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SURVEY RELEASE NO. 48

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FOREST STATISTICS FOR THE PIEDMONT OF NORTH CAROLINA, 1956

by

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FOREWORD

Through the McSweeney-McNary Act of 1928, Congress authorized the Secretary of Agriculture to conduct a comprehensive survey of the forest resources of the United States. The Forest Survey was organized by the Forest Service to carry out the provisions of the Act through the Regional Forest Experiment Stations. In the Southeastern states the Forest Survey is an activity of the Division of Forest Economics of the Southeastern Forest Experiment Station, Asheville, North Carolina.

The five-fold purpose of the Forest Survey is (1) to make a field inventory of the present supply of standing timber, (2) to ascertain the rate at which this supply is being increased through growth, (3) to determine the rate at which it is being reduced through industrial and domestic uses, fire, and other causes, (4) to determine the present consumption and the probable future trend in requirements for forest products, and (5) to interpret and correlate these findings to aid in the formulation of private and public policies regarding forest land management.

The first Forest Survey of North Carolina was made during the late 1930's, and complete findings have been published. In 1952, a resurvey of the State was started to obtain up-to-date statistics on forest area, timber volume, growth, and the amount of timber cut. To date, progress reports on the resurvey have been issued for three of the four survey units as the field work was completed. This report covers the North Carolina Piedmont area, which is designated as Survey Unit No. 3. A statistical report for the entire State will be released in the near future.

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Figure 1.--Counties in the Piedmont of North Carolina included in Forest Survey Unit No. 3.

FOREST STATISTICS FOR THE PIEDMONT OF

NORTH CAROLINA, 1956

The Piedmont of North Carolina (fig. 1) is an area of rolling to hilly land lying between the rugged mountains to the west and the flat, level Coastal Plain to the east. It stretches across the central part of the State in a broad band running northeast and southwest, being a portion of the Piedmont Plateau Region which extends from the Hudson River in New York State to east-central Alabama. Numerous small tracts of forest land intermingled with agricultural land are characteristic throughout the area. Small and highly diverse ownerships are the rule.

This progress report presents statistical information compiled from the second Forest Survey of North Carolina. Examination of systematically spaced points on aerial photographs provided information on forest area. A sample of the points classified as forest were selected to be examined on the ground. Measurements and observations on 1,640 one-fifth-acre plots distributed throughout the forest area in each of the 35 counties provided data on volume and growth of timber, on amount of timber cut, and on forest conditions. In addition to these forest plots, 680 nonforest plots were examined to check on the accuracy of the photo classification and to detect changes in land use since the photographs were made. Field work was done between July 1955 and January 1956.

The forest resources of North Carolina were first inventoried by the Forest Survey during the years 1937-38. Comparisons made between the results of the two surveys are discussed on the following pages to point out trends and changes which have taken place in the past 18 years. A careful adjustment of the 1937 data collected in the Piedmont has been made to eliminate differences due solely to changes in survey standards or methods used, so that comparisons would be valid.

PRESENT FOREST SITUATION AND RECENT TRENDS

Acreage of forest land shows 17-percent increase.--Piedmont North Carolina is the most heavily populated and industrialized section of the State, yet more than half the gross area is still forest land. The 1956 survey revealed that a total of 5.8 million acres,

or 55 percent, was forested (fig. 2). Practically all of this acreage is available for production of commercial timber crops. Reserved land in State Parks, together with other noncommercial forest, amounts to only 21,000 acres.

Figure 2.--Gross area of land and water in the Piedmont of North Carolina.

In the North Carolina Piedmont, as in many areas throughout the Southeast, the trend is toward a shift from agricultural use to forest. Since 1937, the area of forest land increased by 869,000 acres, a gain of 17 percent. Most of this increase is former agricultural and pasture lands which have been allowed to revert to forests--usually the poorer land which because of increased farm productivity and mechanization is no longer needed for crops.

Private ownership accounts for 5.7 million acres, or 98 percent of all commercial forest land in the area. Less than 100,000 acres are publicly owned, and most of this acreage is in State Parks or in the Uwharrie National Forest purchase unit. Farmers own or manage nearly 88 percent of the forest land, and industrial or other private holdings make up the remainder. Data taken from the 1950 Census of Agriculture show that the average farm contains 71 acres, half of which is in woodland.

Pine acreage shows 12 percent drop.--Another trend found in the North Carolina Piedmont is a gradual conversion of forest types from pine to hardwood. There are now about 400,000 fewer acres of yellow pine types than in 1937, a decline of 12 percent in 18 years. On the other hand, hardwood types have made substantial gains. These changes have reduced the proportion of forest area in pine types from 72 percent at the beginning of the period to 54 percent at the present time (fig. 3).

Shortleaf, loblolly, and other yellow pine species are under heavy demand for the manufacture of forest products. Loggers

operating in mixed stands often cut all the pine but little of the hardwood timber. Thus, the residual stand often becomes a hardwood type.

The short-leaf pine type occupies 1.4 million acres and is the most important of the softwood group.

Loblolly and Virginia pine types together also contain more than 1 million acres. The most extensive hardwood type is oak-hickory, which covers nearly 2 million acres.

Figure 3.--Shift of forest area from pine types to hardwood.

Pine sawtimber volume down 15 percent.--Cutting in excess of growth since 1937 decreased the volume of yellow pine sawtimber by 1.2 billion board-feet--a drop of 15 percent (table A).

Table A.--Comparison of sawtimber volume, 1937 to 1956

Species group	1937 ^{1/}	1956	Change	
	<u>Million bd.-ft.</u>	<u>Million bd.-ft.</u>	<u>Million bd.-ft.</u>	<u>Percent</u>
Yellow pines	7,605	6,443	-1,162	-15
Other softwoods	54	62	+8	+15
Hardwoods	5,002	6,956	+1,954	+39
All species	12,661	13,461	+800	+6

^{1/} Original survey volumes have been recomputed to allow for differences in standards between the two surveys and to provide a uniform basis for comparison. Thus, the 1937 estimate shown here will not agree with the volumes previously published.

Hardwood sawtimber, like hardwood type acreage, increased, showing a gain of almost 2 billion board-feet. This was more than enough to offset the drop in pine and, as a result, the total net increase in the sawtimber supply was 6 percent.

A comparison of stand tables for the two surveys shows that the number of pine sawtimber trees has decreased in all diameter classes. Losses range from 2.5 percent in the 10-inch class to over 40 percent in the larger diameters. On the other hand, the number of pine trees in pole sizes had increased substantially. Large gains were also made by hardwood species in all sizes up to 30 inches.

Shortleaf pine predominates.--Sawtimber volume in the Piedmont is about equally divided between softwoods and hardwoods. The leading species is shortleaf pine, which makes up more than half the softwood volume and over one-fourth the total volume (fig. 4). Loblolly and Virginia pine are also important.

Among the hardwoods, a large variety of oak species combine to make up a major share of the board-foot volume. The white oak-swamp chestnut oak group is the largest, and fortunately these species generally grow straighter, are less defective, and have more desirable wood properties than many of the other oaks. In the red oak group,

three-fourths of the volume is composed of scarlet, black, southern red, and other less desirable species.

Figure 4.--Sawtimber volume by species.

Among hardwood species other than oaks, yellow-poplar is the most abundant. This valuable timber tree accounts for 17 percent of the hardwood volume. Other principal hardwood species include sweetgum, hickory, ash, and maple.

The Piedmont contains 83 million cords of wood in trees of various sizes, species, and quality. Only a third of this volume is in trees which are large enough and of high enough quality to make saw logs (fig. 5). Forty-one percent is in poletimber trees which are expected to be of sawtimber quality when they become large enough. Growing stock, which includes the wood in both sawtimber and poletimber trees to a 4-inch top, totals 71 million cords, or 85 percent of all wood volume in the unit. Most of the remaining

12 million cords are in cull trees which will not now, or in the future, produce a minimum 12-foot log with at least 50 percent of its volume suitable for lumber.

Nearly all of the cull volume is in "sound" cull trees; that is, in trees which are not suitable for saw logs because of sound defects such as crook and excessive limbiness. Many of these trees can be used for such products as pulpwood, fence

posts, and other items where clear length and straightness are not limiting factors. The very large and limby sound culls and practically all of the rotten culls have very little use except for fuelwood. Included with the culls are the limbs on hardwood sawtimber; these make up 13 percent of the cull volume.

Much of the sawtimber volume in the Piedmont is in trees capable of producing only small saw logs. Nearly two-thirds of the softwood sawtimber volume is in trees which measure 10 or 12 inches in diameter at breast height. Hardwood sawtimber averages somewhat larger, partly because 10-inch trees are not considered large enough to produce saw logs. Twelve-inch trees contain one-fourth of the hardwood sawtimber volume and more than half of the total is in trees under 20 inches in size.

Growing stock volume is up 17 percent.--In contrast to an increase of only 6 percent for sawtimber, growing stock shows a gain of 17 percent since 1937 (table B). This greater increase in growing stock was due mainly to the substantial increase in poletimber during this period. In the yellow pine group, the increase in poletimber just about offset the 15-percent drop in sawtimber, leaving the growing stock volume about the same. Hardwood growing stock shows a substantial gain of 45 percent.

Figure 5.--Net cordwood volume of timber by species group and class of material.

Table B.--Comparison of volume in all trees 5.0 inches
d.b.h. and larger, 1937 to 1956

Species group and class of material	1937 ^{1/}	1956	Change	
	<u>Million cu. ft.</u>	<u>Million cu. ft.</u>	<u>Million cu. ft.</u>	<u>Percent</u>
Growing stock:				
Yellow pines	2,488	2,417	-71	-3
Other softwoods	32	36	+4	+12
Hardwoods	1,786	2,596	+810	+45
All species	4,306	5,049	+743	+17
Cull trees:				
Yellow pines	112	165	+53	+47
Other softwoods	1	6	+5	+500
Hardwoods ^{2/}	421	562	+141	+33
All species	534	733	+199	+37
All live trees	4,840	5,782	+942	+19

^{1/} See footnote 1, table A.

^{2/} Excludes limb volume of hardwood sawtimber trees.

The big increase in hardwood sawtimber coupled with the drop in yellow pine has increased the hardwood proportion from 40 percent in 1937 to 52 percent in 1956. The proportion of hardwood growing stock jumped from 41 percent to 51 percent.

Percentage-wise, the increase in cull-tree volume was more than twice as great as in growing stock. However, cull timber in the Piedmont makes up a relatively small part of the total volume, and this increase changed the proportion of cull volume only slightly--from 11 percent in 1937 to 13 percent in 1956.

Annual growth is 825 million board-feet of sawtimber, 4 million cords of growing stock.--Sawtimber growth in the Piedmont is 825 million feet a year. This represents a growth rate of about 6 percent on the sawtimber inventory volume. More than half this growth is on yellow pine trees.

The average annual growth per acre of all stands in the Piedmont is 157 board-feet. The range is from 84 board-feet for Virginia pine stands to 254 board-feet for loblolly pine stands. While growth of sawtimber stands for all types averages 292 board-feet per acre, loblolly pine annual growth goes as high as 483 board-feet per acre.

Growing stock growth averages about 0.7 cord per acre per year for all stands and 1.0 cord per acre for sawtimber stands. In loblolly sawtimber stands the growth is 1.5 cords per acre.

Hardwood supply continues rapid increase.--Hardwood volume is increasing even faster now than during the 18-year period between surveys, especially growing stock. Hardwood sawtimber increased at an average annual rate of 2.2 percent between surveys, compared to the current rate of 2.5 percent. The annual rate of increase of hardwood growing stock between surveys was 2.5 percent; now it is 2.7 percent.

Yellow-poplar, sweetgum, and other soft hardwoods are increasing at a much faster rate than the hard hardwoods. However, hard hardwoods have much the larger inventory volume and they account for a greater share of the volume increase (fig. 6).

In contrast to the rapidly increasing hardwood supply, yellow pine sawtimber is decreasing at a slightly faster rate now than the average during the past 18 years. Current yellow pine sawtimber cut exceeds the growth by 65 million board-feet per year, or about 1 percent of the inventory volume. Yellow pine growing stock is still just barely holding its own--just as it has during the period between surveys.

Figure 6.--Comparison of timber growth and timber cut in the Piedmont region of North Carolina.

Table 1.--Gross area^{1/} by broad use class, 1956

Class of use	Area	
	<u>Thousand acres</u>	<u>Percent</u>
Forest land:		
Commercial	5,821.1	54.7
Noncommercial:		
Productive-reserved	15.9	0.2
Unproductive	4.5	(2/)
Total forest	5,841.5	54.9
Nonforest land:		
Agriculture	4,194.0	39.4
Urban and other ^{3/}	497.9	4.7
Total nonforest	4,691.9	44.1
Total land area	10,533.4	99.0
Total water area ^{4/}	105.3	1.0
All classes	10,638.7	100.0

^{1/} From U. S. Bureau of the Census, 1950.

^{2/} Less than 0.05 percent.

^{3/} Includes urban, suburban residential, and rural industrial areas, rights-of-way, cemeteries, schools, etc.

^{4/} Includes 48,600 acres of Census water reported in 1950 plus 14,000 acres of Census water created since 1950. Also includes 42,700 acres of water according to Survey standards but defined by the Bureau of the Census as land area.

Table 2.--Ownership of commercial forest land, 1956

Class of ownership	Commercial forest land	
	<u>Thousand acres</u>	<u>Percent</u>
Public land:		
National forest	55.1	0.9
Indian	--	--
Other Federal	10.5	0.2
Total Federal	65.6	1.1
State	20.3	0.4
County and municipal	11.9	0.2
Total public	97.8	1.7
Private		
Farm	5,110.9	87.8
Other	612.4	10.5
Total private	5,723.3	98.3
All classes	5,821.1	100.0

Table 3.--Commercial forest area by forest type and stand-size class, 1956

(In thousand acres)

Forest type ^{1/}	Large sawtimber stands	Small sawtimber stands	Pole- timber stands	Seedling & sapling stands	Poorly stocked stands & unstocked areas	All stands
Softwood types:						
Loblolly pine	76.7	207.0	318.6	75.3	4.7	682.3
Shortleaf pine	43.2	596.9	560.9	136.0	15.7	1,352.7
Virginia pine	3.7	144.5	248.2	166.2	27.0	589.6
White pine	4.3	2.3	--	--	4.3	10.9
Total	127.9	950.7	1,127.7	377.5	51.7	2,635.5
Hardwood types:						
Oak-pine	64.3	180.0	370.2	112.2	2.1	728.8
Oak-hickory	409.9	464.1	845.6	187.3	23.5	1,930.4
Oak-gum-cypress	147.3	123.1	166.7	50.2	39.1	526.4
Total	621.5	767.2	1,382.5	349.7	64.7	3,185.6
All types	749.4	1,717.9	2,510.2	727.2	116.4	5,821.1
Percent	12.9	29.5	43.1	12.5	2.0	100.0

^{1/} See description of forest types and stand-size classes under Definition of Terms.

Table 4.--Net volume^{1/} of sawtimber by species and stand-size class, 1956

(In million board-feet)

Species ^{2/}	Large sawtimber stands	Small sawtimber stands	Pole- timber stands	Seedling & sapling stands	Poorly stocked stands & unstocked areas	All stands
Softwoods:						
Longleaf pine	29.3	3.8	5.8	--	--	38.9
Loblolly pine	700.8	1,024.3	200.3	5.2	0.5	1,931.1
Shortleaf pine	389.7	2,886.5	373.5	32.5	1.8	3,684.0
Virginia pine	68.3	592.6	123.7	3.5	0.7	788.8
Total	1,188.1	4,507.2	703.3	41.2	3.0	6,442.8
White pine	12.7	4.5	1.0	--	4.7	22.9
Redcedar	5.9	18.7	14.1	--	0.3	39.0
Total sftwds.	1,206.7	4,530.4	718.4	41.2	8.0	6,504.7
Hardwoods:						
Blackgum	30.9	53.3	12.4	1.9	6.7	105.2
Sweetgum	422.7	368.4	92.8	2.9	--	886.8
Yellow-poplar	605.4	460.7	99.3	21.6	--	1,187.0
Soft maple	97.2	64.1	22.6	3.2	1.2	188.3
Other soft hdwds.	208.4	56.9	32.8	1.3	4.4	303.8
Total	1,364.6	1,003.4	259.9	30.9	12.3	2,671.1
White & swamp chestnut oaks	657.9	491.3	131.8	13.6	1.4	1,296.0
Other white oaks	167.9	169.1	63.1	1.3	--	401.4
No. red & swamp red oaks	162.0	90.2	69.8	7.9	--	329.9
Other red oaks	347.6	434.2	134.7	16.0	--	932.5
Hickory	370.9	281.3	165.8	10.5	--	828.5
Ash	97.1	56.1	25.7	--	--	178.9
Beech	91.1	15.9	10.2	--	--	117.2
Sugar maple	1.5	2.7	0.8	--	--	5.0
Black walnut	2.1	11.3	2.3	--	--	15.7
Other hard hdwds.	88.5	74.8	15.5	1.6	--	180.4
Total	1,986.6	1,626.9	619.7	50.9	1.4	4,285.5
Total hdwds.	3,351.2	2,630.3	879.6	81.8	13.7	6,956.6
All species	4,557.9	7,160.7	1,598.0	123.0	21.7	13,461.3
Percent	33.8	53.2	11.9	0.9	0.2	100.0

^{1/} Log scale, International 1/4-inch rule.^{2/} See Definition of Terms for species combined with others.

Table 5.--Net volume^{1/} of sawtimber by species and diameter class, 1956

Species	10-12 inches ^{2/}	14-18 inches	20-24 inches	26+ inches	All diameters	
	Million bd.-ft.	Million bd.-ft.	Million bd.-ft.	Million bd.-ft.	Million bd.-ft.	Percent
Softwoods:						
Longleaf pine	6.6	23.8	8.5	--	38.9	0.3
Loblolly pine	861.2	792.1	232.1	45.7	1,931.1	14.3
Shortleaf pine	2,654.3	909.8	100.9	19.0	3,684.0	27.4
Virginia pine	526.2	248.4	14.2	--	788.8	5.8
Total	4,048.3	1,974.1	355.7	64.7	6,442.8	47.8
White pine	11.2	--	11.7	--	22.9	0.2
Redcedar	24.4	14.6	--	--	39.0	0.3
Total sftwds.	4,083.9	1,988.7	367.4	64.7	6,504.7	48.3
Hardwoods:						
Blackgum	49.5	55.7	--	--	105.2	0.8
Sweetgum	211.7	486.6	155.8	32.7	886.8	6.6
Yellow-poplar	284.9	590.4	279.0	32.7	1,187.0	8.8
Soft maple	59.8	85.6	35.1	7.8	188.3	1.4
Other soft hdwds.	33.4	136.4	97.7	36.3	303.8	2.3
Total	639.3	1,354.7	567.6	109.5	2,671.1	19.9
White & swamp chestnut oaks	299.4	667.6	268.5	60.5	1,296.0	9.6
Other white oaks	133.0	199.1	63.8	5.5	401.4	3.0
No. red & swamp red oaks	79.9	172.6	49.1	28.3	329.9	2.5
Other red oaks	268.4	481.4	136.9	45.8	932.5	6.9
Hickory	235.4	439.0	124.8	29.3	828.5	6.2
Ash	63.0	85.7	24.4	5.8	178.9	1.3
Beech	12.8	53.7	32.9	17.8	117.2	0.9
Sugar maple	3.3	1.7	--	--	5.0	(3/)
Black walnut	6.6	9.1	--	--	15.7	0.1
Other hard hdwds.	43.3	95.0	33.3	8.8	180.4	1.3
Total	1,145.1	2,204.9	733.7	201.8	4,285.5	31.8
Total hdwds.	1,784.4	3,559.6	1,301.3	311.3	6,956.6	51.7
All species	5,868.3	5,548.3	1,668.7	376.0	13,461.3	100.0
Percent	43.6	41.2	12.4	2.8	100.0	--

^{1/} Log scale, International 1/4-inch rule.

^{2/} Ten-inch hardwoods are not included since they are below sawtimber size.

^{3/} Less than 0.05 percent.

Table 6.--Net volume^{1/} of sawtimber by forest type and stand-size class, 1956

(In million board-feet)

Forest type	Large sawtimber stands	Small sawtimber stands	Pole- timber stands	Seedling & sapling stands	Poorly stocked stands & unstocked areas	All stands
Softwood types:						
Loblolly pine	857.7	1,009.7	209.9	2.9	--	2,080.2
Shortleaf pine	355.3	2,987.3	292.6	11.0	1.8	3,648.0
Virginia pine	22.1	642.2	103.7	26.7	0.7	795.4
White pine	13.6	4.6	--	--	6.1	24.3
Total	1,248.7	4,643.8	606.2	40.6	8.6	6,547.9
Hardwood types:						
Oak-pine	382.9	584.8	240.7	29.2	2.0	1,239.6
Oak-hickory	2,112.5	1,421.9	631.6	46.6	--	4,212.6
Oak-gum-cypress	813.8	510.2	119.5	6.6	11.1	1,461.2
Total	3,309.2	2,516.9	991.8	82.4	13.1	6,913.4
All types	4,557.9	7,160.7	1,598.0	123.0	21.7	13,461.3
Percent	33.8	53.2	11.9	0.9	0.2	100.0

^{1/} Log scale, International 1/4-inch rule.

Table 7.--Net volume of sawtimber by species group, log grade, and tree-size class, 1956

PINE

Log grade	10 - 14 inches ^{1/}		16+ inches		All trees	
	<u>Million</u> <u>bd.-ft.</u>	<u>Percent</u>	<u>Million</u> <u>bd.-ft.</u>	<u>Percent</u>	<u>Million</u> <u>bd.-ft.</u>	<u>Percent</u>
Grade 1	--	--	44.1	3.2	44.1	0.7
Grade 2	450.9	8.9	274.0	19.9	724.9	11.2
Grade 3	3,495.5	69.0	721.5	52.4	4,217.0	65.5
Grade 4	1,119.5	22.1	337.3	24.5	1,456.8	22.6
Total	5,065.9	100.0	1,376.9	100.0	6,442.8	100.0

OTHER SOFTWOODS

Grade 1	--	--	--	--	--	(2/)
Grade 2	0.7	1.5	5.7	39.1	6.4	10.4
Grade 3	33.8	71.5	5.4	36.5	39.2	63.3
Grade 4	12.7	27.0	3.6	24.4	16.3	26.3
Total	47.2	100.0	14.7	100.0	61.9	100.0

SOFT HARDWOODS

Grade 1	--	--	188.0	13.5	188.0	7.0
Grade 2	34.5	2.7	272.9	19.6	307.4	11.5
Grade 3	430.9	33.7	373.2	26.8	804.1	30.1
Grade 4	813.3	63.6	558.3	40.1	1,371.6	51.4
Total	1,278.7	100.0	1,392.4	100.0	2,671.1	100.0

HARD HARDWOODS

Grade 1	--	--	315.4	14.5	315.4	7.4
Grade 2	99.2	4.7	528.6	24.3	627.8	14.6
Grade 3	310.2	14.7	385.0	17.7	695.2	16.2
Grade 4	1,700.9	80.6	946.2	43.5	2,647.1	61.8
Total	2,110.3	100.0	2,175.2	100.0	4,285.5	100.0

^{1/} Ten-inch hardwoods not included since they are below sawtimber size.

^{2/} Insufficient sample.

Table 8.--Net volume^{1/} of all timber by species and stand-size class, 1956

(In thousand cords)

GROWING STOCK						
Species	Large sawtimber stands	Small sawtimber stands	Pole- timber stands	Seedling & sapling stands	Poorly stocked stands & unstocked areas	All stands
Softwoods:						
Longleaf pine	65	12	16	--	--	93
Loblolly pine	1,675	4,083	2,395	66	2	8,221
Shortleaf pine	1,109	13,743	5,810	228	6	20,896
Virginia pine	248	2,734	2,146	11	8	5,147
Total	3,097	20,572	10,367	305	16	34,357
White pine	23	14	3	--	14	54
Redcedar	69	153	199	21	1	443
Total sftwds.	3,189	20,739	10,569	326	31	34,854
Hardwoods:						
Blackgum	299	260	309	6	34	908
Sweetgum	1,358	1,856	1,101	66	--	4,381
Yellow-poplar	1,897	1,971	770	102	--	4,740
Soft maple	437	678	419	20	4	1,558
Other soft hwdws.	620	310	322	15	13	1,280
Total	4,611	5,075	2,921	209	51	12,867
White & swamp chestnut oaks	2,154	2,440	1,754	91	4	6,443
Other white oaks	588	1,148	1,011	9	--	2,756
No. red & swamp red oaks	466	481	483	21	--	1,451
Other red oaks	1,177	2,084	1,847	63	--	5,171
Hickory	1,189	1,439	1,105	35	--	3,768
Ash	426	375	259	--	--	1,060
Beech	335	62	182	--	--	579
Sugar maple	6	10	3	--	--	19
Black walnut	76	31	7	--	--	114
Dogwood, persimmon	81	96	192	11	--	380
Other hard hwdws.	383	408	241	30	--	1,062
Total	6,881	8,574	7,084	260	4	22,803
Total hwdws.	11,492	13,649	10,005	469	55	35,670
All species	14,681	34,388	20,574	795	86	70,524
Percent	20.8	48.8	29.2	1.1	0.1	100.0

OTHER MATERIAL

Sound culls:						
Softwoods	69	598	1,354	338	64	2,423
Hardwoods ^{2/}	1,522	2,220	2,704	389	68	6,903
Rotten culls	173	344	518	77	4	1,116
Hardwood limbs	777	454	257	45	6	1,539
Total other material	2,541	3,616	4,833	849	142	11,981

^{1/} Sound wood and bark.^{2/} Includes noncommercial species.

Table 9.--Net volume^{1/} of all timber by species and diameter class, 1956

(In thousand cords)

Species	Diameter class						All diameters
	6 inches	8 inches	10 inches	12 inches	14-18 inches	20+ inches	
Softwoods:							
Longleaf pine	--	--	21	--	54	18	93
Loblolly pine	1,462	1,789	1,452	1,122	1,850	546	8,221
Shortleaf pine	4,758	5,847	4,491	3,281	2,268	251	20,896
Virginia pine	1,339	1,524	960	696	599	29	5,147
Total	7,559	9,160	6,924	5,099	4,771	844	34,357
White pine	--	--	22	12	--	20	54
Redcedar	255	99	34	25	30	--	443
Total sftwds.	7,814	9,259	6,980	5,136	4,801	864	34,854
Hardwoods:							
Blackgum	144	192	243	165	164	--	908
Sweetgum	729	724	716	612	1,192	408	4,381
Yellow-poplar	555	566	637	834	1,463	685	4,740
Soft maple	287	399	275	225	261	111	1,558
Other soft hwdws.	174	187	96	112	390	321	1,280
Total	1,889	2,068	1,967	1,948	3,470	1,525	12,867
White & swamp chestnut oaks	706	1,055	1,263	926	1,726	767	6,443
Other white oaks	366	634	578	456	557	165	2,756
No. red & swamp red oaks	122	298	186	238	440	167	1,451
Other red oaks	691	818	1,094	855	1,282	431	5,171
Hickory	328	609	636	723	1,132	340	3,768
Ash	117	306	104	214	247	72	1,060
Beech	67	73	123	49	144	123	579
Sugar maple	--	--	--	13	6	--	19
Black walnut	6	24	40	19	25	--	114
Dogwood, persimmon	317	35	--	17	11	--	380
Other hard hwdws.	133	161	232	146	282	108	1,062
Total	2,853	4,013	4,256	3,656	5,852	2,173	22,803
Total hwdws.	4,742	6,081	6,223	5,604	9,322	3,698	35,670
All species	12,556	15,340	13,203	10,740	14,123	4,562	70,524
Percent	17.8	21.8	18.7	15.2	20.0	6.5	100.0

OTHER MATERIAL

Sound culls:							
Softwoods	691	575	585	315	244	13	2,423
Hardwoods ^{2/}	1,630	1,447	1,185	588	1,285	768	6,903
Rotten culls	223	164	120	123	230	256	1,116
Hardwood limbs	--	--	--	184	661	694	1,539
Total other material	2,544	2,186	1,890	1,210	2,420	1,731	11,981

^{1/} Sound wood and bark.^{2/} Includes noncommercial species.

Table 10.--Net volume^{1/} of all timber by species and class of material, 1956

(In thousand cords)

Species	Growing stock				Other material	
	Sawtimber trees		Pole-timber trees	Total sound trees	Sound culls ^{2/}	Rotten culls
	Saw-log portion	Upper stems				
Softwoods:						
Longleaf pine	80	13	--	93	8	--
Loblolly pine	4,136	834	3,251	8,221	172	--
Shortleaf pine	8,642	1,649	10,605	20,896	546	7
Virginia pine	1,768	516	2,863	5,147	1,624	14
Total	14,626	3,012	16,719	34,357	2,350	21
White pine	40	14	--	54	1	--
Redcedar	78	11	354	443	72	1
Total sftwds.	14,744	3,037	17,073	34,854	2,423	22
Hardwoods:						
Blackgum	237	92	579	908	345	169
Sweetgum	1,768	444	2,169	4,381	553	79
Yellow-poplar	2,373	609	1,758	4,740	343	92
Soft maple	392	205	961	1,558	1,217	188
Other soft hdwds.	619	204	457	1,280	567	29
Total	5,389	1,554	5,924	12,867	3,025	557
White & swamp chestnut oaks	2,599	820	3,024	6,443	773	86
Other white oaks	822	356	1,578	2,756	1,022	149
No. red & swamp red oaks	640	205	606	1,451	292	56
Other red oaks	1,894	674	2,603	5,171	761	179
Hickory	1,627	568	1,573	3,768	514	77
Ash	385	148	527	1,060	317	16
Beech	229	87	263	579	239	32
Sugar maple	12	7	--	19	22	--
Black walnut	34	10	70	114	41	1
Dogwood, persimmon	17	11	352	380	226	50
Scrub oak ^{3/}	--	--	--	--	444	31
Other hard hdwds.	351	185	526	1,062	582	44
Total	8,610	3,071	11,122	22,803	5,233	721
Total hdwds.	13,999	4,625	17,046	35,670	8,258	1,278
All species	28,743	7,662	34,119	70,524	10,681	1,300
Percent	40.7	10.9	48.4	100.0	89.1	10.9

^{1/} Sound wood and bark.^{2/} Includes limb volume of hardwood sawtimber trees.^{3/} Includes noncommercial species.

Table 11.--Net volume^{1/} of all timber by forest type and stand-size class, 1956

(In thousand cords)

GROWING STOCK						
Forest type	Large sawtimber stands	Small sawtimber stands	Pole- timber stands	Seedling & sapling stands	Poorly stocked stands & unstocked areas	All stands
Softwood types:						
Loblolly pine	2,184	4,467	2,788	66	--	9,505
Shortleaf pine	1,132	14,861	5,015	89	6	21,103
Virginia pine	68	2,924	2,145	184	8	5,329
White pine	59	19	--	--	18	96
Total	3,443	22,271	9,948	339	32	36,033
Hardwood types:						
Oak-pine	1,197	2,724	2,750	160	6	6,837
Oak-hickory	7,301	7,059	6,670	221	--	21,251
Oak-gum-cypress	2,740	2,334	1,206	75	48	6,403
Total	11,238	12,117	10,626	456	54	34,491
All types	14,681	34,388	20,574	795	86	70,524
Percent	20.8	48.8	29.2	1.1	0.1	100.0

OTHER MATERIAL

Softwood types:						
Loblolly pine	147	246	299	2	--	694
Shortleaf pine	106	706	712	119	12	1,655
Virginia pine	15	448	759	296	48	1,566
White pine	4	--	--	--	--	4
Total	272	1,400	1,770	417	60	3,919
Hardwood types:						
Oak-pine	259	398	769	148	9	1,583
Oak-hickory	1,303	1,374	1,770	184	15	4,646
Oak-gum-cypress	707	444	524	100	58	1,833
Total	2,269	2,216	3,063	432	82	8,062
All types	2,541	3,616	4,833	849	142	11,981
Percent	21.2	30.2	40.3	7.1	1.2	100.0

^{1/} Sound wood and bark.

Table 12.--Net volume^{1/} of all timber by species and diameter class, 1956

(In million cubic feet)

GROWING STOCK

Species	Diameter class						All diameters
	6 inches	8 inches	10 inches	12 inches	14-18 inches	20+ inches	
Softwoods:							
Longleaf pine	--	--	1.5	--	4.4	1.5	7.4
Loblolly pine	85.4	119.5	110.3	85.0	148.8	46.6	595.6
Shortleaf pine	278.3	392.4	341.6	247.4	179.0	21.4	1,460.1
Virginia pine	78.5	102.6	70.8	51.7	48.0	2.5	354.1
Total	442.2	614.5	524.2	384.1	380.2	72.0	2,417.2
White pine	--	--	1.6	1.0	--	1.9	4.5
Redcedar	16.2	7.5	2.9	2.2	2.8	--	31.6
Total sftwds.	458.4	622.0	528.7	387.3	383.0	73.9	2,453.3
Hardwoods:							
Blackgum	8.2	12.7	17.5	12.6	13.0	--	64.0
Sweetgum	41.2	47.7	51.6	46.5	95.7	33.7	316.4
Yellow-poplar	31.6	37.4	53.1	62.5	116.6	56.1	357.3
Soft maple	16.6	26.3	20.0	16.9	20.6	9.2	109.6
Other soft hwdws.	10.0	12.3	6.9	8.5	30.9	26.5	95.1
Total	107.6	136.4	149.1	147.0	276.8	125.5	942.4
White & swamp chestnut oaks	40.2	69.6	90.5	70.2	137.2	63.1	470.8
Other white oaks	21.1	41.7	41.8	33.9	44.8	13.6	196.9
No. red & swamp red oaks	6.9	19.6	13.4	18.4	35.1	13.9	107.3
Other red oaks	39.9	54.2	78.3	64.2	101.5	35.3	373.4
Hickory	18.5	40.3	45.8	54.3	90.1	27.9	276.9
Ash	6.8	20.1	7.5	16.0	19.5	6.0	75.9
Beech	3.9	4.8	8.8	3.6	11.7	10.1	42.9
Sugar maple	--	--	--	0.9	0.5	--	1.4
Black walnut	0.3	1.6	2.9	1.6	1.9	--	8.3
Dogwood, persimmon	18.3	2.3	--	1.3	0.9	--	22.8
Other hard hwdws.	7.7	10.5	16.7	11.0	22.4	9.0	77.3
Total	163.6	264.7	305.7	275.4	465.6	178.9	1,653.9
Total hwdws.	271.2	401.1	454.8	422.4	742.4	304.4	2,596.3
All species	729.6	1,023.1	983.5	809.7	1,125.4	378.3	5,049.6
Percent	14.4	20.3	19.5	16.0	22.3	7.5	100.0

OTHER MATERIAL

Sound culls:							
Softwoods	41.0	38.9	44.1	24.5	19.3	1.1	168.9
Hardwoods	92.2	95.3	85.4	44.3	102.6	63.4	483.2
Rotten culls	12.7	10.9	8.5	8.4	19.3	21.0	80.8
Hardwood limbs	--	--	--	15.9	50.3	58.1	124.3
Total other material	145.9	145.1	138.0	93.1	191.5	143.6	857.2

^{1/} Excluding bark.

Table 13.--Net volume^{1/} of all timber by species and class of material, 1956

(In million cubic feet)

Species	Growing stock				Other material	
	Sawtimber trees		Pole-timber trees	Total sound trees	Sound culls ^{2/}	Rotten culls
	Saw-log portion	Upper stems				
Softwoods:						
Longleaf pine	6.2	1.2	--	7.4	0.7	--
Loblolly pine	320.6	70.1	204.9	595.6	12.3	--
Shortleaf pine	647.2	142.2	670.7	1,460.1	38.9	0.6
Virginia pine	134.0	39.0	181.1	354.1	111.4	0.9
Total	1,108.0	252.5	1,056.7	2,417.2	163.3	1.5
White pine	3.6	0.9	--	4.5	0.1	--
Redcedar	6.8	1.1	23.7	31.6	5.5	0.1
Total sftwds.	1,118.4	254.5	1,080.4	2,453.3	168.9	1.6
Hardwoods:						
Blackgum	18.8	6.8	38.4	64.0	22.6	11.9
Sweetgum	141.7	34.2	140.5	316.4	40.8	5.8
Yellow-poplar	189.3	45.9	122.1	357.3	25.7	7.1
Soft maple	31.6	15.1	62.9	109.6	85.9	14.0
Other soft hdwds.	49.9	16.0	29.2	95.1	41.0	2.2
Total	431.3	118.0	393.1	942.4	216.0	41.0
White & swamp chestnut oaks	206.8	63.7	200.3	470.8	57.4	6.9
Other white oaks	64.6	27.7	104.6	196.9	75.8	11.6
No. red & swamp red oaks	51.1	16.3	39.9	107.3	21.0	4.7
Other red oaks	149.5	51.5	172.4	373.4	57.5	13.6
Hickory	129.5	42.8	104.6	276.9	37.9	5.8
Ash	30.2	11.3	34.4	75.9	22.7	1.2
Beech	18.5	6.9	17.5	42.9	16.7	2.4
Sugar maple	0.9	0.5	--	1.4	1.4	--
Black walnut	2.6	0.9	4.8	8.3	3.4	0.1
Dogwood, persimmon	1.4	0.8	20.6	22.8	13.4	2.9
Scrub oak ^{3/}	--	--	--	--	28.8	2.0
Other hard hdwds.	28.9	13.5	34.9	77.3	39.2	3.3
Total	684.0	235.9	734.0	1,653.9	375.2	54.5
Total hdwds.	1,115.3	353.9	1,127.1	2,596.3	591.2	95.5
All species	2,233.7	608.4	2,207.5	5,049.6	760.1	97.1
Percent	44.2	12.1	43.7	100.0	88.7	11.3

^{1/} Excluding bark.^{2/} Includes limb volume of hardwood sawtimber trees.^{3/} Includes noncommercial species.

Table 14.--Average volume^{1/} per acre of sawtimber by forest type,
species group, and stand-size class, 1956

(In board-feet)

Forest type and species group	Large sawtimber stands	Small sawtimber stands	Pole- timber stands	Other stand sizes	All stands
Loblolly pine					
Softwood	8,858	4,313	574	--	2,572
Hardwood	2,322	565	85	36	477
Shortleaf pine					
Softwood	6,440	4,502	461	80	2,393
Hardwood	1,782	502	61	5	304
Virginia pine					
Softwood	4,790	4,023	361	78	1,193
Hardwood	1,280	422	57	63	156
Oak-pine					
Softwood	1,966	1,352	298	122	678
Hardwood	3,986	1,896	353	151	1,023
Oak-hickory					
Softwood	198	191	83	13	126
Hardwood	4,956	2,873	664	208	2,056
Oak-gum-cypress					
Softwood	81	266	41	5	99
Hardwood	5,444	3,880	676	193	2,677
All types					
Softwood	1,610	2,637	286	58	1,117
Hardwood	4,472	1,531	350	113	1,195

^{1/} Log scale, International 1/4-inch rule.

Table 15.--Average volume^{1/} per acre of all trees by forest type, species group,
and stand-size class, 1956

(In standard cords)

Forest type and species group	Large sawtimber stands		Small sawtimber stands		Pole- timber stands		Other stand sizes		All stands	
	Sound ^{2/}	Cull ^{3/}	Sound	Cull	Sound	Cull	Sound	Cull	Sound	Cull
Loblolly pine										
Softwood	20.5	0.2	17.8	0.2	7.3	0.4	0.5	--	11.2	0.3
Hardwood	8.0	1.7	3.8	0.9	1.4	0.5	0.3	(4/)	2.7	0.7
Shortleaf pine										
Softwood	17.1	0.3	21.6	0.4	7.7	0.8	0.6	0.5	13.3	0.6
Hardwood	9.1	2.2	3.3	0.8	1.2	0.5	(4/)	0.3	2.3	0.7
Virginia pine										
Softwood	10.4	--	18.3	1.9	7.4	2.8	0.4	1.3	7.8	2.1
Hardwood	8.2	4.1	1.9	1.2	1.2	0.2	0.6	0.5	1.2	0.6
Oak-pine										
Softwood	6.2	0.5	5.3	0.1	3.4	0.2	0.7	0.5	3.7	0.2
Hardwood	12.4	3.5	9.9	2.1	4.0	1.9	0.8	0.9	5.7	2.0
Oak-hickory										
Softwood	0.8	(4/)	1.0	(4/)	0.9	(4/)	0.3	0.1	0.9	(4/)
Hardwood	17.0	3.1	14.2	2.9	7.0	2.0	0.8	0.9	10.2	2.4
Oak-gum-cypress										
Softwood	0.3	--	0.7	--	0.2	0.1	(4/)	--	0.3	(4/)
Hardwood	18.3	4.8	18.3	3.6	7.0	3.1	1.4	1.8	11.9	3.5
All types										
Softwood	4.3	0.1	12.1	0.4	4.2	0.5	0.4	0.5	6.0	0.4
Hardwood	15.3	3.3	7.9	1.8	4.0	1.4	0.6	0.7	6.1	1.6

^{1/} Sound wood and bark.

^{2/} Sound trees.

^{3/} Cull trees.

^{4/} Less than 0.05 cord per acre.

Table 16.--Number of trees^{1/} by species group, quality class, and tree size, 1956

(In thousand trees)

Species group and quality class	Sapling-size trees	Pole-size trees	Small sawtimber trees	Large sawtimber trees	All trees
Yellow pines:					
Sound trees	719,902	268,215	75,180	4,921	1,068,218
Sound culls	(2/)	28,865	7,665	349	36,879
Rotten culls	(2/)	143	88	45	276
Total	719,902	297,223	82,933	5,315	1,105,373
Other softwoods:					
Sound trees	81,806	8,800	920	38	91,564
Sound culls	(2/)	895	326	--	1,221
Rotten culls	(2/)	--	11	--	11
Total	81,806	9,695	1,257	38	92,796
Soft hardwoods:					
Sound trees	373,096	83,861	14,062	5,246	476,265
Sound culls	(2/)	29,071	2,590	1,281	32,942
Rotten culls	(2/)	5,119	793	613	6,525
Total	373,096	118,051	17,445	7,140	515,732
Hard hardwoods:					
Sound trees	623,658	158,206	27,031	9,708	818,603
Sound culls	(2/)	54,710	3,545	1,877	60,132
Rotten culls	(2/)	5,996	1,580	1,225	8,801
Total	623,658	218,912	32,156	12,810	887,536
All species	1,798,462	643,881	133,791	25,303	2,601,437

^{1/} All trees 1.0 inch d.b.h. and larger.

^{2/} Data not collected.

Table 17.--Area^{1/} of seedling, sapling, and poorly stocked stands by
plantability class, 1956

(In thousand acres)

Forest type	No planting required	Suitable for machine planting	Hand planting required	All classes
Loblolly pine	80.0	--	--	80.0
Shortleaf pine	144.5	--	7.2	151.7
Virginia pine	184.8	2.7	5.7	193.2
White pine	4.3	--	--	4.3
Oak-pine	114.3	--	--	114.3
Oak-hickory	189.1	--	12.5	201.6
All types	717.0	2.7	25.4	745.1
Percent	96.2	0.4	3.4	100.0

^{1/} Excludes 9,200 acres on which planting would be impractical because of existing dense cover of brush.

Table 18.--Stocking on commercial forest area by forest type and tree-size class, 1956

(In thousand acres)

GROWING STOCK OF ALL SIZES

Forest type	Non-stocked 0-9%	Poor stocking 10-39%	Medium stocking 40-69%	Good stocking 70-100%	Total area
Loblolly pine	4.7	61.0	114.1	502.5	682.3
Shortleaf pine	15.6	76.3	204.6	1,056.2	1,352.7
Virginia pine	29.6	106.6	129.3	324.1	589.6
White pine	4.3	--	--	6.6	10.9
Oak-pine	2.2	88.9	245.6	392.1	728.8
Oak-hickory	34.6	282.7	698.8	914.3	1,930.4
Oak-gum-cypress	34.4	132.6	165.3	194.1	526.4
All types	125.4	748.1	1,557.7	3,389.9	5,821.1
Percent	2.2	12.8	26.8	58.2	100.0

SAWTIMBER GROWING STOCK

Loblolly pine	277.8	224.7	110.7	69.1	682.3
Shortleaf pine	547.7	413.7	235.6	155.7	1,352.7
Virginia pine	391.6	126.7	42.1	29.2	589.6
White pine	4.3	6.6	--	--	10.9
Oak-pine	339.4	309.1	72.4	7.9	728.8
Oak-hickory	709.9	901.2	287.7	31.6	1,930.4
Oak-gum-cypress	186.0	219.1	85.3	36.0	526.4
All types	2,456.7	2,201.1	833.8	329.5	5,821.1
Percent	42.2	37.8	14.3	5.7	100.0

Table 19.--Net annual growth by species group and unit of measure, 1956

Species group	Sawtimber	Growing stock	
	<u>Million bd.-ft.</u>	<u>Million cu. ft.</u>	<u>Thousand cords</u>
So. yellow pines	443.8	130.3	2,033
Other softwoods	2.0	1.3	21
Soft hardwoods	173.5	55.5	832
Hard hardwoods	206.0	73.2	1,106
All species	825.3	260.3	3,992

Table 20.--Net annual growth percentages for each species group and unit of measure, 1956

Unit of measure	Southern yellow pines	Other softwoods	Soft hardwoods	Hard hardwoods	All species
Board-feet	6.89	3.20	6.50	4.81	6.13
Cubic feet	5.39	3.65	5.90	4.42	5.15
Standard cords	5.92	4.23	6.47	4.85	5.66

Table 21.--Average growth per acre by forest type and stand-size class, 1956

SAWTIMBER (In board-feet)				
Forest type	Stand-size class			All stands
	Sawtimber	Poletimber	Other stands	
Loblolly pine	483	113	2	254
Shortleaf pine	345	84	14	200
Virginia pine	265	36	6	84
Oak-pine	239	67	13	116
Oak-hickory	220	72	12	132
Oak-gum-cypress	264	47	12	152
All types	292	74	11	157

GROWING STOCK (In standard cords)				
Loblolly pine	1.5	1.1	0.2	1.2
Shortleaf pine	1.2	0.9	0.1	1.0
Virginia pine	0.8	0.7	0.1	0.5
Oak-pine	0.8	0.5	0.1	0.6
Oak-hickory	0.8	0.5	0.1	0.6
Oak-gum-cypress	0.9	0.6	0.1	0.7
All types	1.0	0.7	0.1	0.7

GROWING STOCK (In cubic feet)				
Loblolly pine	114.4	70.2	11.5	81.7
Shortleaf pine	88.7	59.3	6.0	67.2
Virginia pine	59.4	42.8	5.9	34.8
Oak-pine	59.7	35.8	6.5	39.2
Oak-hickory	56.2	35.9	6.8	41.9
Oak-gum-cypress	71.7	39.6	8.2	50.8
All types	73.7	46.4	7.1	52.3

Table 22.--Average annual drain by tree-size class and species group

SAWTIMBER (In million board-feet)					
Tree-size class	Softwoods		Soft hardwoods	Hard hardwoods	All species
	Pine	Other			
Small sawtimber	397.2	2.1	32.4	48.2	479.9
Large sawtimber	112.0	1.9	48.2	76.3	238.4
All trees	509.2	4.0	80.6	124.5	718.3

GROWING STOCK (In thousand cords)					
Pole trees	603	12	96	128	839
Small sawtimber	1,139	5	96	143	1,383
Large sawtimber	255	4	115	187	561
All trees	1,997	21	307	458	2,783

GROWING STOCK (In million cubic feet)					
Pole trees	38.3	0.9	6.3	8.6	54.1
Small sawtimber	85.2	0.5	7.4	10.9	104.0
Large sawtimber	20.9	0.3	9.4	15.3	45.9
All trees	144.4	1.7	23.1	34.8	204.0

Table 23.--Net annual change in volume by species group, 1956

SAWTIMBER (In million board-feet)

Item	Southern yellow pines	Other softwoods	Soft hardwoods	Hard hardwoods	All species
Net volume, Jan. 1, 1956	6,442.8	61.9	2,671.1	4,285.5	13,461.3
Total growth	497.2	2.5	186.1	247.1	932.9
Mortality	53.4	0.5	12.6	41.1	107.6
Net growth	443.8	2.0	173.5	206.0	825.3
Timber cut	509.2	4.0	80.6	124.5	718.3
Loss or gain	-65.4	-2.0	+92.9	+81.5	+107.0
Net volume, Dec. 31, 1956	6,377.4	59.9	2,764.0	4,367.0	13,568.3
Percent change	-1.0	-3.2	+3.5	+1.9	+0.8

GROWING STOCK (In thousand cords)

Net volume, Jan. 1, 1956	34,357	497	12,867	22,803	70,524
Total growth	2,257	24	906	1,248	4,435
Mortality	224	3	74	142	443
Net growth	2,033	21	832	1,106	3,992
Timber cut	1,997	21	307	458	2,783
Loss or gain	+36	0	+525	+648	+1,209
Net volume, Dec. 31, 1956	34,393	497	13,392	23,451	71,733
Percent change	+0.1	0.0	+4.1	+2.8	+1.7

GROWING STOCK (In million cubic feet)

Net volume, Jan. 1, 1956	2,417.2	36.1	942.4	1,653.9	5,049.6
Total growth	146.6	1.5	60.9	83.8	292.8
Mortality	16.3	0.2	5.4	10.6	32.5
Net growth	130.3	1.3	55.5	73.2	260.3
Timber cut	144.4	1.7	23.1	34.8	204.0
Loss or gain	-14.1	-0.4	+32.4	+38.4	+56.3
Net volume, Dec. 31, 1956	2,403.1	35.7	974.8	1,692.3	5,105.9
Percent change	-0.6	-1.1	+3.4	+2.3	+1.1

Table 24.--County area by broad use class, 1956

County	Total area ^{1/}	Nonforest area		Forest land		
		Land	Water	Non- commercial	Commercial	
	<u>Thousand acres</u>	<u>Thousand acres</u>	<u>Thousand acres</u>	<u>Thousand acres</u>	<u>Thousand acres</u>	<u>Percent</u>
Alamance	277.8	143.9	1.8	--	132.1	47.9
Alexander	165.7	74.9	3.4	--	87.4	53.9
Anson	343.0	133.3	3.2	(2/)	206.5	60.8
Cabarrus	230.4	141.2	0.2	--	89.0	38.7
Caswell	278.4	107.0	0.7	--	170.7	61.5
Catawba	263.7	158.9	5.4	--	99.4	38.5
Chatham	452.5	96.8	1.2	--	354.5	78.6
Cleveland	298.2	182.8	0.9	(2/)	114.5	38.5
Davidson	358.4	177.3	10.5	--	170.6	49.0
Davie	169.0	92.1	0.9	--	76.0	45.2
Durham	192.0	73.5	0.8	--	117.7	61.6
Forsyth	271.4	135.1	1.2	1.3	133.8	49.5
Franklin	316.1	127.9	0.7	--	187.5	59.4
Gaston	232.3	121.0	6.8	--	104.5	46.3
Granville	347.5	127.7	1.6	--	218.2	63.1
Guilford	417.3	237.2	3.0	0.1	177.0	42.7
Iredell	380.2	199.5	2.8	--	177.9	47.1
Lincoln	197.8	108.6	1.1	--	88.1	44.8
Mecklenburg	351.4	181.6	6.7	0.7	162.4	47.1
Montgomery	319.4	59.9	8.1	(2/)	251.4	80.8
Orange	254.7	97.9	0.2	--	156.6	61.5
Person	256.0	103.7	0.6	--	151.7	59.4
Polk	150.4	38.4	0.7	--	111.3	74.3
Randolph	512.6	175.5	1.0	--	336.1	65.7
Rockingham	366.1	169.8	0.8	--	195.5	53.5
Rowan	337.3	177.6	13.9	(2/)	145.8	45.1
Rutherford	363.5	145.9	2.1	(2/)	215.5	59.6
Stanly	259.8	144.9	6.0	3.8	105.1	41.4
Stokes	293.8	107.5	0.5	3.9	181.9	62.0
Surry	344.3	129.9	1.2	0.9	212.3	61.9
Union	411.5	225.1	0.4	(2/)	186.0	45.2
Vance	172.1	75.9	11.6	--	84.6	52.7
Wake	554.9	240.0	2.8	5.2	306.9	55.6
Warren	284.8	79.5	1.4	4.5	199.4	70.4
Yadkin	214.4	100.1	1.1	--	113.2	53.1
Unit total	10,638.7	4,691.9	105.3	20.4	5,821.1	55.3

^{1/} Gross area from Bureau of the Census, 1950.^{2/} Less than 50 acres.

Table 25.--Ownership of commercial forest land by county, 1956

County	Private		Public					
			National forest	Other Federal	State	County, city, town	Total public	
	<u>Thousand acres</u>	<u>Percent</u>	<u>Thousand acres</u>	<u>Thousand acres</u>	<u>Thousand acres</u>	<u>Thousand acres</u>	<u>Thousand acres</u>	<u>Percent</u>
Alamance	132.0	99.9	--	--	--	0.1	0.1	0.1
Alexander	87.4	100.0	--	--	--	(1/)	(1/)	--
Anson	206.3	99.9	--	--	0.1	0.1	0.2	0.1
Cabarrus	88.6	99.6	--	--	--	0.4	0.4	0.4
Caswell	158.3	92.7	12.3	--	--	0.1	12.4	7.3
Catawba	99.2	99.8	--	--	(1/)	0.2	0.2	0.2
Chatham	352.8	99.5	--	--	1.6	0.1	1.7	0.5
Cleveland	114.5	100.0	--	--	--	(1/)	(1/)	--
Davidson	169.4	99.3	1.0	--	--	0.2	1.2	0.7
Davie	76.0	100.0	--	--	(1/)	(1/)	(1/)	--
Durham	112.7	95.8	--	1.2	3.4	0.4	5.0	4.2
Forsyth	133.6	99.9	--	--	--	0.2	0.2	0.1
Franklin	187.5	100.0	--	--	(1/)	(1/)	(1/)	--
Gaston	104.4	99.9	--	--	(1/)	0.1	0.1	0.1
Granville	204.7	93.8	--	2.5	10.9	0.1	13.5	6.2
Guilford	172.4	97.4	--	--	0.2	4.4	4.6	2.6
Iredell	177.7	99.9	--	--	(1/)	0.2	0.2	0.1
Lincoln	88.1	100.0	--	--	(1/)	(1/)	(1/)	--
Mecklenburg	160.7	99.0	--	--	0.1	1.6	1.7	1.0
Montgomery	217.7	86.6	33.7	--	--	(1/)	33.7	13.4
Orange	154.9	98.9	--	--	1.7	--	1.7	1.1
Person	151.4	99.8	--	--	--	0.3	0.3	0.2
Polk	110.4	99.2	--	--	--	0.9	0.9	0.8
Randolph	327.4	97.4	8.1	--	(1/)	0.6	8.7	2.6
Rockingham	195.4	99.9	--	--	--	0.1	0.1	0.1
Rowan	144.9	99.4	--	0.2	0.5	0.2	0.9	0.6
Rutherford	215.4	100.0	--	--	--	0.1	0.1	(1/)
Stanly	105.1	100.0	--	--	--	--	--	--
Stokes	181.9	100.0	--	--	--	--	--	--
Surry	211.7	99.7	--	--	(1/)	0.6	0.6	0.3
Union	185.8	99.9	--	--	(1/)	0.2	0.2	0.1
Vance	78.5	92.8	--	5.9	(1/)	0.2	6.1	7.2
Wake	304.8	99.3	--	--	1.7	0.4	2.1	0.7
Warren	198.6	99.6	--	0.7	(1/)	0.1	0.8	0.4
Yadkin	113.1	99.9	--	--	0.1	(1/)	0.1	0.1
Unit total	5,723.3	98.3	55.1	10.5	20.3	11.9	97.8	1.7

1/ Less than 50 acres, or 0.05 percent.

Table 26.--Net volume^{1/} of sawtimber by county and species group, 1956

(In million board-feet)

County	Softwoods ^{2/}	Yellow-poplar and sweetgum ^{3/}	Oaks and other hard hardwoods	All species
Alamance	156.7	79.1	104.3	340.1
Alexander	81.1	16.1	76.6	173.8
Anson	348.4	118.3	46.0	512.7
Cabarrus	96.4	38.1	121.3	255.8
Caswell	228.5	88.7	181.6	498.8
Catawba	111.1	25.0	88.3	224.4
Chatham	470.9	221.6	255.4	947.9
Cleveland	201.8	103.8	25.4	331.0
Davidson	175.6	114.7	204.3	494.6
Davie	50.0	36.1	56.9	143.0
Durham	115.3	115.6	143.3	374.2
Forsyth	83.3	65.8	58.2	207.3
Franklin	386.2	127.7	225.0	738.9
Gaston	127.6	43.0	37.3	207.9
Granville	394.9	186.0	122.0	702.9
Guilford	206.6	129.0	153.2	488.8
Iredell	142.1	62.5	204.5	409.1
Lincoln	65.9	13.6	51.9	131.4
Mecklenburg	250.0	59.3	145.6	454.9
Montgomery	257.8	36.7	177.3	471.8
Orange	200.0	81.6	155.8	437.4
Person	271.5	59.9	87.3	418.7
Polk	81.2	16.7	47.6	145.5
Randolph	235.1	56.3	249.0	540.4
Rockingham	26.1	64.0	83.9	174.0
Rowan	109.7	111.1	161.0	381.8
Rutherford	127.4	26.2	156.5	310.1
Stanly	121.7	17.9	100.8	240.4
Stokes	134.2	51.5	128.7	314.4
Surry	188.8	41.1	87.4	317.3
Union	135.9	44.9	61.0	241.8
Vance	118.7	36.1	30.1	184.9
Wake	548.4	266.1	203.2	1,017.7
Warren	104.2	106.1	167.9	378.2
Yadkin	151.6	10.9	86.9	249.4
Unit total	6,504.7	2,671.1	4,285.5	13,461.3

^{1/} Log scale, International 1/4-inch rule.

^{2/} Includes white pine and redcedar.

^{3/} Includes other soft hardwoods.

Table 27.--Net volume^{1/} of sawtimber by county, broad species group,
and diameter-class group, 1956

(In million board-feet)

County	Softwoods			Hardwoods		
	9.0-14.9 inches	15.0-18.9 inches	19.0+ inches	11.0-14.9 inches	15.0-18.9 inches	19.0+ inches
Alamance	150.0	6.7	--	71.4	66.1	45.9
Alexander	78.8	2.3	--	42.3	36.9	13.5
Anson	212.1	65.1	71.2	85.7	54.4	24.2
Cabarrus	86.5	9.9	--	67.5	46.3	45.6
Caswell	198.3	30.2	--	114.2	94.0	62.1
Catawba	101.6	9.5	--	52.2	47.2	13.9
Chatham	378.4	34.0	58.5	260.5	89.0	127.5
Cleveland	176.4	19.2	6.2	48.8	33.5	46.9
Davidson	152.8	13.6	9.2	161.9	94.4	62.7
Davie	47.4	2.6	--	51.2	31.2	10.6
Durham	61.6	27.3	26.4	87.5	80.7	90.7
Forsyth	63.0	20.3	--	49.2	37.4	37.4
Franklin	177.6	148.2	60.4	157.0	81.7	114.0
Gaston	118.7	8.9	--	45.5	17.5	17.3
Granville	285.0	65.3	44.6	130.9	66.5	110.6
Guilford	168.8	37.8	--	144.4	65.9	71.9
Iredell	120.9	12.0	9.2	114.7	102.8	49.5
Lincoln	56.4	9.5	--	38.8	22.8	3.9
Mecklenburg	207.1	16.8	26.1	65.5	62.8	76.6
Montgomery	217.9	30.5	9.4	143.5	42.3	28.2
Orange	176.5	16.5	7.0	125.2	76.0	36.2
Person	255.5	16.0	--	73.6	40.5	33.1
Polk	61.9	14.1	5.2	43.1	16.1	5.1
Randolph	204.0	31.1	--	245.5	44.3	15.5
Rockingham	21.6	4.5	--	68.3	20.7	58.9
Rowan	92.9	10.8	6.0	116.7	82.4	73.0
Rutherford	122.8	4.6	--	104.1	56.0	22.6
Stanly	93.8	11.8	16.1	80.6	34.0	4.1
Stokes	103.1	23.2	7.9	65.6	56.7	57.9
Surry	120.5	48.7	19.6	64.1	29.5	34.9
Union	135.9	--	--	49.5	49.9	6.5
Vance	106.3	7.3	5.1	38.3	17.1	10.8
Wake	341.5	162.9	44.0	198.9	140.6	129.8
Warren	84.2	20.0	--	129.3	87.7	57.0
Yadkin	133.3	18.3	--	53.5	30.1	14.2
Unit total	5,113.1	959.5	432.1	3,389.0	1,955.0	1,612.6

^{1/} Log scale, International 1/4-inch rule.

Table 28.--Net volume^{1/} of all timber by county, pulping species group, and tree-diameter group, 1956

(In thousand cords)

GROWING STOCK									
County	Yellow pines		Other softwoods		Soft hardwoods		Hard hardwoods		All species
	5 - 12 inches	13+ inches	5 - 12 inches	13+ inches	5 - 12 inches	13+ inches	5 - 12 inches	13+ inches	
Alamance	826	51	73	3	223	140	302	200	1,818
Alexander	600	37	14	--	50	32	175	150	1,058
Anson	1,284	404	11	4	198	233	238	81	2,453
Cabarrus	428	98	25	2	114	76	335	245	1,323
Caswell	971	159	7	--	437	161	357	403	2,495
Catawba	524	68	--	--	29	50	294	163	1,128
Chatham	1,790	379	34	--	705	409	1,008	429	4,754
Cleveland	870	165	--	--	183	212	175	57	1,662
Davidson	1,004	93	18	--	325	214	491	353	2,498
Davie	336	21	18	2	151	53	178	109	868
Durham	619	137	--	3	259	240	229	294	1,781
Forsyth	417	78	14	--	267	107	298	121	1,302
Franklin	958	559	8	--	326	257	431	455	2,994
Gaston	624	67	2	--	168	87	196	63	1,207
Granville	1,336	430	7	--	506	344	539	209	3,371
Guilford	778	191	14	--	326	226	507	260	2,302
Iredell	451	119	27	4	251	122	340	403	1,717
Lincoln	446	50	1	--	138	29	200	96	960
Mecklenburg	1,048	221	15	--	120	104	278	296	2,082
Montgomery	1,457	186	2	--	199	75	1,120	270	3,309
Orange	1,071	145	--	--	249	143	481	332	2,421
Person	1,259	118	12	--	328	101	224	157	2,199
Polk	388	63	3	--	36	30	244	76	840
Randolph	1,021	153	81	--	325	78	1,483	315	3,456
Rockingham	227	11	3	--	165	100	252	170	928
Rowan	626	73	28	12	239	203	385	323	1,889
Rutherford	1,051	67	--	--	117	69	759	272	2,335
Stanly	628	109	--	--	107	35	391	179	1,449
Stokes	505	139	--	--	264	98	609	256	1,871
Surry	851	195	17	20	101	62	304	161	1,711
Union	896	32	8	--	132	86	369	126	1,649
Vance	552	111	--	--	110	78	116	57	1,024
Wake	1,503	692	--	--	487	527	623	419	4,251
Warren	685	76	--	--	156	202	469	364	1,952
Yadkin	712	118	5	--	81	12	378	161	1,467
Unit total	28,742	5,615	447	50	7,872	4,995	14,778	8,025	70,524

^{1/} Sound wood and bark.

Table 28.--Net volume^{1/} of all timber by county, pulping species group, and tree-diameter group, 1956 (cont.)

(In thousand cords)

OTHER MATERIAL

County	Yellow pines		Other softwoods		Soft hardwoods		Hard hardwoods		All species
	5 - 12 inches	13+ inches	5 - 12 inches	13+ inches	5 - 12 inches	13+ inches	5 - 12 inches	13+ inches	
Alamance	19	5	--	--	44	30	30	30	158
Alexander	42	17	--	--	12	10	65	24	170
Anson	32	--	11	--	51	34	86	68	282
Cabarrus	1	10	3	2	23	48	84	43	214
Caswell	35	10	--	--	58	70	81	100	354
Catawba	60	--	--	--	16	1	47	21	145
Chatham	18	27	--	--	158	115	221	240	779
Cleveland	22	3	--	--	57	43	75	51	251
Davidson	13	--	--	--	39	42	70	71	235
Davie	9	--	--	--	29	14	16	14	82
Durham	91	4	--	--	43	66	52	86	342
Forsyth	96	--	4	--	23	37	35	62	257
Franklin	20	--	--	--	108	42	98	76	344
Gaston	74	10	--	--	36	6	64	24	214
Granville	24	4	--	--	48	57	97	58	288
Guilford	8	12	--	--	64	16	48	70	218
Iredell	104	10	--	--	79	11	202	82	488
Lincoln	22	7	--	--	16	47	60	42	194
Mecklenburg	20	16	19	--	77	62	68	87	349
Montgomery	23	8	--	--	115	36	132	112	426
Orange	4	4	2	--	63	31	46	40	190
Person	51	--	9	--	82	40	25	33	240
Polk	142	21	1	--	45	5	134	119	467
Randolph	64	7	--	--	182	37	327	130	747
Rockingham	489	14	--	--	123	73	112	46	857
Rowan	22	12	5	--	60	14	71	45	229
Rutherford	50	3	--	--	90	24	142	211	520
Stanly	68	--	2	--	48	2	88	47	255
Stokes	34	18	--	--	51	22	149	65	339
Surry	244	28	--	--	18	33	348	76	747
Union	--	--	13	--	47	72	131	114	377
Vance	25	5	1	--	45	72	38	22	208
Wake	59	5	2	--	59	65	133	63	386
Warren	14	--	--	--	73	144	60	44	335
Yadkin	109	3	--	--	73	6	60	43	294
Unit total	2,108	263	72	2	2,155	1,427	3,495	2,459	11,981

^{1/} Sound wood and bark.

Table 29.--Average annual sawtimber drain by county and species group^{1/}

(In million board-feet)

County	Yellow pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species
Alamance	1.6	--	2.3	8.2	12.1
Alexander	9.8	--	1.2	1.6	12.6
Anson	14.5	--	5.9	11.2	31.6
Cabarrus	6.3	--	1.3	1.8	9.4
Caswell	--	--	--	0.7	0.7
Catawba	16.8	--	0.3	3.6	20.7
Chatham	19.0	0.2	--	--	19.2
Cleveland	9.2	--	--	1.0	10.2
Davidson	1.4	--	--	--	1.4
Davie	8.0	0.2	0.2	--	8.4
Durham	12.1	--	2.5	1.5	16.1
Forsyth	12.5	0.2	7.0	6.0	25.7
Franklin	33.1	--	1.1	0.5	34.7
Gaston	12.3	--	1.1	--	13.4
Granville	20.8	--	6.3	9.0	36.1
Guilford	7.3	--	2.5	15.4	25.2
Iredell	17.2	--	2.5	10.0	29.7
Lincoln	6.0	0.4	--	1.9	8.3
Mecklenburg	15.0	0.5	--	--	15.5
Montgomery	19.6	--	2.4	7.3	29.3
Orange	3.5	--	3.3	--	6.8
Person	9.2	--	2.0	0.8	12.0
Polk	12.9	--	0.6	1.4	14.9
Randolph	36.9	--	2.9	5.8	45.6
Rockingham	16.9	--	1.1	1.9	19.9
Rowan	2.7	2.5	6.7	2.9	14.8
Rutherford	10.8	--	--	2.9	13.7
Stanly	1.3	--	--	0.8	2.1
Stokes	7.2	--	1.1	7.6	15.9
Surry	8.5	--	1.4	2.6	12.5
Union	11.0	--	11.5	0.5	23.0
Vance	11.7	--	0.3	0.7	12.7
Wake	80.6	--	12.2	11.9	104.7
Warren	44.3	--	0.9	--	45.2
Yadkin	9.2	--	--	5.0	14.2
Unit total	509.2	4.0	80.6	124.5	718.3

^{1/} Estimates of timber drain by county are less accurate than inventory volumes, and use of individual county statistics should be avoided. For general use, data for a minimum of 10 counties should be combined.

Table 30.--Average annual drain on growing stock by county and species group^{1/}

(In thousand cords)

County	Yellow pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species
Alamance	5	2	7	21	35
Alexander	77	--	4	4	85
Anson	80	--	14	31	125
Cabarrus	21	1	6	7	35
Caswell	18	--	6	9	33
Catawba	68	1	6	19	94
Chatham	76	2	--	--	78
Cleveland	28	--	--	4	32
Davidson	5	--	--	--	5
Davie	31	1	2	--	34
Durham	51	1	13	10	75
Forsyth	40	--	21	30	91
Franklin	124	--	11	10	145
Gaston	50	--	5	6	61
Granville	56	1	32	31	120
Guilford	36	--	7	38	81
Iredell	78	2	8	36	124
Lincoln	33	1	1	5	40
Mecklenburg	46	1	--	--	47
Montgomery	86	--	9	24	119
Orange	24	--	9	--	33
Person	54	--	7	5	66
Polk	46	--	7	10	63
Randolph	120	1	18	32	171
Rockingham	64	1	13	13	91
Rowan	8	6	22	10	46
Rutherford	52	--	--	9	61
Stanly	9	--	--	4	13
Stokes	32	--	6	26	64
Surry	36	--	5	8	49
Union	43	--	32	4	79
Vance	37	--	1	4	42
Wake	272	--	31	32	335
Warren	158	--	3	--	161
Yadkin	33	--	1	16	50
Unit total	1,997	21	307	458	2,783

^{1/} Estimates of timber drain by county are less accurate than inventory volumes, and use of individual county statistics should be avoided. For general use, data for a minimum of 10 counties should be combined.

DEFINITION OF TERMS

Land-Use Classes

Forest land: Includes (a) lands which are at least 10 percent stocked with trees of any size and capable of producing sawtimber or other wood products, and (b) lands from which the trees described in (a) have been removed to less than 10-percent stocking but which have not been developed for other use; subdivided into the following classes:

Commercial: Forest land which is (a) producing, or physically capable of producing, usable crops of wood (usually sawtimber), (b) economically available now or in the future, and (c) not withdrawn from timber use.

Noncommercial: Forest land (a) withdrawn from timber utilization through statute, ordinance, or administrative order but which otherwise qualifies as commercial forest land, or (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.

Nonforest land: Includes land under cultivation or in pasture where the timber has been cleared to less than 10 percent stocking, idle or abandoned agricultural land, marsh land, and land in urban, residential, or industrial areas, school yards, cemeteries, roads, railroads, and other rights-of-way.

Water: Includes lakes, bays, and estuaries over 40 acres in size, and streams, canals, and sloughs at least one-eighth of a mile in width which are classed as "inland water" by the Bureau of the Census. Smaller lakes and ponds between one acre and 40 acres in size, and waterways between 120 feet and 660 feet in width, which are classed as land area by the Bureau of the Census, are also included as water areas.

Forest Types

Forest type is determined on the basis of cubic volume for all stand sizes except seedlings and saplings (stand size 4), in which case the number of stems are the criteria.

Yellow pine types: Forests in which 50 percent or more of the cubic volume or number of stems in the stand is shortleaf, pitch, or Virginia pine species. In mixtures the predominating species determines the type.

White pine: Forests in which 50 percent or more of the stand is eastern white pine and hemlock, either singly or in combination.

Oak-pine type: Forests in which 50 percent or more of the stand is hardwoods, usually upland oaks, but in which southern yellow pine species make up 25 to 49 percent of the stand.

Oak-hickory type: Upland hardwood forests in which 50 percent or more of the stand is composed of oak, hickory, yellow-poplar, soft maple, basswood, sweet birch, ash, and other hardwood species, except in cases where yellow pines made up 25 to 49 percent and the stand was classified as oak-pine type.

Oak-gum cypress type: Bottomland forests in which 50 percent or more of the stand is tupelo, blackgum, sweetgum, ash, oak, elm, maple, in mixture with cypress and other associated species, except where pines comprise 25-49 percent of the stand.

Stand-Size Classes

Sawtimber: Stands containing at least 1,500 board-feet net volume per acre, International 1/4-inch log rule, in sound, live, softwood trees 9.0 inches d.b.h. or larger, or hardwood trees 11.0 inches d.b.h. or larger. Two classes of sawtimber stands are recognized:

Large sawtimber: Stands of sawtimber having more than 50 percent of the net board-foot volume in trees 15.0 inches d.b.h. or larger.

Small sawtimber: Stands of sawtimber having 50 percent or more of the net board-foot volume in trees smaller than 15.0 inches d.b.h.

Poletimber: Stands failing to meet the minimum sawtimber specifications, but at least 10-percent stocked with trees 5.0 inches d.b.h. or larger and with at least half the minimum stocking in pole-size trees.

Seedling and saplings: Stands not qualifying as sawtimber or poletimber stands, but having at least a 10-percent stocking of trees of commercial species and with half the minimum stocking in seedlings and saplings.

Nonstocked and other areas: Forest areas not qualifying as sawtimber, poletimber, or seedling and sapling stands.

Diameters

D.b.h. (diameter at breast height): Stem diameter in inches, outside bark, measured at 4-1/2 feet above the ground.

Diameter class: All trees were tallied by 2-inch diameter classes, each class including diameters 1.0 inch below and 0.9 inch above the stated midpoint, e.g., trees 7.0 to and including 8.9 inches are included in the 8-inch class. Corresponding limits apply to other diameter classes.

Timber Quality Classification

Growing Stock

Sawtimber trees: Live softwood trees at least 9.0 inches d.b.h. and hardwood trees at least 11.0 inches d.b.h., with not less than one merchantable log 12 feet long, or with less than 50 percent of the gross volume of the tree in sound sawtimber. To be merchantable all saw logs must be at least 8 feet long and at least 50 percent sound. They must also meet the following requirements:

Softwood logs^{1/} must have a scaling diameter of 6 inches or larger, and sweep or crook must not exceed two-thirds of the scaling diameter.

Hardwood logs must have a scaling diameter of 8 inches or larger and must pass specifications^{2/} for standard lumber logs, or tie and timber logs.

Poletimber trees: Straight-boled trees between 5.0 inches d.b.h. and sawtimber size.

Sapling-size trees: Trees 1.0 inch to 4.9 inches d.b.h. which will grow into poletimber or sawtimber-size trees of sound quality.

Other Material

Sound cull trees: Live trees of all sizes that are unmerchantable for saw logs now or prospectively because of species, poor form, excessive limbiness, or other sound defect.

Rotten cull trees: Live trees of all sizes that are unmerchantable for saw logs now or prospectively because of rotten defect.

Hardwood limbs: The limb volume of all hardwood sawtimber and cull trees to a minimum diameter of 4.0 inches inside bark.

Species Groups

Yellow pines: Includes shortleaf, loblolly, Virginia, and longleaf pine.

Other softwoods: White pine, hemlock, and eastern redcedar.

Soft hardwoods: Blackgum, sweetgum, yellow-poplar, soft maple, elm, sycamore, hackberry, buckeye, and willow.

Hard hardwoods: All of the oaks, hickories, ash, beech, birch, hard maple, black locust, black walnut, holly, dogwood, persimmon, and sourwood.

^{1/} For detailed specifications of log grades, see "Interim log grades for southern pine." Southern Forest Experiment Station, 18 pp. 1953.

^{2/} For detailed hardwood log grade specifications, see "Hardwood log grades for standard lumber: proposals and results." U. S. Forest Products Laboratory, DL737. 1949.

Volume Estimates

Board-foot volume: The volume in board feet, measured by the International 1/4-inch rule, exclusive of defect, of that portion of sound sawtimber trees between the stump and the upper limit of merchantability for saw logs.

Volume in cords: For sound trees the volume in standard cords (including bark) of the sound portion of trees 5.0 inches d.b.h. and larger, between stump and a minimum top-stem diameter of 4.0 inches inside bark. Similar volumes are given for cull trees. The volume in limbs, which are at least 4.0 inches in diameter inside bark, is shown separately for all sawtimber-size hardwoods.

Volume in cubic feet: Same as volume shown in cords except bark is not included.

International 1/4-inch log rule: A rule for estimating the board-foot volume of 4-foot log sections, according to the formula $V = .905 (0.22D^2 - 0.71D)$. The taper allowance for computing the volume in log lengths greater than four feet is 0.5 inch per 4-foot section. Allowance for saw kerf is 1/4 inch.

Standard cord: A stacked pile, 4 x 4 x 8 feet, of round or split bolts, estimated to contain, on the average, about 74 cubic feet of solid wood.

Growth and Timber Cut

Net growth.--The estimated volume of net growth includes the growth on the present growing stock, the growth on trees which died or were cut during the year, and the ingrowth resulting from smaller trees reaching volume size. It excludes mortality, or loss of volume in trees dying from natural causes. Net growth estimates are based on growth of sound trees. Growth of "other material" is not included.

In board-feet: The change during the calendar year in sawtimber volume resulting from growth, ingrowth, and mortality losses.

In cubic feet or cords: The change during the calendar year in the volume of all sound trees 5.0 inches and larger resulting from growth, ingrowth, and mortality losses.

Timber cut.--The volume of timber cut is based on the measurement and tally of stumps found on regular ground sample plots. Stumps of all trees cut during the past 3-year period are recorded and the measurements are converted into equivalent tree volume. The average yearly volume of timber cut for the 3-year period is then taken as the annual estimate. Board-foot volumes include the saw-log portion of all sawtimber-size trees which were cut. Estimates in cubic feet or cords include the entire stem from stump to 4.0-inch top of all sound trees 5.0 inches in diameter and larger. Timber cut from cull or dead trees is not included.

Stocking

Stocking is the extent to which growing space is effectively utilized by trees. The number of stems present by d.b.h. classes was used as a basis for stocking classification. Areas having the minimum numbers of trees listed below, either in a single diameter class or proportionately in any combinations of diameter classes, were considered fully stocked.

<u>D.b.h.</u>	<u>Minimum number trees per acre</u>
Seedlings	1,000
2 inches	800
4 inches	590
6 inches	400
8 inches	240
10 inches	155
12 inches	115
14 inches	90

RELIABILITY OF FOREST SURVEY DATA

In general, the errors which affect the accuracy of Forest Survey area and timber volume estimates arise from two sources. These may be described as (1) sampling errors which result from using sampling procedures rather than making a complete inventory or canvass, and (2) non-sampling errors which arise from human mistakes in judgment, measurement, recording, or arithmetic.

In Forest Survey work a diligent effort is made to maintain a high degree of accuracy in the collection and compilation of data. The sampling errors are held to a specified minimum through survey design and sampling technique. These errors are the only measurable errors involved in computing the reliability of the data. The non-sampling errors are minimized or eliminated through training, supervision, field check cruises, and complete editing and machine verification in compiling the data.

Forest area.--The sampling intensity of the 1956 survey provided an estimate of the total forest area with a standard error of ± 0.8 percent. The probabilities are two out of three that the actual forest area is within ± 0.8 percent of the estimated acreage. The standard error per million acres was ± 1.9 percent.

Cubic volume.--The standard error of the net cubic-foot volume estimate was ± 2.4 percent, or ± 5.4 percent per billion cubic feet. Here again, the probabilities are two out of three that the actual volume does not vary from the estimated volume by more than this percentage. The error of the volume in standard cords was not computed, but it should be approximately the same as for cubic volume.

Board-foot volume.--The standard error of the total board-foot volume estimate was ± 3.0 percent.

Growth.--Estimates of timber growth are based on measurements of radial growth on 2,985 sample trees, and on mortality data taken on sample plots. Because of technical problems involved, no attempt was made to compute the sampling error of growth estimates.

Timber cut.--Estimates of the amount of timber cut were based on the number and size of stumps tallied on cutover plots. Stumps of all trees cut during the 3-year period preceding date of inventory were recorded, and the measurements were converted into tree volume. The average volume of timber cut for the 3-year period was taken as the annual estimate. The standard error for the total volume of growing stock cut was ± 8.7 percent, or ± 3.9 percent per billion cubic feet.

Use of county data.--The tables showing forest area, timber volumes, and timber cut by county are included to permit grouping of the data in any desired area combinations. In designing the survey, provision was made for controlling the range of sampling error on a county basis. However, comparison or use of individual county statistics should be avoided because of the possibility that they may be subject to considerable error. It is recommended that area or volume data for a minimum of five counties be combined, and that at least 10 counties be used when working with data on timber cut.

The actual range of errors on county data are shown below:

<u>Item</u>	<u>Percent of error</u>	
	<u>Low</u>	<u>High</u>
Forest area	± 3.7	± 9.0
Growing stock volume	± 9.2	± 13.9
Board-foot volume	± 11.5	± 15.4

HOW THE FOREST INVENTORY IS MADE

The present system of inventory is a two-step method which includes land-use classification of points on aerial photographs followed by the cruising of ground sample plots. The county is the basic work unit. The detailed procedure is as follows:

1. Preliminary estimates of the acreage of land in forests and other land-use classes are obtained by classifying points printed on every third aerial photograph in alternate flight lines within a county. The proportion of points falling in each class is used to estimate the acreage. This estimate is later checked and revised through the use of ground plots.

2. Ground sample plots are selected in a systematic manner from the forest land classifications made in Step 1, using an interval which will provide sufficient plots to meet established limits of error per billion cubic feet of timber. This results in a proportional sample of all existing timber stands. Timber cruisers make a detailed description and tally of the ground plots to obtain data on timber volume, quality, stocking, and mortality. Samples of agricultural and other photo classifications are also checked on the ground to verify or adjust the area estimates based on these classifications.

3. Growth estimates are based on increment borings taken proportionally from sample trees of various diameters and species in each forest type and stand class. The volume of timber cut is computed from a tally of the stumps of trees cut on the plots during a specified period.

4. All field data are sent to Asheville for editing and are placed on punch cards for machine sorting and tabulation. Final estimates are based on statistical summaries of the data.

Forest Survey Reports Published Since 1945

Forest Statistics:

- No. 25 - Forest Resources of the Lower Coastal Plain of South Carolina
- No. 26 - 1946 Commodity Drain by County from South Carolina Forests
- No. 28 - South Carolina's Forest Resources, 1947
- No. 30 - Forest Resources of Northeast Florida, 1949
- No. 31 - Forest Resources of Central Florida, 1949
- No. 32 - Forest Resources of Northwest Florida, 1949
- No. 33 - Forest Resources of South Florida, 1949
- No. 34 - Timber Production and Commodity Drain from Florida's Forests, 1948
- No. 36 - Forest Statistics for Florida, 1949
- No. 37 - Forest Statistics for Southwest Georgia, 1951
- No. 39 - Forest Statistics for Southeast Georgia, 1952
- No. 40 - Forest Statistics for Central Georgia, 1952
- No. 41 - Forest Statistics for the Southern Coastal Plain of North Carolina, 1952
- No. 42 - Forest Statistics for North Central and North Georgia, 1953
- No. 44 - Forest Statistics for Georgia, 1951-53
- No. 45 - Forest Statistics for the Northern Coastal Plain of North Carolina, 1955
- No. 46 - Forest Statistics for the Mountain Region of North Carolina, 1955

Pulpwood Production:

- No. 21 - 1945 Pulpwood Production by County in the Carolinas and Virginia
- No. 23 - 1946 Pulpwood Production by County in the Southeast
- No. 27 - 1947 Pulpwood Production by County in the Southeast
- No. 29 - 1948 Pulpwood Production by County in the Southeast
- *No. 35 - 1949 Pulpwood Production in the South (out of print)
- *No. 69 - Pulpwood Production in the South, 1950
- *No. 38 - 1951 Pulpwood Production in the South
- *No. 72 - 1952 Pulpwood Production in the South
- *No. 43 - 1953 Pulpwood Production in the South
- *No. 76 - 1954 Pulpwood Production in the South
- *No. 47 - 1955 Pulpwood Production in the South

Other Reports

- Southern Forests as a Source of Pulpwood. Forest Survey Release No. 22
- Southern Pulpwood Production and the Timber Supply. Forest Survey Release No. 24
- Virginia Forest Resources and Industries, 1949. U. S. Dept. Agr. Misc. Pub. No. 681
- The Timber Supply Outlook in South Carolina, 1951. U. S. Dept. Agr. Resource Report No. 3
- The Timber Supply Situation in Florida, 1952. U. S. Dept. Agr. Resource Report No. 6