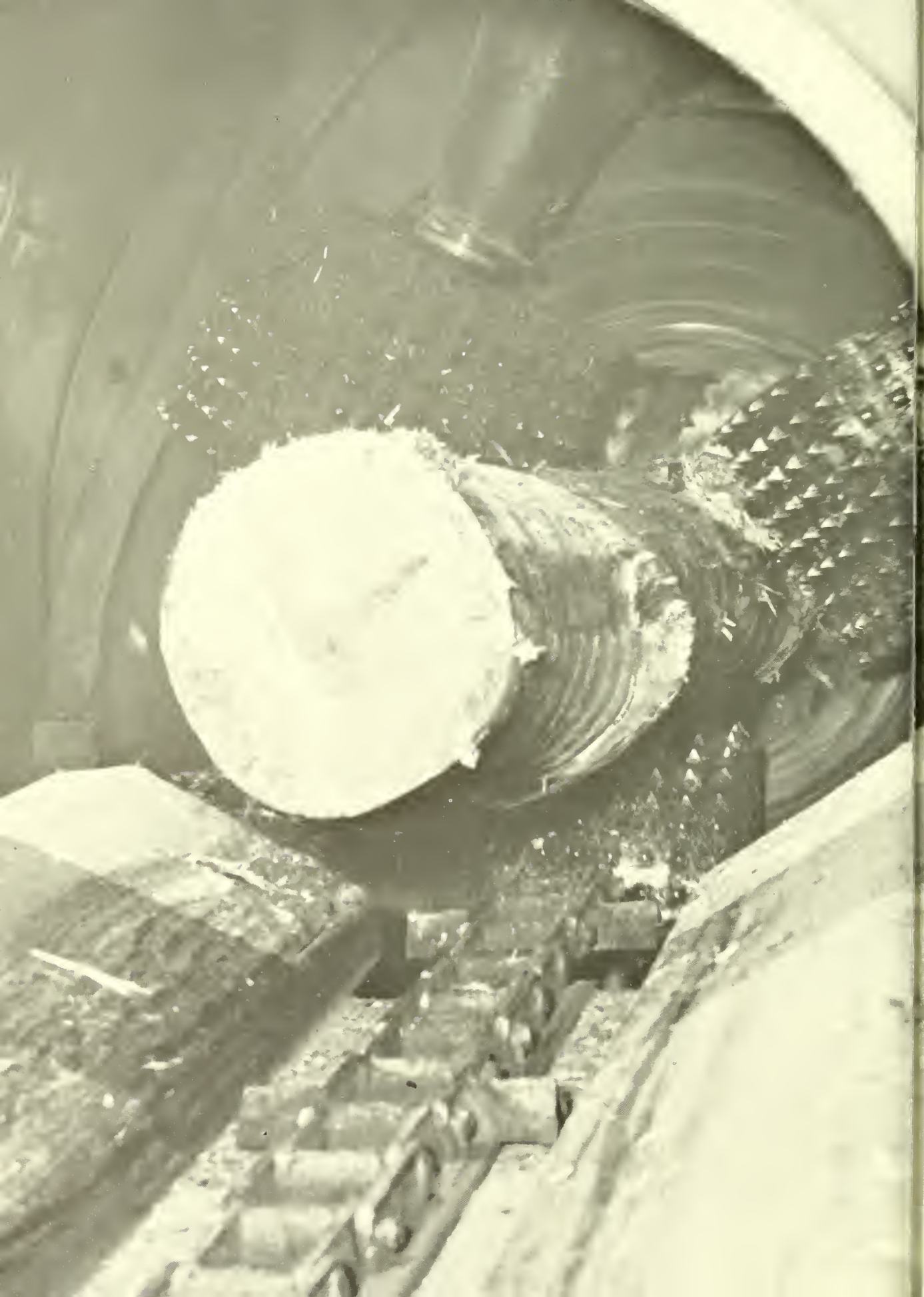
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AT LEAST 372 MIDSOUTH FIRMS are currently producing chips for sale to pulp mills, according to information gathered in mid-1962. Alabama leads other States with 136. Mississippi has 71 installations, Arkansas 62, Louisiana 54, Texas 35, Tennessee 11, and Oklahoma 3. An additional 16 sawmills are equipped with log barkers only.

Sawmill residues are the main source of raw material for more than 90 percent of the Midsouth's chipping installations. The rest largely depend upon wood-preserving plants, veneer mills, and box plants.

The use of plant waste has rocketed since the first commercial chipping facility was opened in 1952 at a sawmill in Bradley County, Arkansas. By the end of 1953, a dozen southern sawmills were in the business; their combined annual output totaled 19,000 cord-equivalents. Thereafter the volume rose swiftly and steadily, until by 1961 it was 1,620,000 cords. Alabama is the leading producer, with Arkansas and Texas next (fig. 1). Today chips comprise 15 percent of the Midsouth's entire pulpwood production (fig. 2).

Eighty-eight percent of the chips are southern pine. Hardwood sales are presently handicapped by the need to separate species for most pulping processes. Nevertheless the rate of increase from 1960 to 1961 was 22 percent for hardwoods as compared to 9 percent for pine.

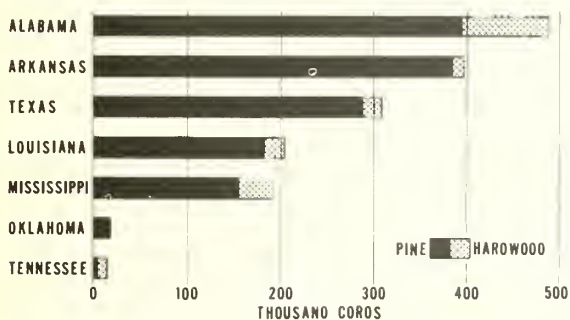


Figure 1. Pulpwood chip output in the Midsouth, 1961.

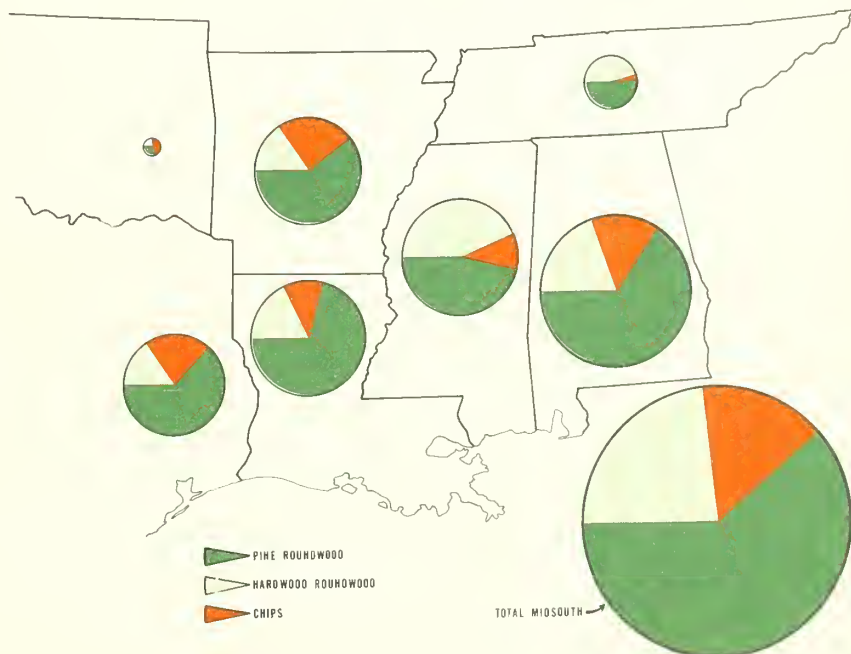


Figure 2. Pulpwood by State and type of product, 1961. Area of circle represents total State production.

The spectacular rise in chip manufacture has created some concern about future markets for pulpwood bolts. As is shown by figure 3, however, the annual rate of increase in chip output peaked in 1957, and since then has steadily declined. In the near future, the trends should closely parallel those for lumber output.

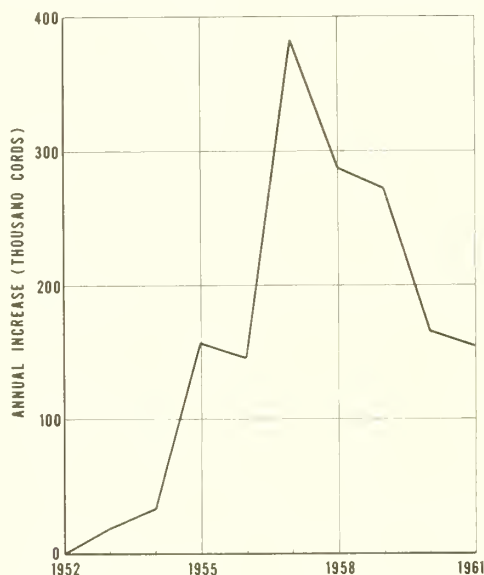


Figure 3. Annual increase in Midsouth chip output.

Producers of pulp chips were paid 23 million dollars for their 1961 deliveries. The 1953 receipts were less than a half million dollars (fig. 4). Prices in open-market transactions have remained relatively stable during the past 5 years. The averages in 1961 were \$6.30 per ton for pine and \$4.98 for hardwood. Nearly 90 percent of all chips are sold screened.

Of the Midsouth's 33 pulp companies, 23 purchased chips in 1961. Their combined purchases accounted for 91 percent of the region's chip output. The rest went to 7 companies in Florida, Georgia, Illinois, and North Carolina. Half of the 30 companies accepted both pine and hardwood, 37 percent only pine, and 13 percent only hardwood.

Nearly three-fourths of the material is pulped within the State in which it is manufactured. Some 91 percent of Texas' chipped material is used by in-State mills—the highest proportion for any Midsouth State (fig. 5).

Most companies sell to only one pulp firm, but 25 marketed chips to 2 establishments in 1961, and 5 firms delivered to 3 customers apiece.

Pulp chips move primarily by rail car and truck. Airline distances of shipments to markets range up to 340 miles. Of the total number of chipping establishments active in 1962, 8 percent are within 20 miles of receiving pulp mills, 44 percent within 20 to 59 miles, 30 percent within 60 to 99 miles, and 17 percent within 100 to 199 miles; 1 percent of the total ship more than 200 miles.

Tables 1 through 7 identify the 372 Midsouth wood-using firms (fig. 6) that are equipped with machinery for converting plant residues into pulp chips. Also included are the 16 sawmills with log barkers only. Companies are listed by State, county, and nearest town. If a company makes chips from the residues of more than one plant at the same location, each type of plant at that location is listed. Plants are coded as follows:

- S Sawmill
- V Veneer mill
- T Wood-preserving plant
- C Chipping concentration yard
- R Roundwood chipping yard
- O Other plant

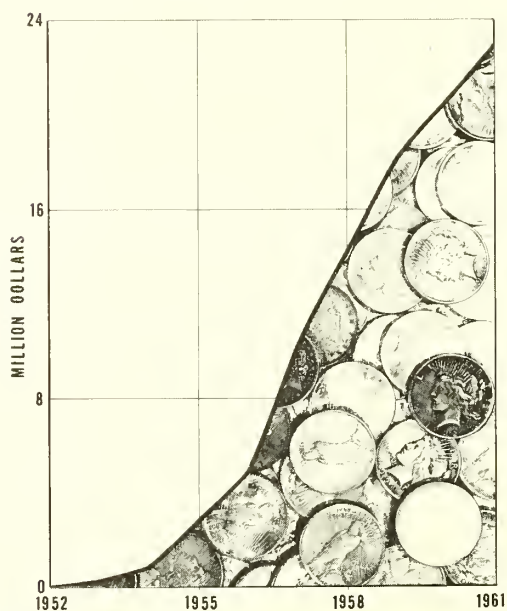


Figure 4. Value of chips in the Midsouth.

Though an effort was made to locate all installations active in 1962, a few may have been overlooked or misclassified. Omission of a firm, therefore, is no reflection upon its activities. Nor does inclusion constitute a recommendation.

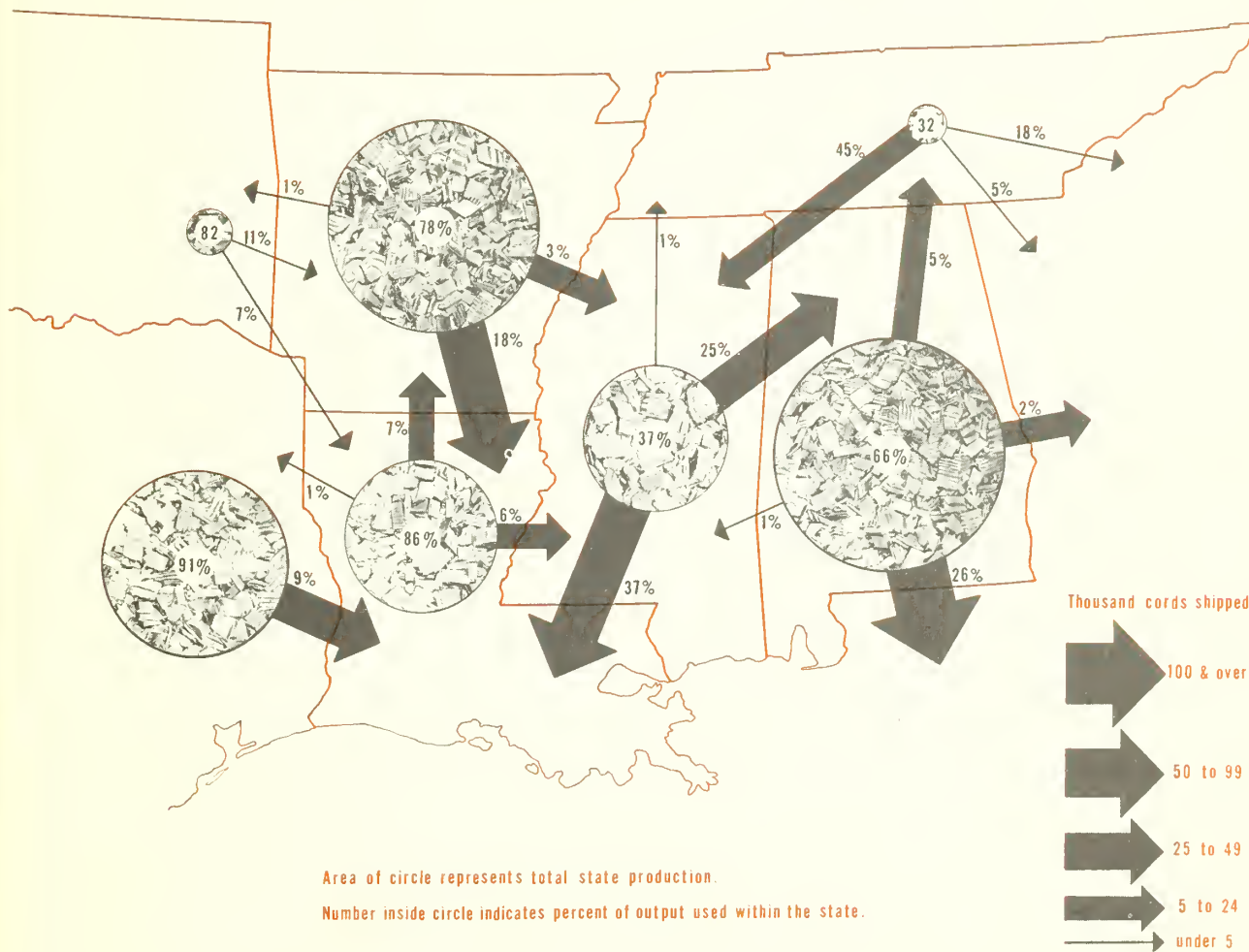


Figure 5. Out-of-state chip shipments, 1961.

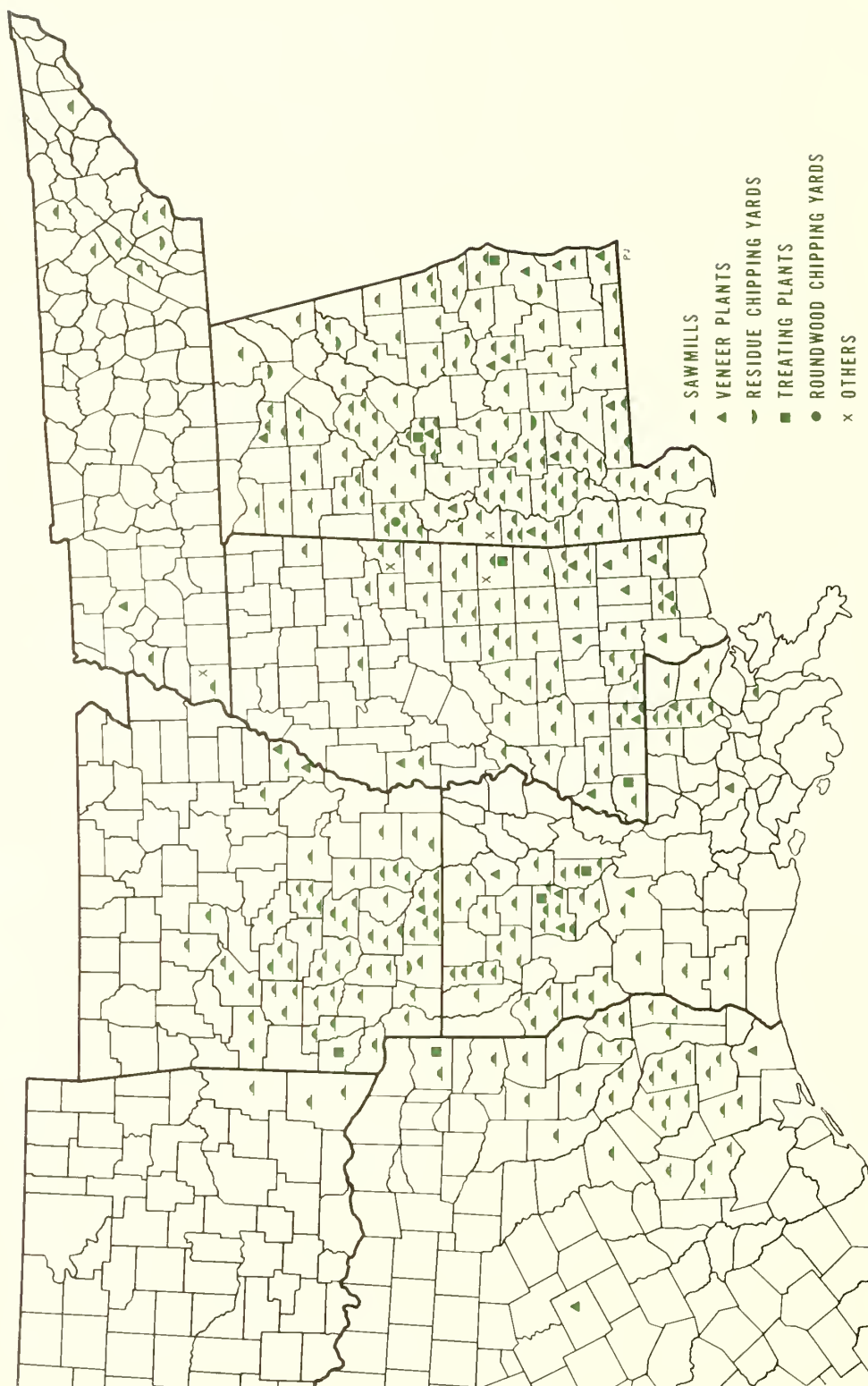


Figure 6. Pulpwood chipping installations, 1962.

Table 1. *Alabama chipping installations*

County	Name	Type of plant	Location
Baldwin	: Thomas J. Earle, Inc.	S	Stockton
	L. J. Earley	S	Robertsdale
	O. J. Early Lumber Co.	S	Lottie
	Ray E. Loper Lumber Co.	S	Bay Minette
	J. M. McMillan	S	Stockton
	W. N. Stuckey Lumber Co.	S	Bay Minette
Barbour	: Alabama-Georgia Veneer Co.	V	Eufaula
	Barbour Chip Co., Inc.	C	Eufaula
Bibb	: Olon Belcher Lumber Co., Inc.	S	Brent
	S. E. Belcher, Inc.	S	Green Pond
	Belcher Wood Products Co., Ltd.	S,V,T	Centreville
	Briarfield Sawmill Co.	S	Brierfield
	I. L. Burt Lumber Co.	S	West Blocton
	Leonard Kornegay	S	Eoline
Butler	: McMurphy Sawmill Co.	S	Chapman
	W. T. Smith Lumber Co.	S	Chapman
Calhoun	: Anniston Wood Products	C	Anniston
	Read Brothers Lumber Co.	S	Wellington
	Webb Lumber Co. ¹	S	Anniston
Chambers	: Bailey Brothers	S	Abanda
	East Alabama Lumber Co.	S	Lafayette
	Swan Lumber Co.	S	Lafayette
Cherokee	: Cedar Bluff Lumber Co.	S	Cedar Bluff
Choctaw	: General Box Co.	V	Gilbertown
	F. E. Gibson Lumber Co.	S	Gilbertown
	Jachin Lumber Co.	S	Jachin
	J. W. Lassiter Lumber Co.	S	Cullomburg
	C. F. Littlepage Lumber Co., Inc.	S	Mt. Sterling
	Melvin Lumber Co.	S	Melvin
Clarke	: Cogle Sawmill Co.,		
	division of Marathon Southern	S	Thomasville
	Dickinson Lumber Co.	S	Dickenson
	General Supply Co.	S	Dickenson
	Jackson Sawmill Co., Inc.	S	Jackson
	McCorquodale Brothers Co., Inc.	S	Jackson
	Scotch Lumber Co.	S	Fulton
	M. W. Smith Lumber Co., Inc.	S	Jackson
Clay	: M. W. Smith Lumber Co., Inc.	S	Whatley
Clay	: Pruett Lumber Co.	S	Lineville
	Williamson Lumber Co. ¹	S	Ashland
Coffee	: J. H. Flack Lumber Co.	S	Elba
Colbert	: McKinney Lumber Co.	S	Muscle Shoals
Conecuh	: McMillan Mill Co.	S	Castleberry
Coosa	: W. E. Dunham Lumber Co.	S	Weogufka
	Sterling Lumber & Supply Co.	S	Goodwater
Covington	: Dixon Lumber Co.	S	Andalusia
	Lockhart Lumber Co.	S	Lockhart
Crenshaw	: D & D Lumber Co.	S	Brantley
Cullman	: C. Arnold & Son., Inc.	S	Cullman
	N. C. Arnold & Son Lumber Co. ¹	S	Phelan
	Buettner Brothers Lumber Co., Inc.	S	Cullman

Table 1. *Alabama chipping installations (Continued)*

County	Name	Type of plant	Location
Dallas	: Belcher Wood Products, Ltd.	S	Plantersville
	Miller & Co.	S	Selma
	Miller & Co.	S	Selma
DeKalb	: Bailey Lumber Co. ¹	S	Collinsville
	Wood & Stallings Lumber Co. ¹	S	Rainsville
	Word Lumber Co. ¹	S	Ft. Payne
Elmore	: S. C. Bass Lumber Co. ¹	S	Wetumpka
	Johnson & Smith Lumber Co.	S	Elmore
	Robinson & Smith Lumber Co. ¹	S	Wetumpka
	Wetumpka Wood Products	C	Wetumpka
Escambia	: T. R. Miller Mill Co.	S,V	Brewton
	Price Lumber Co.	S	Brewton
	Swift Lumber Co.	S	Atmore
	B. N. White Lumber Co.	S	Flomaton
Fayette	: W. R. Bobo Lumber Co.	S	Crossville
	Carpenter Lumber Co.	S	Berry
	Long Brothers Sawmills	S	Etteca
	Newman Lumber Co.	S	Belk
Franklin	: Herman A. Keeton Lumber Co.	S	Red Bay
Geneva	: Casey Brothers Lumber Co.	S	Slocomb
	Logan Lumber Co.	S	Samson
Greene	: Colson Lumber Co.	S	Eutaw
	Sumter Veneer Works	V	Eutaw
Hale	: Bazemore Lumber Co.	S	Greensboro
Henry	: Dixie Veneer Co.	S,V	Abbeville
Houston	: Casey Lumber Co.	S	Dothan
	Howell Plywood Corp.	V	Dothan
Jackson	: W. J. Word Lumber Co.	S	Scottsboro
Jefferson	: W. A. Belcher Lumber Co., Inc.	S	Birmingham
	J. T. Capps & Son	S	Concord
	W. L. Edge & Son Lumber Co.	S	Adger
	Letson Lumber Co.	S	Bessemer
	McCord Lumber Co.	S	Pinson
	Miller & Co. of Birmingham, Inc.	S	Birmingham
	Willis Brothers Lumber Co. ¹	S	Morris
Lee	: Dudley Lumber Co.	S	Salem
	Society Hill Lumber Co.	S	Opelika
Lowndes	: Howard Lumber Co.	S	St. Clair
Macon	: Sistrunk Lumber Co.	S	Society Hill
Marengo	: Chattanooga Box & Lumber Co.	S	Linden
	Linden Lumber Co.	S	Linden
	Miller & Co.	S	Demopolis
	Rolison Lumber Co.	S	Sweetwater
	Thomas & Miller Lumber Co.	S	Linden
Marion	: W. T. Vick Lumber Co.	S	Hamilton
Marshall	: Hiwassee Land Co.	C	Guntersville
	King Lumber Co. ¹	S	Arab
Mobile	: Gulf Lumber Co.	S	Mobile
	Mobile River Sawmill Co.	S	Mt. Vernon
	Horace S. Turner Jr., Inc.	S	Citronelle

Table 1. *Alabama chipping installations (Continued)*

County	Name	Type of plant	Location
Monroe	: Beatrice Veneer Works, Inc.	V	Monroeville
	E. L. Bruce Co.	S	Vredenburgh
	F. H. King Lumber Co.	S	Frisco City
	Rufus Owens Lumber Co.	S	Old Texas
	Peterman Lumber Co.	S	Peterman
	S. P. Timber Co.	S	Monroeville
Montgomery	: Browder Veneer Works	V	Montgomery
	Buchanan Lumber Co.	S	Montgomery
	Capital Veneer Works, Inc.	V	Montgomery
	Flack Lumber Co., Inc.	S	Montgomery
Morgan	: Decatur Wood Salvage Co.	S,V	Decatur
	Gobble-Fite Lumber Co. ¹	S	Decatur
	Stone Lumber Co. ¹	S	Decatur
Perry	: Timberland Lumber Co.	S	Marion
Pickens	: Anders & King Timber Co.	R	Aliceville
	Carpenter & Shirley Lumber Co.	S	Gordo
	Lewis Lumber Co.	S	Aliceville
	McShan Lumber Co.	S	McShan
	Pate Lumber Co., Inc.	S	Carrollton
	Reid Lumber Co.	S	Reform
Pike	: Helms Lumber Co.	S	Brundidge
Randolph	: Braxton Cotney ¹	S	Wadley
	S. M. Wylie Co., Inc.	S	Dickert
Russell	: A. B. Carroll Lumber Co., Inc.	S	Hurtsboro
	Walker-Williams Lumber Co.	S,T	Hatchechubbee
St. Clair	: Stovall Florida ¹	S	Pell City
	Simmons Lumber Co.	S	Springville
	W. D. Wilkins Lumber Co. ¹	S	Eden
Shelby	: Shelby County Lumber Co.	S	Columbiana
Sumter	: Allison Lumber Co.	S	Bellamy
	Epes Handle Co.	O	Epes
	Sumter Manufacturing Co.	S	York
Talladega	: S & R Lumber Co.	S	Talladega
Tallapoosa	: Foy Lumber Co., Inc.	S	Alexander City
	Charles B. Sullivan ¹	S	Camp Hill
Tuscaloosa	: Albert Holman Lumber Co.	S	Northport
	Newton Brothers Lumber Co.	S	Tuscaloosa
	Pearson Lumber Co.	S	Tuscaloosa
	W. G. Sullivan Lumber Co.	S	Brownville
Walker	: Gus Earley Lumber Co.	S	Carbon Hill
Washington	: Carpenter & Dickey	S	Chatom
	W. E. Hill Lumber Co.	S	Millry
	Longleaf Lumber Co.	S	Chatom
	Martin Lumber Co.	S	Millry
Wilcox	: Browder Veneer Co.	V	Camden
	McMurphy Lumber Co.	S	Allenton
	Nettles Lumber Co.	S	Kimbrough
	Pine Apple Chip Co.	C	Pine Apple
	Pine Apple Lumber Co.	S	Pine Apple
	M. W. Smith Sawmill Co., Inc.	S	Camden
Winston	: Bankhead Forest Industries, Inc.	S	Grayson
	W. S. Coats Lumber Co.	S	Double Springs

¹ Debarker only.

Table 2. *Arkansas chipping installations*

County	Name	Type of plant	Location
Ashley	: P. E. Barnes Lumber Co.	S	Hamburg
	Crossett Lumber Co.	S	Crossett
Bradley	: Potlatch Forests, Inc.	S	Hermitage
	Potlatch Forests, Inc.	S	Warren
	Potlatch Forests, Inc.	S	Warren
Calhoun	: Neal Lumber Co.	S	Hampton
Clark	: M. M. Barksdale Lumber Co.	S	Amity
	J. A. Barringer & Sons	S	Gurdon
	Milus Bean	S	Amity
	Gurdon Lumber Co.	S	Gurdon
Cleveland	: Rison Lumber Co.	S	Rison
Columbia	: G & H Chip Co.	C	Waldo
	Partee Manufacturing Co.	S	Magnolia
Conway	: Gifford Lumber Co., Inc.	S	Morrilton
Dallas	: D. J. Barnes Lumber Co.	S	Fordyce
	Fordyce Lumber Co.	S	Fordyce
	Sparkman Lumber Co.	S	Sparkman
Drew	: Ozark-Badger Lumber Co.	S	Wilmar
Garland	: Bates Lumber Co.	S	Hot Springs
	Wilson Lumber Co.	S	Hot Springs
	B. G. Wilson Lumber Co., Inc.	S	Hot Springs
Grant	: W. S. Fox & Sons	S	Sheridan
	H. G. Toler & Sons Lumber Co., Inc.	S	Leola
	J. L. Williams & Sons	S	Sheridan
	Herman Wilson Lumber Co.	S	Leola
Hempstead	: Graydon Anthony Lumber Co.	S	Hope
Hot Spring	: Hot Spring County Lumber Co.	S	Malvern
Howard	: Dierks Forests, Inc.	S	Dierks
	J. D. Scott Lumber Co.	S	Nashville
Jefferson	: W. S. Fox & Sons	S	Pine Bluff
Lafayette	: Fuller Lumber Co.	S	Lewisville
Little River	: Gunter Brothers Lumber Co.	S	Wilton
Miller	: Junkin Lumber Co.	S	Texarkana
Monroe	: Potlatch Forests, Inc.	S	Clarendon
Montgomery	: J. M. Hampton & Sons Lumber Co.	S	Mt. Ida
	Moudy Lumber Co.	S	Mt. Ida
	Stauter Lumber Co.	S	Norman
Nevada	: Arkansas Pine Lumber Co.	S	Prescott
	Ozan Lumber Co.	S	Prescott
Ouachita	: Anthony-Kervin Lumber Co.	S	Bearden
	Bearden Lumber Co.	S	Bearden
	Landers-Reynolds-White Lumber Co.	S	Camden
Phillips	: Chicago Mill & Lumber Co.	S,V	Helena
	McKnight Veneer & Plywoods, Inc.	V	West Helena
Pike	: Murfreesboro Lumber Co.	S	Murfreesboro
	White Lumber Co.	S	Glenwood

Table 2. *Arkansas chipping installations (Continued)*

County	Name	Type of plant	Location
Pope	: Satterfield Lumber Co.	S	Russellville
Saline	: Holicer & Jones Lumber Co., Inc.	S	Benton
Scott	: Mansfield Lumber Co.	S	Mansfield
	: Waldron Lumber Co.	S	Waldron
Sevier	: Dierks Treating Plant	T	De Queen
Union	: Garland Anthony Lumber Co.	S	Mt. Holly
	: Bass-Clark Lumber Co.	S	El Dorado
	: Junction City Veneer Corp.	V	Junction City
	: Mount Holly Lumber Co.	S	Mt. Holly
	: Olin Industries	S	Huttig
	: Reynolds & Draper Lumber Co.	S	El Dorado
	: J. W. Reynolds Lumber Co.	S	Smackover
	: Urbana Lumber Co.	S	Urbana
Yell	: Nebo Lumber Co.	S	Dardenelle
	: Plainview Lumber & Supply Co.	S	Plainview
	: Wood Lumber Co.	S	Ola

Table 3. *Louisiana chipping installations*

Parish	Name	Type of plant	Location
Allen	: Hillyer-Deutsch-Edwards, Inc.	S	Oakdale
Beauregard	: International Paper Co.	S	De Ridder
Bienville	: Hunt Lumber Co., Inc.	S	Danville
	: Martin Timber Co., Inc.	S	Castor
	: Woodard-Walker Lumber Co., Inc.	S	Taylor
Bossier	: Willis Lumber Co., Inc.	S	Princeton
Calcasieu	: General Box Company	V	De Quincy
	: Johnson Lumber Co.	S	Sulphur
Caldwell	: N. D. Roberts Lumber Co.	S	Grayson
De Soto	: Mc Coy Bros. Lumber Co., Inc.	S	Stanley
	: Matthews Lumber Co.	S	Mansfield
	: Matthews Lumber Co.	S	Mansfield
	: James A. Pace Lumber Co.	S	Logansport
Grant	: Colfax Lumber Co., Inc.	S	Colfax
	: Carroll W. Maxwell Lumber Co., Inc.	S	Pollock
Iberville	: Wirebound Box Division of St. Regis Paper Co.	V	Maringouin
Jackson	: Lakeside Lumber Co., Inc.	S	Chatham
Jefferson	: W. A. Ransom Lumber Co.	S	Harahan
La Salle	: Carraway & Mc Dougald Lumber Co.	S	Jena
	: Tullos Lumber Co.	S	Jena
	: The Urania Lumber Co., Ltd.	S,T	Urania
Lincoln	: Sturgis-Nix Lumber Co.	S	Ruston
Ouachita	: Louisiana Veneer Co.	V	West Monroe

Table 3. *Louisiana chipping installations (Continued)*

Parish	Name	Type of plant	Location
Rapides	Roy O. Martin Lumber Co., Inc.	S	Alexandria
	Red River Veneer Co.	V	Pineville
Sabine	Hunt Lumber Co., Inc.	S	Zwolle
	Louisiana Long Leaf Lumber Co.	S	Fisher
	Sabine Lumber Co.	S	Zwolle
St. Helena	Terrebonne Lumber Co.	S	Pine Grove
St. Tammany	Brunning Lumber Co.	S	Covington
	Jenkins Lumber, Inc.	S	Folsom
Tangipahoa	Clemons Brothers Lumber Co.	S	Amite
	Conway Guiteau Lumber Co.	S	Fluker
	Louisiana Cypress Lumber Co., Inc.	S	Ponchatoula
	Martin Brothers Timber & Products Corp.	V	Roseland
	Maurin Lumber Co.	S	Hammond
	Ponchatoula Lumber Co., Inc.	S	Ponchatoula
	Reimers-Schneider Co., Inc.	S	Natalbany
Union	Farmerville Manufacturing Co.	S	Farmerville
	C. A. Reed Lumber Co.	S	Bernice
Vernon	Louisiana Pine Lumber Co., Inc.	S	Leesville
	Mc Donald Sawmill	S	Pitkin
Washington	Ross Jenkins Lumber Co., Inc.	S	Franklinton
Webster	W. L. Johnson Lumber Co.	S	Cotton Valley
	Pace Brothers Lumber Co., Inc.	S	Minden
	Springhill Lumber Co.	S	Spring Hill
	Woodard-Walker Lumber Co., Inc.	S	Heflin
Winn	Brewton & Taylor Lumber Co.	S	Winnfield
	L. L. Brewton Lumber Co.	S,T	Winnfield
	Brown-Hart-McIntyre Veneer Co.	V	Winnfield
	Hunt Lumber Co., Inc.	S	Dodson
	Olin Industries	S	Winnfield
	Sketo Veneer Co.	V	Winnfield
	Tremont Lumber Co.	S	Joyce

Table 4. *Mississippi chipping installations*

County	Name	Type of plant	Location
Adams	Natchez Veneer & Lumber Co.	V	Natchez
Amite	Sam Mabry Lumber Co.	S	Liberty
Calhoun	Mabry Lumber Co.	S	Derma
Claiborne	Claiborne County Lumber Co.	S	Hermanville
Clarke	International Paper Co.	S	Quitman
	Jones Brothers Lumber Co.	S	Shubuta
Clay	Seitz Lumber Co.	S	West Point
Copiah	Graves Lumber Co.	S	Hazlehurst
	Hutchison Lumber Co.	S	Georgetown
Covington	Rhymes Veneers, Inc.	V	Collins

Table 4. *Mississippi chipping installations (Continued)*

County	Name	Type of plant	Location
Franklin	: O. V. Clements & Sons Lumber Co.	S	Meadville
	: Haltom Lumber Co.	S	Roxie
George	: Dickerson Lumber Co.	S	Lucedale
	: Holcomb Lumber Co.	S	Lucedale
	: Lucedale Veneer Co.	V	Lucedale
Greene	: Leaksville Forest Products, Inc.	V	Leaksville
	: Southern Oak & Pine Lumber Co.	S	Leaksville
Grenada	: Hankins Lumber Co.	S	Grenada
Hinds	: Kitchens Brothers Manufacturing Co.	S	Utica
Itawamba	: Evans Lumber Co.	S	Dorsey
Jasper	: D. L. Fair Lumber Co.	S	Montrose
	: J. J. & T. H. Sims Lumber Co.	S	Bay Springs
Jones	: Bailey Lumber Co.	S	Laurel
Kemper	: Monroe Dean Lumber Co.	S	De Kalb
	: J. A. Mc Dade Lumber Co.	S	Electric Mills
Lamar	: Joe N. Miles & Sons Lumber Co.	S	Lumberton
Lauderdale	: General Box Co.	O	Meridian
	: Sanders Lumber Co.	S,T	Meridian
Leake	: Neese Lumber Co.	S	Carthage
Lincoln	: Columbus Lumber Co.	S	Brookhaven
Lowndes	: Airline Manufacturing Co.	S,O	Columbus
	: Davis Lumber Co.	S	Columbus
Marion	: Forbes Lumber Co.	S	Sandy Hook
	: J. R. Fornea	S	Foxworth
	: C. L. Rogers Lumber Co.	S	Columbia
Neshoba	: Deemer Wood Products Co.	S	Philadelphia
	: A. De Weese Lumber Co.	S	Philadelphia
	: Molpus Lumber Co.	S	Philadelphia
Newton	: J. R. Buckwalter Lumber Co.	S	Union
Noxubee	: O. B. Persons Lumber Co.	S	Shuqualak
	: R. E. Prince Lumber Co.	S	Shuqualak
Oktibbeha	: Sturgis Lumber Company	S	Sturgis
Pearl River	: Wirebound Box Division of St. Regis Paper Co.	V	Picayune
Perry	: Perry County Plywood Corp.	V	Beaumont
Pike	: Fernwood Industries	S	Fernwood
	: M. D. Hayles Lumber Co.	S	Fernwood
	: Holland Lumber Co.	S	Osyka
	: Indianapolis Wirebound Box Co.	V	Fernwood
	: Seago & Sons Lumber Co.	S	Mc Comb
Rankin	: A. De Weese Lumber Co.	S	Koch
	: Price Paschal Lumber Co.	S	Brandon
Scott	: Hankins Eubanks Lumber Co.	S	Lake
	: King Lumber Co.	S	Forest
	: E. G. Laughlin Lumber Co.	S	Morton

Table 4. *Mississippi chipping installations (Continued)*

County	Name	Type of plant	Location
Simpson	: Broadhead Lumber & Manufacturing Co.	S	Mendenhall
	Reynolds Lumber Company	S	Magee
Smith	: T. H. Luckey	S	Mize
Stone	: J. F. Miller Lumber Co.	S	Wiggins
	N. E. Neely	S	Bond
	Wiggins Lumber Co.	S	Wiggins
	Wiggins Veneer Co.	V	Wiggins
Walthall	: Wm. Brent	S	Tylertown
Warren	: Houston Brothers	S	Vicksburg
Washington	: Chicago Mill & Lumber Co.	S,V	Greenville
Wayne	: Consumers Wirebound Box Co.	V	Waynesboro
	E. C. Douglas Lumber Co.	S	Buckatunna
	Gatlin Lumber Co.	S	Waynesboro
	J. C. Martin Lumber Co.	S	Waynesboro
	Carl W. Mullis Lumber Co.	S	Waynesboro
Wilkinson	: Crosby Lumber & Manufacturing Co.	S,T	Crosby
Winston	: D. L. Fair Lumber Co.	S	Louisville

Table 5. *Oklahoma chipping installations*

County	Name	Type of plant	Location
Le Flore	: Burnett Lumber Co.	S	Heavener
Mc Curtain	: Dierks Forests, Inc.	S	Wright City
	Herron Lumber Co.	S	Idabel

Table 6. *Tennessee chipping installations*

County	Name	Type of plant	Location
Campbell	: Gennett Lumber Co.	S	Royal Blue
Gibson	: Dyer Fruit Box Manufacturing Co.	V	Dyer
Greene	: Crum Lumber Co.	S	Greeneville
Lauderdale	: Raymond Smith Lumber Co.	S	Henning
Mc Minn	: Groves-Buttram Lumber Co.	C	Athens
Monroe	: Brooks Lumber Co.	S	Tellico Plains
	Trotter Lumber Co.	S	Tellico Plains
Morgan	: Gennett Lumber Co.	S	Stephens
Rhea	: Rhea County Lumber Co.	S	Spring City
Roane	: Yankie Lumber Co.	S	Harriman
Shelby	: Chapman-Dewey Lumber Co.	S,O	Memphis

Table 7. *Texas chipping installations*

County	Name	Type of plant	Location
Angelina	: Angelina County Lumber Co.	S	Keltys
	: Southern Pine Lumber Co.	S	Diboll
Cass	: Atlanta Lumber Co.	S,T	Atlanta
Cherokee	: Bauman Lumber Co.	S	Alto
Hardin	: Allen-Peavy Lumber Co., Inc.	S	Kountze
	: Kirby Lumber Corp.	S	Silsbee
Harrison	: Snider Lumber Co.	S	Marshall
Houston	: Stowe Lumber Co.	S	Crockett
Jasper	: Ealand Wood Lumber Co.	S	Jasper
Jefferson	: Cummer-Graham Co.	V	Beaumont
Liberty	: Liberty Lumber Co.	S	Liberty
	: Williams Lumber Co.	S	Cleveland
Montgomery	: Grogan Brothers Lumber Co., Inc.	S	Conroe
	: L & M Lumber Co., Inc.	S	Willis
	: Roy L. Willis Lumber Co.	S	Conroe
Mc Lennan	: Wm. Cameron & Co.	V	Waco
Nacogdoches	: Nacogdoches County Lumber Co.	S	Nacogdoches
Newton	: Newton Lumber Co.	S	Newton
	: Wiergate Lumber Co.	S	Wiergate
Panola	: Darnell Lumber Co.	S	Carthage
Polk	: W. T. Carter & Brothers Lumber Co.	S	Camden
	: Leggett Lumber Co.	S	Livingston
	: Livingston Wood Products Corp.	S	Livingston
	: Southwest Forest Industries, Edens-Birch Division	S	Corrigan
Rusk	: Henderson Lumber Manufacturing Co.	S	Henderson
Sabine	: Southern Pine Lumber Co.	S	Pineland
	: Sturgis Lumber Co.	S	Hemphill
San Augustine	: Commercial Lumber Co., Inc.	S	San Augustine
	: San Augustine Lumber Co.	S	San Augustine
Shelby	: Anderson Manufacturing Co.	S	Tenaha
Tyler	: Beech Creek Lumber Co.	S	Warren
	: Hillister Lumber Co.	S	Hillister
	: Williford & Stevens	S	Woodville
	: Woodville Lumber Co.	S	Woodville
Walker	: Walker Bros. Lumber Co.	S	Huntsville







FOREST SURVEY RELEASE 87

SOUTHERN FOREST EXPERIMENT STATION

New Orleans, Louisiana

Forest Service, U.S. Department of Agriculture

1962

