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Forest Statistics for Central Tennessee Counties — 1989

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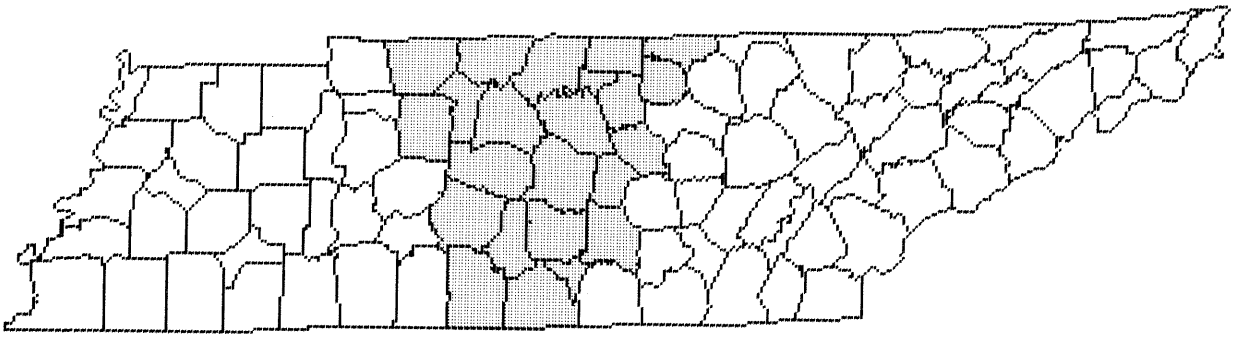

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SUMMARY

The 1989 survey of the Central Unit of Tennessee revealed the following:

- Timberland now covers 2,461.3 thousand acres, an increase of 14 percent since 1980.
- Ninety-five percent of the unit's timberland is privately owned.
- Cedar and mixed cedar-hardwood stands occupy 456.1 thousand acres of timberland.
- Oak-hickory forests account for 79 percent of the unit's timberland.
- Area in sawtimber-sized stands increased by 250 thousand acres with most of the increase in oak-hickory forest types.
- The number of hardwood growing-stock trees fell 17 percent, while softwood numbers increased 26 percent.
- Hardwood growing-stock volume climbed 55 percent to 2,304.7 million cubic feet and softwood growing-stock volume climbed 74 percent to 138.1 million cubic feet.
- Softwood sawtimber volumes more than doubled and hardwood sawtimber volumes increased by two-thirds since 1980.
- Hardwood sawtimber quality declined since 1980.
- Net growth increased for both growing stock and sawtimber despite a doubling in mortality.
- Removals increased for both growing stock and sawtimber but were concentrated in the sawtimber portion of the inventory.
- Growth exceeds removals by roughly 3 to 1.

FOREWORD

The Southern Forest Survey, an activity of the Southern Forest Experiment Station Forest Inventory and Analysis work unit, covers the States of Alabama, Arkansas, Louisiana, Mississippi, Oklahoma, Tennessee, and Texas, and the island of Puerto Rico.

This survey is part of the nationwide Forest Survey originally authorized by the McSweeney-McNary Act of 1928. More recent legislation pertinent to the survey mission includes the Forest and Rangeland Renewable Resources Planning Act of 1974 and the Forest and Rangeland Renewable Resources Research Act of 1978. The survey mission is to develop, analyze, and maintain renewable forest resource information. This information is essential for formulation of forest policies and programs.

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*Core tables are presented in response to the Southern Industrial Forestry Research Council's recommendations. These tables are identical among Forest Inventory and Analysis units in the eastern United States.

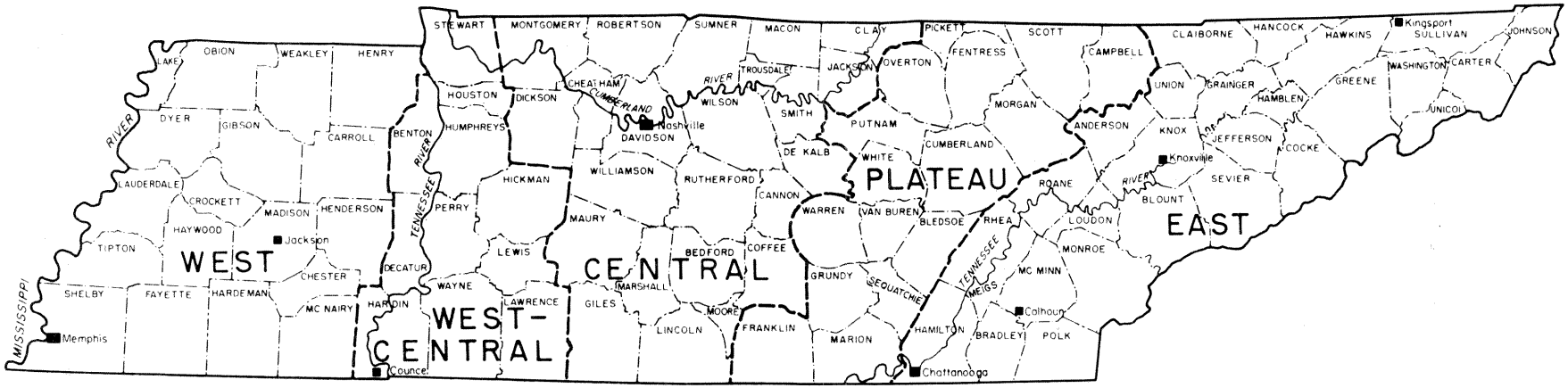

Figure I.-The forest survey regions of Tennessee.

Forest Statistics for Central Tennessee Counties — 1989

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INTRODUCTION

Tabulated results were derived from data obtained during a recent inventory of 23 counties comprising the Central Unit of Tennessee (fig. I). Tables 1-25 were developed to provide compatibility among Forest Inventory and Analysis Projects. Tables 26-40 are supplementary tables and may change from unit to unit or State to State to address specific resource issues.

Data on forest acreage and timber volume were secured by a three-step process. A forest-nonforest classification using aerial photographs was accomplished for points representing approximately 230 acres. These photo classifications were adjusted based on ground observations at sample locations representing approximately 3,840 acres. Finally, field measurements were made at forest locations on the intersections of grid lines spaced 3 miles apart. At these forest locations, per acre estimates were obtained from trees measured on ten 37.5 basal area factor prism points.

The sampling methods were designed to achieve suitable sampling errors for estimates of area and volume at the State level. Sampling error increases as the area or volume considered decreases. The sampling errors presented in table I, equal to one standard deviation for the sample data, may be used to construct confidence intervals for population estimates. For example, at the 95 percent confidence level, the confidence interval for growing-stock volume (in million cubic feet) in the Central Unit of Tennessee (with a sampling error or 4.7 percent) is

$$2{,}442.7 \pm 1.96(0.047 \times 2{,}442.7) = 2{,}442.7 \pm 225.0$$

where 1.96 is the number of standard deviations. This confidence interval indicates a 95-percent degree of confidence that the range, 2,217.7 to 2,667.7 million cubic feet, will contain the true growing-stock inventory volume.

Sampling errors for sub-groups of counties in the unit may be estimated by the following formula:

$$SE_g = \frac{SE_t\sqrt{X_t}}{\sqrt{X_g}}$$

where:

SE = standard error of estimate (expressed as a percent)

Table I—*Sampling errors*[1] *for timberland, growing stock, and sawtimber, Central Tennessee Counties, 1989*

County	Timberland	Growing stock			Sawtimber volume
		Volume	Growth	Removals	
	Percent				
Bedford	2.9	32.8	17.8	39.5	38.6
Cannon	4.8	20.4	25.4	36.1	27.8
Cheatam	3.7	15.6	9.2	38.3	21.1
Clay	1.8	12.2	23.0	28.9	15.9
Coffee	2.0	10.7	17.6	25.0	12.8
Davidson	2.9	23.7	21.7	23.7	29.6
De Kalb	3.1	20.2	11.9	(2)	24.7
Dickson	2.3	16.2	17.5	33.0	18.6
Giles	2.6	15.1	15.2	19.8	21.5
Jackson	3.6	22.4	15.3	35.0	27.6
Lincoln	2.5	18.1	14.7	26.4	23.7
Macon	3.1	16.6	18.8	49.1	18.4
Marshall	2.4	28.0	25.7	35.6	38.5
Maury	2.4	17.8	20.0	47.3	28.3
Montgomery	2.2	12.1	15.7	(2)	14.4
Moore	2.7	32.9	23.7	...	44.7
Robertson	2.6	16.1	11.8	41.2	16.6
Rutherford	3.2	20.1	20.6	...	25.7
Smith	4.0	45.6	35.0	15.3	(2)
Sumner	2.0	20.5	19.9	16.9	25.2
Trousdale	4.9	26.8	47.6	...	31.3
Williamson	2.4	16.4	15.0	38.1	18.9
Wilson	2.0	24.1	35.0	36.9	30.6
All counties	0.6	4.7	4.8	8.8	5.9

[1]By random-sampling formula.
[2]Sampling error greater than 50.

X = variable of interest
(area or volume)
g = group of counties to be combined
t = total for the Unit.

For example, the sampling error estimate of growing-stock volume for Davidson, Rutherford, and Wilson counties is 15.7 percent. Thus, the 95 percent confidence interval for growing-stock volume is 218.1 ± 67.1 million cubic feet.

Ownership information is obtained through the 3-mile grid sample outlined above. County courthouse records are used to obtain ownership information for each forested plot. An expansion factor representing timberland area in that county is then applied to the ownership group the plot represents. Next, the ownership groups are totaled for each county. Thus, acreages reported at the county level are estimates and may not exactly match known totals for each ownership category within that county.

In order to achieve greater compatibility among Forest Inventory and Analysis Projects, a new tree classification system has been in effect since the 1988 Arkansas survey. Tree grade 5 is used to designate trees currently or prospectively capable of producing at least one 12-foot log or two 8-foot logs in the saw-log portion but not able to produce a 12-foot log in the butt 16 feet. These trees, formerly classed as rough or rotten, are now included in growing stock. Table II shows the impact of this change on volume and growth.

HIGHLIGHTS

Area

The 23 counties of the Central Unit of Tennessee encompass the Central Basin as well as portions of the surrounding Highland Rim. In the past, areas of productive soils and gentle terrain have encouraged agricultural development of the unit. Agricultural uses, mainly pastures, have been expanding at the expense of the unit's forests since the 1960's. This trend of steadily declining forest area has been reversed in recent years with the reversion of 300 thousand acres back to timberland. Today, the unit contains 2,461.3 thousand acres of timberland, a full 40 percent of the unit. Only one out of every 20 acres of timberland is in public ownership. The remainder is in private ownership, of which farmers and individuals are the two dominant owners.

The Central Unit is unique in that it contains sizeable acreages of cedar forests. Approximately 95 percent of both the loblolly-shortleaf and oak-pine forest type groups is composed of cedar or cedar-hardwood forest types. In total, cedar and mixed cedar stands occupy 456.1 thousand acres of timberland. Although the cedar types are sizeable, hardwood forests still predominate in the unit. Oak-hickory forest types account for 79 percent of the unit's timberland. A small proportion, 2 percent, is in bottomland hardwoods, the only forest type group to decline in acreage since 1980.

In addition to increasing in area, the unit's timberlands have been maturing. Since 1980, an additional 250 thousand acres have been classified as sawtimber-sized stands. This maturation process has not been evenly distributed across the unit's forests. Almost all of the increase in sawtimber-sized stands occurred in the oak-hickory forest types. The softwood and oak-pine forest types, while still maturing, are younger, composed of predominantly pole and sapling-sized stands. This younger stand-size distribution is a likely consequence of past exploitation of the cedar resource that comprises most of these two forest type groups.

Timber Inventory

The maturing nature of the unit's hardwood forests resulted in a 17-percent decline in hardwood growing-stock

Table II–*Changes in volume and growth estimates due to inclusion of tree grade 5 in growing-stock inventory, Central Tennessee Counties, 1989*

	Tree grade 5		
	Excluded from growing stock	Included in growing stock	Percent change
	Million cubic feet		
Softwood:			
Growing-stock volume	127.2	138.1	8.6
Rough and rotten volume	39.2	28.4	-27.6
Growing-stock growth	5.8	6.9	19.0
Hardwood:			
Growing-stock volume	2148.0	2304.7	7.3
Rough and rotten volume	504.1	347.5	-31.1
Growing-stock growth	79.0	95.1	20.4
	Million board feet		
Softwood:			
Sawtimber volume	178.0	197.2	10.8
Sawtimber growth	10.4	12.3	18.3
Hardwood:			
Sawtimber volume	6602.1	7080.0	7.2
Sawtimber growth	318.2	367.0	15.3

numbers with all of the loss contained in the 2- and 4-inch size classes. At the same time, growing-stock volume of 5-inch and larger hardwoods increased by more than half to 2,304.7 million cubic feet. The maturation of the hardwood resource is especially evident in the sawtimber portion of the inventory, which experienced a 52-percent increase in sawtimber-sized trees with an accompanying 68-percent rise in sawtimber volume to 7,080.0 million board feet.

The 26-percent increase in growing-stock numbers experienced by the younger softwood resource occurred across all diameter classes. As a result, softwood growing-stock volume climbed 74 percent to 138.1 million cubic feet. Although three-quarters of the softwood volume is contained in the generally younger softwood and oak-pine forest type groups, softwood sawtimber volume more than doubled since 1980, climbing to 197.2 million board feet. These volume increases are evidence that the once exploited cedar resource, which makes up the vast majority of the softwood volume, is recovering.

With 97 percent of the unit's sawtimber volume in hardwoods, sawtimber quality is of special concern. Despite increases in hardwood sawtimber volumes, volume in grade 1 trees declined by 20 percent since 1980, while volumes in lower grades increased, especially grade 4 which increased by 151 percent. Although the increasing lower grades may provide the stock for future increases in higher grade trees, the proportion of sawtimber volume contained in grades 1 and 2 has fallen from 40 percent to 31 percent since 1980. This leaves little doubt that the oak-hickory forests of the unit, which contain 94 percent of the hardwood sawtimber inventory, are declining in quality as they mature.

Growth, Removals, and Mortality

The increasing inventory of the unit is a consequence of a favorable growth-to-drain situation since 1980. On an annual basis, net growth for the unit averaged 102.0 million cubic feet for growing stock and 379.3 million board feet for sawtimber. These growth figures reflect the physical change in the inventory over the survey period as well as a growing-stock definition change initiated since the 1980 survey. As a result, these growth estimates are not directly comparable to past growth estimates. Using comparable growth estimates that exclude the definition change (table II), net growth increased 54 percent for growing stock and 82 percent for sawtimber. These net growth increases were attained even though mortality doubled since 1980. Oak mortality increased by a factor of 4 and was responsible for the majority of the increase in mortality since 1980. This large increase in oak mortality is a possible indicator of the impact of oak decline in the unit.

Removals became a larger source of drain on the inventory over the survey period and were concentrated in the sawtimber portions of the inventory. On an average annual basis, sawtimber removals climbed 29 percent to 121.9 million board feet, while growing-stock removals only increased 7 percent to 30.2 million cubic feet. As a consequence of the recovering cedar inventory, cedar sawtimber removals also increased and were mainly responsible for doubling softwood sawtimber removals since 1980. The increase in hardwood sawtimber removals was distributed across all species, but the oaks are still the predominant species cut. Even at these increased levels, growth still exceeds removals by roughly 3 to 1 for both the growing-stock and sawtimber portions of the inventory.

In total, the unit's timberlands are increasing in both area and volume. The softwood (cedar) resource is recovering from past exploitation, while the hardwood resource is maturing. Growth exceeds removals by 3 to 1, but concentration of hardwood removals in quality trees has reduced the quality of this maturing resource.

DEFINITION OF TERMS

Average net annual growth. – Average net annual volume increase for the inter-survey period.

Average annual mortality. – Average annual sound-wood volume of growing-stock trees dying from natural causes.

Average annual removals. – Average net annual volume of growing-stock trees removed from the inventory by harvesting, cultural operations (such as timber-stand improvement), land clearing, or changes in land use.

Commercial species. – Tree species which normally develop into trees suitable for industrial wood products.

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

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

Growing-stock trees. – Live trees of commercial species. Rough and rotten trees are excluded.

Growing-stock volume. – The cubic-foot volume of sound wood in growing-stock trees at least 5.0 inches in diameter at breast height, from a l-foot stump to a minimum 4.0-inch top diameter outside bark of the central stem, or to the point where the central stem breaks into limbs.

Live trees. – Commercial and noncommercial tree species of sapling size or larger.

Natural stands. – Stands with no evidence of artificial regeneration. This includes those established by seed tree regeneration methods.

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

Planted stands. – Stands with some evidence of planting or direct seeding.

Poletimber trees. – Growing-stock trees at least 5.0 inches in diameter at breast height, but smaller than sawtimber size.

Reserved timberland. – Productive public forest land withdrawn from timber utilization through statute or administrative regulations.

Rotten trees. – Live trees of commercial species that do not contain at least one 12-foot log or two 8-foot logs in the

saw-log portion, now or prospectively, primarily because of rot.

Rough trees. — Live trees of commercial species that do not contain at least one 12-foot log or two 8-foot logs in the saw-log portion, now or prospectively, primarily because of roughness or poor form. Also included are all live trees of noncommercial species.

Saplings. — Growing-stock trees at least 1.0 inches but less than 5.0 inches in diameter at breast height.

Sawtimber trees. — Live trees that contain at least one 12-foot log or two 8-foot logs in the saw-log portion, and meet regional specifications for freedom from defect. Softwoods must be at least 9.0 inches in diameter at breast height and hardwoods at least 11.0 inches in diameter at breast height.

Sawtimber volume. — Sound-wood volume of the saw-log portion of growing-stock sawtimber trees in board feet, International 1/4-inch rule and in cubic feet.

Seedlings. — Growing-stock trees less than 1.0 inch in diameter at breast height and greater than one foot tall for hardwoods, greater than six inches tall for softwoods, and greater than one-half inch in diameter at ground level for longleaf pine.

Select red oaks. — A classification of several red oak species composed of: cherrybark, Shumard, and northern red oaks.

Select white oaks. — A classification of several white oak species composed of: white, swamp chestnut, swamp white, chinkapin, Durand, and bur oaks.

Site class. — A classification of forest land in terms of inherent capacity to grow crops of industrial wood.

Stand-size class. — A classification of forest land based on the diameter class of live trees on the sampled area; that is, sawtimber, poletimber, or sapling and seedling.

Timberland. — Forest land that is producing, or is capable of producing, crops of industrial wood and not withdrawn from timber utilization. Timberland is synonymous with "commercial forest land" in prior reports.

Tree grade. — A classification of the volume of the saw-log portion of sawtimber trees, based on: 1) the log grade of the butt log, or 2) ability to produce at least one 12-foot or two 8-foot logs in the upper-section of the saw-log portion.

Woodland. — Forest land incapable of yielding crops of industrial wood because of adverse site conditions.

CORE TABLES 1-25

Table 1–*Area by county and land class, Central Tennessee Counties, Tennessee, 1989*

County	All land[1]	Forest land				Nonforest land
		Total	Timberland[2]	Woodland[3]	Reserved timberland	
	Thousand acres					
Bedford	304.1	74.6	74.6	...	...	229.5
Cannon	170.0	88.5	88.5	...	...	81.5
Cheatam	194.3	118.2	118.2	...	...	76.1
Clay	145.3	105.1	105.1	...	...	40.2
Coffee	274.2	114.4	114.2	...	0.2	159.8
Davidson	320.5	108.7	108.1	...	0.6	211.8
De Kalb	186.0	114.2	114.2	...	...	71.8
Dickson	314.0	174.3	174.3	...	...	139.7
Giles	390.7	171.8	171.8	...	...	218.9
Jackson	197.0	135.9	135.9	...	...	61.1
Lincoln	365.3	136.7	136.7	...	...	228.6
Macon	196.6	77.0	77.0	...	...	119.6
Marshall	241.0	89.6	89.6	...	...	151.3
Maury	394.4	133.0	133.0	...	...	261.4
Montgomery	344.7	136.9	136.9	...	0.1	207.8
Moore	82.4	36.6	36.6	...	...	45.8
Robertson	304.6	53.0	53.0	...	...	251.5
Rutherford	387.5	155.7	155.7	...	...	231.8
Smith	200.2	81.0	81.0	...	...	119.1
Sumner	338.6	88.2	88.2	...	...	250.4
Trousdale	73.1	30.0	30.0	...	...	43.2
Williamson	373.6	142.0	142.0	...	...	231.6
Wilson	365.1	98.1	97.0	...	1.1	267.0
All counties	6163.2	2463.4	2461.3	...	2.1	3699.7

[1]From U.S. Bureau of the Census.

[2]Forest land (formerly termed commercial forest land) that is producing or capable of producing at least 20 cubic feet of industrial wood per acre per year. Includes areas which may be inaccessible or inoperable by current standards. Excludes reserved timberlands.

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

Table 2–*Area of timberland by county and ownership class, Central Tennessee Counties, 1989*

County	All ownerships	National forest	Misc. federal	State	County and municipal	Forest industry[1]	Farmer	Corporate[2]	Individual[2]
	Thousand acres								
Bedford	74.6	...	...	...	...	5.3	32.0	...	37.3
Cannon	88.5	...	...	...	...	...	41.6	...	46.8
Cheatam	118.2	...	...	23.6	...	...	17.7	11.8	65.0
Clay	105.1	...	...	...	...	...	72.8	...	32.3
Coffee	114.2	...	10.4	...	...	...	51.9	15.6	36.3
Davidson	108.1	...	6.4	...	6.4	...	12.7	6.4	76.3
De Kalb	114.2	...	11.4	...	...	...	28.5	...	74.2
Dickson	174.3	...	...	...	...	...	114.2	12.0	48.1
Giles	171.8	...	...	...	...	9.8	103.1	...	58.9
Jackson	135.9	...	...	...	...	...	31.4	...	104.5
Lincoln	136.7	...	...	...	...	...	83.2	...	53.5
Macon	77.0	...	...	...	...	...	56.0	...	21.0
Marshall	89.6	...	...	...	...	...	69.7	5.0	14.9
Maury	133.0	...	...	...	6.7	...	53.2	13.3	59.9
Montgomery	136.9	...	31.1	...	...	6.2	24.9	...	74.7
Moore	36.6	...	...	...	...	...	20.9	5.2	10.5
Robertson	53.0	...	...	...	...	...	37.9	7.6	7.6
Rutherford	155.7	...	5.6	5.6	5.6	...	44.5	5.6	88.9
Smith	81.0	...	...	...	...	...	67.5	...	13.5
Sumner	88.2	...	...	...	...	...	56.7	...	31.5
Trousdale	30.0	...	...	...	...	...	...	...	30.0
Williamson	142.0	...	...	...	...	...	78.9	...	63.1
Wilson	97.0	...	...	15.3	...	...	51.0	5.1	25.5
All counties	2461.3	...	64.8	44.5	18.6	21.4	1150.2	87.5	1074.3

[1]Includes land leased to forest industry.
[2]Indian land will be classed as corporate or individual as defined by the Bureau of Indian Affairs.

Table 3–*Area of timberland by county and forest type group, Central Tennessee Counties, 1989*

County	Total	Forest type group					
		White-red jack pine	Loblolly-shortleaf[1] pine		Oak-[2] pine	Oak-hickory	Oak-gum-cypress
			Planted	Natural			
	Thousand acres						
Bedford	74.6	...	...	16.0	10.7	42.6	5.3
Cannon	88.5	...	...	5.2	10.4	72.9	...
Cheatam	118.2	...	...	...	...	118.2	...
Clay	105.1	...	...	...	8.1	97.0	...
Coffee	114.2	...	...	...	...	109.0	5.2
Davidson	108.1	...	...	...	12.7	95.4	...
De Kalb	114.2	...	...	11.4	22.8	74.2	5.7
Dickson	174.3	...	...	...	6.0	168.3	...
Giles	171.8	4.9	...	4.9	4.9	152.2	4.9
Jackson	135.9	...	...	...	31.4	104.5	...
Lincoln	136.7	...	...	17.8	17.8	89.1	11.9
Macon	77.0	...	...	...	...	77.0	...
Marshall	89.6	...	...	5.0	24.9	59.7	...
Maury	133.0	...	...	6.7	6.7	119.7	...
Montgomery	136.9	...	...	...	12.4	124.4	...
Moore	36.6	...	...	...	...	36.6	...
Robertson	53.0	...	...	...	...	53.0	...
Rutherford	155.7	...	...	50.0	38.9	66.7	...
Smith	81.0	...	...	13.5	6.8	60.8	...
Sumner	88.2	...	...	12.6	...	75.6	...
Trousdale	30.0	...	...	...	12.0	18.0	...
Williamson	142.0	...	...	15.8	15.8	105.2	5.3
Wilson	97.0	...	...	15.3	61.2	20.4	...
All counties	2461.3	4.9	...	174.2	303.5	1940.5	38.3

[1]Includes redcedar forest type.
[2]Includes redcedar-hardwood forest type.

Table 4—*Area of timberland by county and stand-size class, Central Tennessee Counties, 1989*

County	All classes	Stand-size class		
		Sawtimber	Poletimber	Sapling-seedling
	Thousand acres			
Bedford	74.6	26.6	32.0	16.0
Cannon	88.5	31.2	41.6	15.6
Cheatam	118.2	59.1	41.4	17.7
Clay	105.1	16.2	48.5	40.4
Coffee	114.2	72.7	31.1	10.4
Davidson	108.1	44.5	50.9	12.7
De Kalb	114.2	57.1	40.0	17.1
Dickson	174.3	102.2	48.1	24.0
Giles	171.8	34.4	83.4	54.0
Jackson	135.9	52.3	47.0	36.6
Lincoln	136.7	29.7	65.4	41.6
Macon	77.0	49.0	14.0	14.0
Marshall	89.6	34.8	19.9	34.8
Maury	133.0	39.9	53.2	39.9
Montgomery	136.9	56.0	49.8	31.1
Moore	36.6	26.1	10.5	...
Robertson	53.0	37.9	7.6	7.6
Rutherford	155.7	33.4	50.0	72.3
Smith	81.0	13.5	47.3	20.3
Sumner	88.2	63.0	12.6	12.6
Trousdale	30.0	6.0	24.0	...
Williamson	142.0	52.6	78.9	10.5
Wilson	97.0	25.5	35.7	35.7
All counties	2461.3	963.6	932.8	565.0

Table 5—*Area of timberland by county and site class, Central Tennessee Counties, 1989*

County	All classes	Site class (cubic feet/acre/year)				
		>165	120-165	85-120	50-85	<50
	Thousand acres					
Bedford	74.6	...	10.7	16.0	16.0	32.0
Cannon	88.5	5.2	10.4	15.6	31.2	26.0
Cheatam	118.2	5.9	17.7	17.7	70.9	5.9
Clay	105.1	...	...	32.3	64.7	8.1
Coffee	114.2	...	15.6	57.1	41.5	...
Davidson	108.1	6.4	...	19.1	57.2	25.4
De Kalb	114.2	...	40.0	34.2	17.1	22.8
Dickson	174.3	6.0	18.0	30.0	102.2	18.0
Giles	171.8	...	39.3	24.5	78.5	29.5
Jackson	135.9	...	15.7	20.9	73.2	26.1
Lincoln	136.7	...	...	17.8	71.3	47.5
Macon	77.0	...	21.0	49.0	7.0	...
Marshall	89.6	...	10.0	10.0	59.7	10.0
Maury	133.0	...	20.0	20.0	46.6	46.6
Montgomery	136.9	6.2	12.4	56.0	49.8	12.4
Moore	36.6	...	...	10.5	20.9	5.2
Robertson	53.0	...	...	30.3	15.2	7.6
Rutherford	155.7	...	...	...	55.6	100.1
Smith	81.0	...	...	20.3	54.0	6.8
Sumner	88.2	...	12.6	25.2	44.1	6.3
Trousdale	30.0	...	...	...	24.0	6.0
Williamson	142.0	5.3	26.3	36.8	57.9	15.8
Wilson	97.0	5.1	...	...	66.4	25.5
All counties	2461.3	40.1	269.5	543.3	1124.9	483.6

Table 6–*Area of timberland by county and stocking classes of growing-stock trees, Central Tennessee Counties, 1989*

County	All classes	Stocking class (percent)				
		>130	100-130	60-100	16.7-60	<16.7
	Thousand acres					
Bedford	74.6	...	16.0	42.6	16.0	...
Cannon	88.5	...	10.4	52.0	20.8	5.2
Cheatam	118.2	...	11.8	70.9	35.5	...
Clay	105.1	...	...	80.8	24.3	...
Coffee	114.2	...	31.1	67.5	15.6	...
Davidson	108.1	...	...	63.6	44.5	...
De Kalb	114.2	...	28.5	85.6	...	...
Dickson	174.3	...	24.0	132.2	12.0	6.0
Giles	171.8	...	19.6	93.3	58.9	...
Jackson	135.9	...	15.7	73.2	41.8	5.2
Lincoln	136.7	...	29.7	71.3	35.7	...
Macon	77.0	...	7.0	63.0	7.0	...
Marshall	89.6	...	...	49.8	39.8	...
Maury	133.0	...	...	113.1	20.0	...
Montgomery	136.9	...	12.4	74.7	49.8	...
Moore	36.6	...	5.2	20.9	10.5	...
Robertson	53.0	...	...	45.5	7.6	...
Rutherford	155.7	...	11.1	72.3	50.0	22.2
Smith	81.0	...	13.5	47.3	20.3	...
Sumner	88.2	...	...	50.4	37.8	...
Trousdale	30.0	...	...	24.0	6.0	...
Williamson	142.0	...	21.0	73.6	47.3	...
Wilson	97.0	...	...	66.4	30.6	...
All counties	2461.3	...	257.3	1533.8	631.6	38.7

Table 7–*Area of timberland by forest type and ownership class, Central Tennessee Counties, 1989*

Forest type[1]	All ownerships	National forest	Other public	Forest industry	Forest industry-leased	Other private
	Thousand acres					
White-red-jack pine	4.9	...	...	4.9	...	...
Loblolly-shortleaf pine	174.2	...	5.6	...	...	168.6
Softwood total	179.1	...	5.6	4.9	...	168.6
Oak-pine	303.5	...	22.8	...	...	280.7
Oak-hickory	1940.5	...	94.4	16.5	...	1829.6
Oak-gum-cypress	38.3	...	5.2	...	...	33.1
Hardwood total	2282.2	...	122.3	16.5	...	2143.4
All types	2461.3	...	127.9	21.4	...	2312.1

[1]Forest type is based on species plurality of all live trees. Mixed types that in combination contain a majority of hardwood stocking are hardwood types.

Table 8–*Area of timberland by ownership and stocking classes of growing-stock trees, Central Tennessee Counties, 1989*

Ownership class	All classes	Stocking class (percent)				
		>130	100-130	60-100	16.7-60	<16.7
	Thousand acres					
Other public	127.9	...	5.9	73.9	42.5	5.6
Forest industry	21.4	...	...	21.4	...	...
Other private	2312.1	...	251.4	1438.5	589.1	33.1
All ownerships	2461.3	...	257.3	1533.8	631.6	38.7

Table 9–*Area of timberland by forest type and stand-size class, Central Tennessee Counties, 1989*

Forest type[1]	All classes	Stand-size class		
		Sawtimber	Poletimber	Sapling-seedling
	Thousand acres			
White-red-jack pine	4.9	4.9	...	...
Loblolly-shortleaf pine	174.2	22.2	82.4	69.6
Softwood total	179.1	27.1	82.4	69.6
Oak-pine	303.5	54.4	144.3	104.7
Oak-hickory	1940.5	860.6	700.1	379.8
Oak-gum-cypress	38.3	21.5	5.9	10.9
Hardwood total	2282.2	936.4	850.4	495.4
All types	2461.3	963.6	932.8	565.0

[1]Forest type is based on species plurality of all live trees. Mixed types that in combination contain a majority of hardwood stocking are hardwood types.

Table 10–*Number of live trees on timberland by species and diameter class, Central Tennessee Counties, 1989*

Species	All classes	Diameter class (inches at breast height) 1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 & larger
	Thousand trees												
Shortleaf-loblolly pine	3034	1324	...	495	821	269	89	...	36	...	...	...	...
Other yellow pines	2763	2332	...	130	219	38	...	28	16	...	...	...	...
Eastern white-red pine	1414	900	...	196	67	129	123	...	...	...	...	...	...
Other softwoods	210408	117329	53169	23539	10659	3566	1437	455	155	67	9	21	...
Total softwoods	217619	121885	53169	24360	11767	4003	1649	483	207	67	9	21	...
Select white oaks	65595	27820	14751	6670	5507	3499	2501	2105	1371	582	329	397	62
Select red oaks	10566	1581	2129	1225	1333	1206	981	785	521	489	145	157	14
Other white oaks	25000	6119	5006	3827	2902	2656	1359	1253	819	420	284	304	50
Other red oaks	31862	9056	4886	3788	3135	3432	2612	1896	1111	887	502	505	51
Hickory	117490	54005	24545	13412	10264	7189	3862	2527	953	461	123	124	26
Hard maple	102027	64582	15831	9281	4310	2786	2049	1703	586	495	205	141	57
Soft maple	38928	26192	4727	3121	2108	1237	553	340	243	145	88	138	36
Beech	30878	18458	5704	1447	1687	680	805	718	326	341	152	423	137
Sweetgum	20696	12586	2567	2309	1234	713	691	314	231	25	10	18	...
Tupelo-blackgum	45644	34800	4833	2970	1313	809	425	217	180	59	9	28	...
Ash	103160	64184	18176	9268	5293	2567	1618	917	565	267	183	109	15
Basswood	2551	1620	...	258	126	237	50	100	62	57	19	21	...
Yellow-poplar	44742	26111	5726	3619	2132	1755	1446	1456	970	711	361	421	34
Black walnut	11007	2676	1737	2860	1280	1156	570	378	191	48	75	36	...
Other hardwoods	403734	253273	81148	32150	17082	9501	4956	2942	1130	814	377	290	70
Total hardwoods	1053880	603065	191766	96206	59707	39424	24477	17651	9258	5801	2862	3111	552
Noncommercial	143938	104574	27383	8239	2728	469	200	263	68	...	...	14	...
All species	1415437	829524	272318	128806	74201	43896	26326	18397	9533	5868	2871	3146	552

Table 11—*Number of growing-stock trees on timberland by species and diameter class, Central Tennessee Counties, 1989*

Species	All classes	Diameter class (inches at breast height) 1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 & larger
	Thousand trees												
Shortleaf-loblolly pine	3034	1324	...	495	821	269	89	...	36	...	...	...	...
Other yellow pines	2681	2332	...	130	137	38	...	28	16	...	...	...	...
Eastern white-red pine	1353	900	...	196	67	92	99	...	...	...	...	...	...
Other softwoods	165204	92950	40762	19443	8580	2192	896	216	93	56	9	8	...
Total softwoods	172272	97506	40762	20264	9605	2591	1084	243	145	56	9	8	...
Select white oaks	47064	14478	11474	6132	5234	3435	2253	1824	1130	493	311	285	16
Select red oaks	9278	1030	1653	1225	1265	1177	930	764	477	463	135	151	7
Other white oaks	18532	2640	3244	3479	2846	2493	1143	1171	704	361	234	181	37
Other red oaks	26467	4905	4886	3576	3032	3159	2457	1799	987	811	394	423	38
Hickory	85391	30371	20070	11151	9812	6827	3359	2270	870	426	123	95	16
Hard maple	54679	27856	10534	6548	3310	2458	1675	1176	501	337	156	98	28
Soft maple	17681	9960	2654	2083	1365	816	270	147	116	90	58	109	14
Beech	12205	4176	2462	1263	1454	622	733	617	254	280	93	218	34
Sweetgum	13924	7049	2090	1844	980	713	665	314	217	25	10	18	...
Tupelo-blackgum	14092	6574	2908	1832	1236	765	374	176	151	48	...	28	...
Ash	51677	25876	10798	5811	4029	2234	1241	753	455	228	163	81	8
Basswood	1331	479	...	258	126	159	50	100	62	57	19	21	...
Yellow-poplar	36094	18923	4724	3416	2132	1663	1446	1413	928	665	349	414	22
Black walnut	5894	545	545	1869	1016	936	494	270	124	12	65	18	...
Other hardwoods	145721	67702	30661	20922	12924	6855	3038	2082	691	403	259	172	13
Total hardwoods	540030	222564	108703	71409	50761	34311	20127	14875	7665	4700	2369	2313	232
All species	712303	320070	149465	91673	60366	36902	21211	15119	7810	4756	2379	2320	232

Table 12–*Volume of growing stock on timberland by species and diameter class, Central Tennessee Counties, 1989*

Species	All classes	Diameter class (inches at breast height) 5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 & larger
	Million cubic feet										
Shortleaf-loblolly pine	12.1	1.2	5.8	3.1	1.4	...	0.7	...	...	...	...
Other yellow pines	2.5	0.3	0.7	0.4	...	0.7	0.4	...	...	...	...
Eastern white-red pine	3.1	0.5	0.3	0.9	1.4	...	...	...	...	...	...
Other softwoods	120.3	42.5	39.9	18.6	11.3	3.8	2.7	1.2	0.2	0.2	...
Total softwoods	138.1	44.5	46.7	23.0	14.0	4.5	3.8	1.2	0.2	0.2	...
Select white oaks	262.9	16.0	28.4	38.3	38.6	45.1	40.0	21.3	16.2	18.2	0.9
Select red oaks	111.5	2.3	9.3	12.5	16.2	19.8	14.9	19.3	6.0	10.3	1.0
Other white oaks	157.3	8.1	15.9	27.2	19.5	24.6	21.3	12.3	11.7	11.6	5.2
Other red oaks	269.9	9.8	20.1	35.2	42.3	44.7	31.3	31.8	20.2	29.8	4.7
Hickory	357.7	28.2	60.2	75.1	61.8	62.7	31.5	19.7	6.6	8.2	3.6
Hard maple	168.7	17.1	19.9	26.3	27.9	29.9	16.1	14.5	7.7	7.2	2.1
Soft maple	46.5	5.6	8.0	8.7	4.3	3.2	2.8	3.5	2.4	6.7	1.2
Beech	88.1	3.4	8.1	7.0	13.6	14.3	8.3	10.3	4.6	15.3	3.2
Sweetgum	52.0	4.1	6.0	8.2	12.6	8.8	8.4	1.5	0.5	1.8	...
Tupelo-blackgum	33.7	4.1	6.2	7.0	5.0	4.0	4.0	2.2	...	1.3	...
Ash	131.6	13.2	22.2	21.4	20.0	17.3	16.0	8.5	7.6	5.0	0.4
Basswood	15.1	0.9	0.6	1.4	1.4	2.3	2.1	3.0	1.2	2.2	...
Yellow-poplar	245.7	8.9	14.7	19.3	29.5	40.5	35.4	34.4	21.9	37.5	3.6
Black walnut	40.8	4.8	5.8	9.2	6.7	5.7	3.7	0.7	3.0	1.2	...
Other hardwoods	323.1	46.2	66.9	64.2	44.8	41.7	20.4	14.7	12.4	10.6	1.2
Total hardwoods	2304.7	172.7	292.2	361.2	344.2	364.6	256.2	197.6	122.0	166.9	27.1
All species	2442.7	217.2	338.9	384.2	358.3	369.1	260.0	198.8	122.2	167.0	27.1

Table 13—*Volume of growing stock in the saw-log portion of sawtimber[1] trees on timberland by species and diameter class, Central Tennessee Counties, 1989*

Species	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 & larger
	Million cubic feet								
Shortleaf-loblolly pine	4.3	2.4	1.2	...	0.6	...	...	...	...
Other yellow pines	1.5	0.3	...	0.7	0.4	...	...	...	...
Eastern white-red pine	2.1	0.8	1.3	...	...	...	...	...	...
Other softwoods	31.4	14.7	9.5	3.5	2.5	1.0	0.2	0.2	...
Total softwoods	39.2	18.2	12.0	4.2	3.5	1.0	0.2	0.2	...
Select white oaks	143.9	...	29.1	35.6	32.7	17.5	13.2	15.2	0.6
Select red oaks	70.1	...	11.7	15.9	12.1	16.0	5.0	8.5	0.9
Other white oaks	82.3	...	14.2	19.9	17.6	8.7	9.2	9.2	3.5
Other red oaks	165.0	...	30.5	36.5	25.7	26.4	17.2	24.7	4.1
Hickory	154.5	...	46.1	51.8	26.0	16.0	5.5	5.9	3.2
Hard maple	80.8	...	20.6	22.5	12.6	11.5	6.3	5.9	1.5
Soft maple	19.2	...	3.0	2.6	2.3	2.8	2.1	5.3	1.1
Beech	54.5	...	9.5	11.6	6.8	8.0	3.7	11.9	2.9
Sweetgum	25.9	...	8.1	7.4	7.0	1.4	0.4	1.7	...
Tupelo-blackgum	13.2	...	3.4	3.2	3.7	2.0	...	1.1	...
Ash	60.3	...	15.0	14.3	12.7	7.4	6.2	4.3	0.3
Basswood	10.0	...	1.1	1.7	1.8	2.6	1.0	1.8	...
Yellow-poplar	170.5	...	21.2	33.3	31.0	29.5	19.4	33.0	3.2
Black walnut	15.6	...	4.9	4.1	2.9	0.6	2.3	0.8	...
Other hardwoods	109.7	...	30.8	30.8	16.3	11.8	10.0	9.0	1.0
Total hardwoods	1175.5	...	248.9	291.0	211.1	162.1	101.7	138.4	22.4
All species	1214.7	18.2	260.9	295.2	214.5	163.1	101.8	138.5	22.4

[1]That part of the bole of sawtimber trees between a 1-foot stump and saw-log top.

Table 14—*Volume of sawtimber on timberland by species and diameter class, Central Tennessee Counties, 1989*

Species	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 & larger
	Million board feet								
Shortleaf-loblolly pine	22.3	12.7	6.5	...	3.1	...	...	...	...
Other yellow pines	8.7	1.7	...	4.8	2.1	...	...	...	...
Eastern white-red pine	9.8	3.3	6.5	...	...	...	...	...	...
Other softwoods	156.4	71.9	46.6	17.7	13.9	4.9	0.7	0.5	...
Total softwoods	197.2	89.6	59.7	22.6	19.2	4.9	0.7	0.5	...
Select white oaks	856.4	...	159.7	206.1	196.9	109.1	84.1	96.3	4.2
Select red oaks	418.1	...	64.5	94.2	72.1	98.6	30.0	52.8	5.9
Other white oaks	497.3	...	79.6	113.6	107.3	54.4	59.7	59.9	22.8
Other red oaks	990.6	...	165.8	212.9	153.5	162.1	110.1	160.1	26.1
Hickory	947.6	...	265.6	317.5	165.4	101.2	35.9	40.7	21.3
Hard maple	499.9	...	118.4	136.6	79.1	75.8	41.9	39.6	8.4
Soft maple	114.0	...	15.9	14.9	14.0	16.9	13.9	33.6	4.7
Beech	328.5	...	51.0	67.0	41.0	49.4	24.1	77.1	18.8
Sweetgum	151.5	...	44.5	43.3	42.0	8.8	2.6	10.4	...
Tupelo-blackgum	75.7	...	17.5	18.0	21.8	12.6	...	5.7	...
Ash	364.2	...	83.6	85.4	81.5	45.3	40.6	26.4	1.4
Basswood	63.0	...	6.7	10.0	10.1	16.8	7.1	12.3	...
Yellow-poplar	1046.7	...	123.6	198.6	188.0	183.0	121.8	214.9	16.9
Black walnut	93.7	...	27.1	24.4	18.2	4.1	14.9	5.1	...
Other hardwoods	632.9	...	165.3	176.6	97.9	70.9	61.8	52.6	7.7
Total hardwoods	7080.0	...	1388.8	1719.2	1288.9	1009.0	648.5	887.3	138.3
All species	7277.2	89.6	1448.5	1741.8	1308.1	1013.9	649.2	887.9	138.3

Table 15–*Volume of growing stock and sawtimber on timberland by county and species group, Central Tennessee Counties, 1989*

County	Growing stock						Sawtimber					
	All species	Softwood			Hardwood		All species	Softwood			Hardwood	
		Pine						Pine				
		Planted	Natural	Other	Soft[1]	Hard[2]		Planted	Natural	Other	Soft[1]	Hard[2]
	Million cubic feet						*Million board feet*					
Bedford	50.8	...	...	4.4	19.8	26.7	141.2	...	...	4.6	61.6	75.0
Cannon	92.2	...	4.5	4.6	29.1	54.0	243.6	...	2.2	7.1	66.5	167.9
Cheatam	145.8	...	0.4	4.8	27.7	112.9	440.0	...	1.9	12.1	85.2	340.9
Clay	88.6	...	0.7	2.7	12.1	73.1	212.9	...	4.8	3.9	23.2	181.0
Coffee	154.3	...	...	...	28.4	125.9	486.6	...	...	...	81.2	405.4
Davidson	114.4	...	0.5	3.9	8.8	101.2	380.7	...	...	6.2	22.8	351.7
De Kalb	166.8	...	...	13.6	57.9	95.4	523.5	...	...	21.9	238.1	263.5
Dickson	216.8	...	...	1.2	32.6	183.0	738.3	...	...	...	110.5	627.8
Giles	151.4	3.1	0.1	1.9	52.5	93.7	347.8	9.8	...	3.9	103.8	230.3
Jackson	166.6	...	1.2	9.0	51.2	105.1	583.8	...	3.9	15.8	185.4	378.8
Lincoln	114.2	...	...	9.7	31.5	73.0	276.6	...	...	5.1	60.1	211.4
Macon	105.2	...	...	0.3	53.6	51.3	378.0	...	...	...	194.0	184.1
Marshall	51.7	...	...	5.9	10.1	35.6	153.6	...	...	6.9	25.4	121.3
Maury	108.3	...	...	0.5	35.5	72.3	241.8	...	...	...	75.5	166.4
Montgomery	143.0	...	5.5	2.8	48.3	86.3	404.4	...	14.9	3.8	130.2	255.4
Moore	55.3	...	...	2.7	9.6	43.0	192.6	...	...	7.1	27.6	157.8
Robertson	66.3	...	...	0.4	24.3	41.6	262.5	...	...	1.8	87.5	173.2
Rutherford	52.3	...	...	11.7	7.6	33.0	95.2	...	...	6.1	14.8	74.2
Smith	79.1	...	...	4.2	20.5	54.5	202.7	...	...	1.4	64.0	137.4
Sumner	79.3	...	...	3.6	30.7	45.0	275.4	...	...	4.3	120.5	150.6
Trousdale	25.3	...	...	4.8	7.8	12.8	49.8	...	...	0.5	18.2	31.1
Williamson	163.7	...	1.6	13.0	53.0	96.2	545.3	...	3.3	20.1	201.1	320.8
Wilson	51.4	...	...	14.7	5.7	31.0	100.7	...	...	23.8	12.3	64.6
All counties	2442.7	3.1	14.6	120.3	658.2	1646.5	7277.2	9.8	31.0	156.4	2009.5	5070.5

[1]Hardwood species with an average specific gravity of 0.50 or less such as gums, yellow-poplar, cottonwood, red maple, basswood, aspen, and willow.
[2]Hardwood species with an average specific gravity greater than 0.50 such as oaks, hard maple, hickories, and green and white ash.

Table 16–*Volume of timber on timberland by class of timber and species group, Central Tennessee Counties, 1989*

Class of timber	All species	Softwood			Hardwood	
		Pine				
		Planted	Natural	Other	Soft[1]	Hard[2]
	Million cubic feet					
Sawtimber trees:						
Saw-log portion	1214.7	2.1	5.7	31.4	336.0	839.6
Upper-stem portion	310.8	0.3	0.9	6.5	81.2	221.9
Total	1525.5	2.3	6.6	37.9	417.2	1061.4
Poletimber trees	917.3	0.8	7.9	82.5	241.0	585.1
All growing-stock trees	2442.7	3.1	14.6	120.3	658.2	1646.5
Rough trees:						
Sawtimber size	149.0	0.4	...	14.3	42.5	91.8
Poletimber size	146.4	...	0.2	12.4	39.9	93.9
Total	295.5	0.4	0.2	26.7	82.4	185.7
Rotten trees:						
Sawtimber size	72.3	...	...	0.9	17.5	53.9
Poletimber size	8.1	...	...	0.1	2.0	5.9
Total	80.4	...	...	1.0	19.5	59.8
Salvable dead trees:						
Sawtimber size	8.5	...	...	0.3	2.6	5.5
Poletimber size	13.0	...	0.4	0.9	1.3	10.4
Total	21.5	...	0.4	1.2	4.0	15.9
All classes	2840.1	3.6	15.2	149.3	764.1	1908.0

[1]Hardwood species with an average specific gravity of 0.50 or less such as gums, yellow-poplar, cottonwood, red maple, basswood, aspen, and willow.

[2]Hardwood species with an average specific gravity greater than 0.50 such as oaks, hard maple, hickories, and green and white ash.

Table 17–*Volume of live trees and growing stock on timberland by ownership group and species group, Central Tennessee Counties, 1989*

Ownership	Live trees						Growing stock					
		Softwood			Hardwood			Softwood			Hardwood	
		Pine						Pine				
	All species	Planted	Natural	Other	Soft[1]	Hard[2]	All species	Planted	Natural	Other	Soft[1]	Hard[2]
	Million cubic feet											
Other public	151.8	...	5.5	5.8	49.4	91.1	130.0	...	5.5	4.5	39.3	80.7
Forest industry	38.6	3.6	...	0.4	15.7	19.0	34.2	3.1	...	0.4	13.5	17.2
Other private	2628.2	...	9.3	141.9	695.1	1781.9	2278.5	...	9.1	115.5	605.4	1548.6
All ownerships	2818.6	3.6	14.8	148.1	760.1	1892.0	2442.7	3.1	14.6	120.3	658.2	1646.5

[1]Hardwood species with an average specific gravity of 0.50 or less such as gums, yellow-poplar, cottonwood, red maple, basswood, aspen, and willow.
[2]Hardwood species with an average specific gravity greater than 0.50 such as oaks, hard maple, hickories, and green and white ash.

Table 18–*Average net annual growth of growing stock and sawtimber on timberland by county and species group, Central Tennessee Counties, 1989*

County	Growing stock						Sawtimber					
		Softwood			Hardwood			Softwood			Hardwood	
		Pine						Pine				
	All species	Planted	Natural	Other	Soft[1]	Hard[2]	All species	Planted	Natural	Other	Soft[1]	Hard[2]
	Million cubic feet						*Million board feet*					
Bedford	1.5	...	...	0.3	0.7	0.5	4.2	...	...	0.2	2.0	2.0
Cannon	4.6	...	0.3	0.2	1.8	2.3	14.0	...	0.3	0.6	5.7	7.4
Cheatam	7.8	...	...	0.3	1.8	5.7	28.8	...	...	1.0	6.1	21.7
Clay	4.6	...	...	0.1	0.9	3.6	15.8	...	-0.2	0.1	2.5	13.4
Coffee	4.8	...	...	...	1.3	3.6	19.3	...	...	...	3.8	15.5
Davidson	4.2	...	0.1	0.2	0.5	3.4	11.2	...	...	0.7	0.9	9.5
De Kalb	7.5	...	...	0.6	2.9	4.0	27.7	...	...	1.4	14.0	12.4
Dickson	7.8	...	...	0.1	1.6	6.1	42.0	...	...	...	6.5	35.5
Giles	8.7	0.4	...	...	3.3	5.0	23.4	1.2	0.1	0.2	8.4	13.5
Jackson	5.9	...	0.1	0.2	2.1	3.6	23.5	...	0.3	0.6	7.8	14.8
Lincoln	4.3	...	...	0.2	1.6	2.5	14.2	...	...	0.4	3.3	10.4
Macon	4.3	...	...	...	2.7	1.6	22.3	...	...	...	13.3	8.9
Marshall	1.1	...	...	0.4	0.3	0.5	2.9	...	...	0.7	0.7	1.5
Maury	3.1	...	...	...	1.2	1.9	8.8	...	...	...	4.2	4.6
Montgomery	7.8	...	0.4	0.1	2.8	4.5	27.6	...	0.7	0.2	10.2	16.5
Moore	1.5	...	...	...	0.5	1.0	4.7	...	...	-0.3	1.3	3.7
Robertson	3.5	...	...	...	1.5	2.0	17.2	...	...	...	6.8	10.3
Rutherford	2.6	...	...	0.8	0.4	1.4	6.6	...	...	0.7	1.0	4.9
Smith	4.0	...	...	0.4	1.1	2.5	15.3	...	...	0.2	4.9	10.2
Sumner	3.2	...	...	0.2	1.4	1.6	15.4	...	...	0.5	5.8	9.2
Trousdale	0.8	...	...	0.4	...	0.4	2.2	...	...	...	0.4	1.7
Williamson	6.5	...	0.1	0.6	2.2	3.6	25.8	...	0.4	1.0	10.2	14.3
Wilson	1.9	...	...	0.4	0.2	1.2	6.6	...	...	1.5	1.3	3.8
All counties	102.0	0.4	0.9	5.6	32.6	62.5	379.3	1.2	1.4	9.7	121.3	245.7

[1]Hardwood species with an average specific gravity of 0.50 or less such as gums, yellow-poplar, cottonwood, red maple, basswood, aspen, and willow.
[2]Hardwood species with an average specific gravity greater than 0.50 such as oaks, hard maple, hickories, and green and white ash.

Table 19—*Average net annual removals of growing stock and sawtimber on timberland by county and species group, Central Tennessee Counties, 1989*

County	Growing stock						Sawtimber					
		Softwood			Hardwood			Softwood			Hardwood	
		Pine						Pine				
	All species	Planted	Natural	Other	Soft[1]	Hard[2]	All species	Planted	Natural	Other	Soft[1]	Hard[2]
	Million cubic feet						*Million board feet*					
Bedford	0.4	...	...	0.1	0.1	0.3	1.2	...	...	...	0.4	0.7
Cannon	1.5	...	...	...	1.1	0.5	6.8	...	...	...	5.0	1.8
Cheatam	2.1	...	...	...	0.2	1.8	7.6	...	0.2	...	0.6	6.8
Clay	2.3	...	...	...	0.1	2.2	9.9	...	...	...	0.6	9.3
Coffee	2.5	...	...	...	0.4	2.1	11.5	...	...	...	1.7	9.8
Davidson	2.3	...	...	0.1	0.2	2.0	9.6	...	...	0.3	0.3	8.9
De Kalb	0.3	...	...	...	0.2	0.2	2.1	...	...	...	1.1	1.0
Dickson	1.5	...	...	...	0.2	1.4	6.8	...	...	...	0.8	6.0
Giles	3.1	...	0.1	...	1.0	2.0	10.9	...	0.3	...	3.3	7.2
Jackson	0.7	...	...	...	...	0.7	4.0	...	...	...	...	4.0
Lincoln	0.7	...	...	0.2	0.2	0.3	2.0	...	...	0.2	0.6	1.3
Macon	0.4	...	...	...	0.1	0.3	1.3	...	...	...	0.6	0.7
Marshall	1.1	...	...	0.2	0.2	0.6	4.5	...	...	0.3	0.8	3.4
Maury	2.4	...	...	...	0.7	1.7	10.0	...	...	...	2.3	7.7
Montgomery	1.5	...	...	...	0.1	1.4	7.1	...	...	...	0.4	6.7
Moore	...	...	...	...	...	...	...	...	...	...	...	...
Robertson	2.0	...	...	...	0.1	1.8	9.0	...	...	...	0.4	8.6
Rutherford	0.3	...	...	...	...	0.2	0.7	...	...	...	...	0.7
Smith	0.9	...	...	...	...	0.8	2.1	...	...	...	...	2.1
Sumner	1.7	...	...	...	0.7	1.0	5.5	...	...	...	1.3	4.2
Trousdale	0.1	...	...	...	0.1	0.1	0.4	...	...	...	0.4	...
Williamson	1.0	...	...	0.1	0.2	0.7	3.2	...	...	0.6	0.3	2.2
Wilson	1.5	...	...	0.3	0.6	0.6	5.7	...	...	0.7	2.6	2.4
All counties	30.2	...	0.1	0.9	6.5	22.7	121.9	...	0.5	2.1	23.8	95.5

[1]Hardwood species with an average specific gravity of 0.50 or less such as gums, yellow-poplar, cottonwood, red maple, basswood, aspen, and willow.
[2]Hardwood species with an average specific gravity greater than 0.50 such as oaks, hard maple, hickories, and green and white ash.

Table 20—*Average net annual growth and average annual removals of growing stock on timberland by species, Central Tennessee Counties, 1989*

Species	Growth	Removals
	Million cubic feet	
Yellow pines	0.9	0.1
Eastern white-red pines	0.4	...
Other softwoods	5.6	0.9
Total softwoods	6.9	1.1
Select white-red oaks	14.0	6.6
Other white-red oaks	14.6	8.2
Hickory	10.9	3.3
Hard maple	8.3	0.9
Sweetgum	3.0	0.5
Ash-walnut-black cherry	8.9	2.0
Yellow-poplar	13.6	2.9
Other hardwoods	21.9	4.8
Total hardwoods	95.1	29.2
All species	102.0	30.2

Table 21–*Average net annual growth and average annual removals of sawtimber on timberland by species, Central Tennessee Counties, 1989*

Species	Growth	Removals
	Million board feet	
Yellow pines	1.4	0.5
Eastern white-red pines	1.2	...
Other softwoods	9.7	2.1
Total softwoods	12.3	2.6
Select white-red oaks	59.3	31.0
Other white-red oaks	61.5	38.0
Hickory	40.5	9.9
Hard maple	29.4	3.8
Sweetgum	11.0	2.0
Ash-walnut-black cherry	31.4	7.1
Yellow-poplar	65.6	14.2
Other hardwoods	68.3	13.3
Total hardwoods	367.0	119.3
All species	379.3	121.9

Table 22–*Average annual mortality of growing stock and sawtimber on timberland by species, Central Tennessee Counties, 1989*

Species	Growing stock	Sawtimber
	Million cubic feet	*Million board feet*
Yellow pines	0.1	...
Other softwoods	0.4	0.1
Total softwoods	0.5	0.1
Select white-red oaks	2.7	6.5
Other white-red oaks	4.6	10.9
Hickory	4.0	6.6
Hard maple	0.5	1.0
Sweetgum	0.3	0.2
Ash-walnut-black cherry	1.0	1.4
Yellow-poplar	0.6	1.6
Other hardwoods	5.7	7.1
Total hardwoods	19.3	35.4
All species	19.8	35.5

Table 23–*Average net annual growth and average annual removals of growing stock on timberland by ownership class and species group, Central Tennessee Counties, 1989*

Ownership class	Growth						Removals					
		Softwood			Hardwood			Softwood			Hardwood	
		Pine						Pine				
	All species	Planted	Natural	Other	Soft[1]	Hard[2]	All species	Planted	Natural	Other	Soft[1]	Hard[2]
	Million cubic feet											
Other public	5.3	...	0.4	0.1	1.9	3.0	...	...	...	...	...	...
Forest industry	1.5	0.4	...	...	0.5	0.6	...	...	...	...	...	...
Other private	95.2	...	0.6	5.5	30.2	59.0	30.2	...	0.1	0.9	6.5	22.7
All ownerships	102.0	0.4	0.9	5.6	32.6	62.5	30.2	...	0.1	0.9	6.5	22.7

[1]Hardwood species with an average specific gravity of 0.50 or less such as gums, yellow-poplar, cottonwood, red maple, basswood, aspen, and willow.
[2]Hardwood species with an average specific gravity greater than 0.50 such as oaks, hard maple, hickories, and green and white ash.

Table 24–*Average net annual growth and average annual removals of sawtimber on timberland by ownership class and species group, Central Tennessee Counties, 1989*

Ownership class	Growth						Removals					
		Softwood			Hardwood			Softwood			Hardwood	
		Pine						Pine				
	All species	Planted	Natural	Other	Soft[1]	Hard[2]	All species	Planted	Natural	Other	Soft[1]	Hard[2]
	Million board feet											
Other public	21.2	...	0.7	0.7	7.6	12.2	...	...	...	...	...	...
Forest industry	5.0	1.2	...	...	1.9	1.9	...	...	...	...	...	...
Other private	353.1	...	0.8	9.0	111.8	231.5	121.9	...	0.5	2.1	23.8	95.5
All ownerships	379.3	1.2	1.4	9.7	121.3	245.7	121.9	...	0.5	2.1	23.8	95.5

[1]Hardwood species with an average specific gravity of 0.50 or less such as gums, yellow-poplar, cottonwood, red maple, basswood, aspen, and willow.
[2]Hardwood species with an average specific gravity greater than 0.50 such as oaks, hard maple, hickories, and green and white ash.

Table 25–*Volume of sawtimber on timberland by species and tree grade, Central Tennssee Counties, 1989*

Species	All grades	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
	Million board feet					
Yellow pines	31.0	...	5.2	20.9	...	4.8
Redcedar	156.4	142.4	...	...	...	14.0
Other softwoods	9.8	...	4.8	4.7	...	0.4
Total softwoods	197.2	142.4	10.0	25.6	...	19.2
Select white-red oaks	1274.5	130.0	328.2	570.8	187.1	58.3
Other white-red oaks	1487.9	121.9	345.7	687.3	242.8	90.1
Hickory	947.6	29.5	218.1	451.9	211.7	36.4
Hard maple	499.9	3.4	58.5	229.7	167.9	40.4
Sweetgum	151.5	20.3	15.0	79.5	25.4	11.1
Tupelo and blackgum	75.7	15.8	10.9	26.2	15.1	7.7
Ash-walnut-black cherry	510.3	65.7	142.1	208.9	42.3	51.3
Yellow-poplar	1046.7	123.6	215.1	406.6	261.1	40.2
Other hardwoods	1085.9	46.7	154.0	348.2	394.7	142.3
Total hardwoods	7080.0	557.0	1487.8	3009.2	1548.1	477.9
All species	7277.2	699.4	1497.7	3034.8	1548.1	497.1

Supplemental Tables 26-40

Table 26–*Area of timberland by stand age, forest type group and type of regeneration, Central Tennessee Counties, 1989*

Stand age class	Pine		Oak-pine		Other hardwood types	
	Artificial	Natural	Artificial	Natural	Artificial	Natural
	Thousand acres					
1-10	...	13.5	...	4.9	...	46.2
11-20	...	5.6	...	...	...	5.2
21-30	...	4.9	...	...	...	...
31-40	...	...	...	...	...	...
41-50	...	...	...	...	...	...
>50	...	...	...	...	...	...
Mixed	4.9	150.2	...	298.6	...	1927.4
Total	4.9	174.2	...	303.5	...	1978.7

Table 27–*Volume of softwood growing stock on timberland by forest type, Central Tennessee Counties, 1989*

County	Total	Forest type group					
		White-red-jack pine	Loblolly-shortleaf pine		Oak-pine	Oak-hickory	Oak-gum cypress
			Planted	Natural			
	Million cubic feet						
Bedford	4.4	...	...	3.5	0.5	...	0.4
Cannon	9.1	...	...	2.8	5.5	0.8	...
Cheatam	5.2	...	...	...	...	5.2	...
Clay	3.4	...	...	...	1.2	2.3	...
Coffee	...	...	...	...	...	...	...
Davidson	4.4	...	...	...	1.3	3.1	...
De Kalb	13.6	...	...	5.3	8.0	0.3	...
Dickson	1.2	...	...	...	1.2	...	...
Giles	5.1	3.5	...	0.2	...	1.4	...
Jackson	10.2	...	...	...	9.1	1.1	...
Lincoln	9.7	...	...	7.1	1.1	1.6	...
Macon	0.3	...	...	...	...	0.3	...
Marshall	5.9	...	...	2.4	1.5	2.0	...
Maury	0.5	...	...	0.3	...	0.2	...
Montgomery	8.4	...	...	...	4.8	3.6	...
Moore	2.7	...	...	...	...	2.7	...
Robertson	0.4	...	...	...	...	0.4	...
Rutherford	11.7	...	...	7.3	3.8	0.7	...
Smith	4.2	...	...	...	1.4	2.8	...
Sumner	3.6	...	...	3.6	...	...	...
Trousdale	4.8	...	...	...	3.1	1.7	...
Williamson	14.6	...	...	6.4	6.0	2.2	...
Wilson	14.7	...	...	3.2	10.4	1.0	...
All counties	138.1	3.5	...	42.1	58.7	33.4	0.4

Table 28–*Volume of hardwood growing stock on timberland by forest type, Central Tennessee, Counties, 1989*

County	Total	Forest type group					
		White-red-jack pine	Loblolly-shortleaf pine		Oak-pine	Oak-hickory	Oak-gum-cypress
			Planted	Natural			
	Million cubic feet						
Bedford	46.4	...	...	1.9	0.2	39.1	5.2
Cannon	83.1	...	...	2.0	9.1	72.0	...
Cheatam	140.5	...	...	...	...	140.5	...
Clay	85.2	...	...	...	2.7	82.5	...
Coffee	154.3	...	...	...	...	147.1	7.3
Davidson	110.0	...	...	...	4.1	105.9	...
De Kalb	153.2	...	...	1.6	10.8	124.3	16.5
Dickson	215.6	...	...	...	3.6	212.1	...
Giles	146.3	2.6	...	...	...	141.5	2.2
Jackson	156.4	...	...	...	11.1	145.2	...
Lincoln	104.4	...	...	4.1	3.7	88.5	8.1
Macon	104.9	...	...	...	...	104.9	...
Marshall	45.7	...	...	1.3	6.8	37.6	...
Maury	107.8	...	...	...	1.5	106.3	...
Montgomery	134.6	...	...	...	8.4	126.3	...
Moore	52.6	...	...	...	...	52.6	...
Robertson	65.9	...	...	...	...	65.9	...
Rutherford	40.6	...	...	3.4	11.8	25.4	...
Smith	74.9	...	...	...	3.2	71.7	...
Sumner	75.8	...	...	1.1	...	74.6	...
Trousdale	20.6	...	...	...	4.1	16.5	...
Williamson	149.1	...	...	1.6	6.8	132.7	8.0
Wilson	36.7	...	...	1.4	19.1	16.2	...
All counties	2304.7	2.6	...	18.3	106.9	2129.6	47.4

Table 29–*Volume of softwood growing stock in the saw-log portion of sawtimber trees on timberland by forest type, Central Tennessee Counties, 1989*

County	Total	Forest type group				
		White-red-jack pine	Loblolly-shortleaf pine		Oak-pine	Oak hickory
			Planted	Natural		
	Million cubic feet					
Bedford	0.9	...	...	0.5	0.4	...
Cannon	1.9	...	...	1.0	0.8	...
Cheatam	2.6	...	...	...	...	2.6
Clay	1.4	...	...	...	...	1.4
Coffee	...	...	...	...	...	...
Davidson	1.4	...	...	...	0.3	1.0
De Kalb	4.5	...	...	2.2	2.3	...
Dickson	...	...	...	...	...	...
Giles	2.8	2.1	...	...	...	0.8
Jackson	3.9	...	...	...	3.4	0.5
Lincoln	1.0	...	...	1.0	...	...
Macon	...	...	...	...	...	...
Marshall	1.4	...	...	0.9	0.2	0.2
Maury	...	...	...	...	...	...
Montgomery	3.6	...	...	...	1.9	1.6
Moore	1.3	...	...	...	...	1.3
Robertson	0.4	...	...	...	...	0.4
Rutherford	1.2	...	...	0.5	0.6	0.1
Smith	0.3	...	...	...	...	0.3
Sumner	0.9	...	...	0.9	...	...
Trousdale	0.3	...	...	...	0.3	...
Williamson	5.0	...	...	2.0	1.8	1.2
Wilson	4.6	...	...	0.2	4.4	...
All counties	39.2	2.1	...	9.3	16.4	11.5

Table 30–*Volume of hardwood growing stock in the saw-log portion of sawtimber trees on timberland by forest type, Central Tennessee Counties, 1989*

County	Total	Forest type group					
		White-red-jack pine	Loblolly-shortleaf pine		Oak-pine	Oak-hickory	Oak-gum cypress
			Planted	Natural			
	Million cubic feet						
Bedford	23.3	...	...	1.4	...	18.3	3.7
Cannon	39.4	...	...	0.7	1.1	37.6	...
Cheatam	72.6	...	...	...	...	72.6	...
Clay	34.6	...	...	...	1.3	33.3	...
Coffee	80.4	...	...	...	...	75.9	4.4
Davidson	58.3	...	...	...	...	58.3	...
De Kalb	82.3	...	...	...	1.2	69.0	12.0
Dickson	126.7	...	...	...	1.5	125.2	...
Giles	54.8	1.1	...	...	...	52.6	1.2
Jackson	90.2	...	...	...	5.5	84.7	...
Lincoln	46.0	...	...	1.3	0.7	42.6	1.4
Macon	64.0	...	...	...	...	64.0	...
Marshall	25.4	...	...	0.5	3.2	21.7	...
Maury	41.3	...	...	...	0.3	41.0	...
Montgomery	62.6	...	...	...	4.6	58.0	...
Moore	29.1	...	...	...	...	29.1	...
Robertson	43.5	...	...	...	...	43.5	...
Rutherford	15.6	...	...	0.6	4.4	10.5	...
Smith	32.7	...	...	...	0.9	31.8	...
Sumner	45.2	...	...	0.5	...	44.8	...
Trousdale	8.4	...	...	...	1.4	7.0	...
Williamson	86.0	...	...	0.3	2.0	77.7	6.0
Wilson	13.2	...	...	0.4	5.3	7.4	...
All counties	1175.5	1.1	...	5.6	33.5	1106.6	28.8

Table 31–*Volume of timber on timberland by county, class of timber and species group, Central Tennessee Counties, 1989*

County	All classes	Growing stock		Rough		Rotten	
		Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood
	Million cubic feet						
Bedford	68.7	4.4	46.4	2.9	12.2	...	2.8
Cannon	106.8	9.1	83.1	0.7	12.1	...	1.8
Cheatam	159.9	5.2	140.5	...	8.8	...	5.4
Clay	96.2	3.4	85.2	...	5.1	...	2.5
Coffee	175.2	...	154.3	...	11.3	...	9.6
Davidson	137.2	4.4	110.0	1.4	12.8	0.3	8.4
De Kalb	180.2	13.6	153.2	0.8	8.8	...	3.8
Dickson	227.9	1.2	215.6	...	9.2	...	1.8
Giles	177.8	5.1	146.3	0.7	17.5	...	8.3
Jackson	190.4	10.2	156.4	1.3	17.5	0.2	4.8
Lincoln	133.9	9.7	104.4	1.0	13.9	...	4.8
Macon	112.2	0.3	104.9	...	5.3	...	1.6
Marshall	64.4	5.9	45.7	1.5	9.4	...	1.9
Maury	126.5	0.5	107.8	0.4	16.5	...	1.3
Montgomery	166.2	8.4	134.6	0.3	19.5	...	3.4
Moore	60.6	2.7	52.6	0.7	3.3	...	1.3
Robertson	74.4	0.4	65.9	...	7.2	...	0.9
Rutherford	82.7	11.7	40.6	7.5	20.0	0.2	2.7
Smith	97.2	4.2	74.9	0.7	14.7	...	2.7
Sumner	93.8	3.6	75.8	1.0	12.0	...	1.5
Trousdale	29.7	4.8	20.6	0.3	3.9	...	0.2
Williamson	189.7	14.6	149.1	1.7	17.6	0.3	6.5
Wilson	67.0	14.7	36.7	4.5	9.7	...	1.3
All counties	2818.6	138.1	2304.7	27.4	268.1	1.0	79.4

Table 32–*Number of live trees on timberland by detailed species and diameter class, Central Tennessee Counties, 1989*

Species	All classes	Diameter class (inches at breast height) 1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 & larger
	Thousand trees												
Shortleaf pine	671	583	...	71	...	...	...	...	17	...	...	...	...
Loblolly pine	2363	741	...	424	821	269	89	...	19	...	...	...	...
Virginia pine	2763	2332	...	130	219	38	...	28	16	...	...	...	...
E. white pine	1414	900	...	196	67	129	123	...	...	...	...	...	...
Redcedar	210408	117329	53169	23539	10659	3566	1437	455	155	67	9	21	...
Total softwoods	217619	121885	53169	24360	11767	4003	1649	483	207	67	9	21	...
Select white oaks	65595	27820	14751	6670	5507	3499	2501	2105	1371	582	329	397	62
Select red oaks	10566	1581	2129	1225	1333	1206	981	785	521	489	145	157	14
Other white oaks	25000	6119	5006	3827	2902	2656	1359	1253	819	420	284	304	50
Other red oaks	31862	9056	4886	3788	3135	3432	2612	1896	1111	887	502	505	51
Other hickories	117490	54005	24545	13412	10264	7189	3862	2527	953	461	123	124	26
Persimmon	13562	9328	1604	1716	549	182	154	...	31	...	...	...	...
Hard maple	102027	64582	15831	9281	4310	2786	2049	1703	586	495	205	141	57
Soft maple	31444	22730	3612	2243	1089	820	277	150	185	101	88	113	36
Boxelder	7484	3461	1115	879	1019	417	276	191	57	44	...	25	...
Beech	30878	18458	5704	1447	1687	680	805	718	326	341	152	423	137
Sweetgum	20696	12586	2567	2309	1234	713	691	314	231	25	10	18	...
Blackgum	45644	34800	4833	2970	1313	809	425	217	180	59	9	28	...
White ash	81790	54658	12803	6268	3620	1815	1072	741	408	184	128	77	15
Other ashes	21371	9526	5373	3000	1673	752	545	175	158	83	55	31	...
Sycamore	1883	479	...	355	258	232	135	170	33	51	98	68	4
Basswood	2551	1620	...	258	126	237	50	100	62	57	19	21	...
Yellow-poplar	44742	26111	5726	3619	2132	1755	1446	1456	970	711	361	421	34
Magnolia	72	...	...	...	72	...	...	...	...	...	...	...	...
Black walnut	11007	2676	1737	2860	1280	1156	570	378	191	48	75	36	...
Black cherry	12559	9333	1102	636	547	347	247	174	73	83	...	17	...
American elm	34513	22607	6130	2565	1243	877	530	332	32	97	42	33	23
Other elms	77863	45984	20054	7069	2552	1375	470	146	115	61	9	25	...
River birch	24	...	...	...	...	...	...	...	13	10	...	...	...
Other birches	1438	1438	...	...	...	...	...	...	...	...	...	...	...
Hackberry	71479	44060	11308	5975	4695	1995	1545	939	441	297	96	89	40
Black locust	12447	2663	2484	2418	2588	1134	483	390	128	85	61	16	...
Other locusts	7371	3818	1888	737	367	363	174	24	...	...	...	...	...
Sassafras	40769	19835	10003	4316	2818	2010	910	487	224	86	72	7	...
Dogwood	100378	79310	17908	2858	302	...	...	...	...	...	...	...	...
Holly	156	...	...	93	63	...	...	...	...	...	...	...	...
Other commercial	29221	14420	8667	3413	1028	986	309	280	39	43	...	34	3
Total hardwoods	1053880	603065	191766	96206	59707	39424	24477	17651	9258	5801	2862	3111	552
Noncommercial	143938	104574	27383	8239	2728	469	200	263	68	...	...	14	...
All species	1415437	829524	272318	128806	74201	43896	26326	18397	9533	5868	2871	3146	552

Table 33—*Number of growing-stock trees on timberland by detailed species and diameter class, Central Tennessee Counties, 1989*

Species	All classes	Diameter class (inches at breast height) 5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 & larger
	Thousand trees										
Shortleaf pine	88	71	...	...	...	...	17	...	...	...	...
Loblolly pine	1622	424	821	269	89	...	19	...	...	...	...
Virginia pine	349	130	137	38	...	28	16	...	...	...	...
E. white pine	453	196	67	92	99	...	...	...	...	...	...
Redcedar	31493	19443	8580	2192	896	216	93	56	9	8	...
Total softwoods	34005	20264	9605	2591	1084	243	145	56	9	8	...
Select white oaks	21112	6132	5234	3435	2253	1824	1130	493	311	285	16
Select red oaks	6595	1225	1265	1177	930	764	477	463	135	151	7
Other white oaks	12648	3479	2846	2493	1143	1171	704	361	234	181	37
Other red oaks	16677	3576	3032	3159	2457	1799	987	811	394	423	38
Other hickories	34949	11151	9812	6827	3359	2270	870	426	123	95	16
Persimmon	2477	1716	445	182	119	...	15	...	...	...	...
Hard maple	16289	6548	3310	2458	1675	1176	501	337	156	98	28
Soft maple	3746	1661	936	621	106	80	116	63	58	92	14
Boxelder	1321	422	430	195	163	67	...	26	...	17	...
Beech	5567	1263	1454	622	733	617	254	280	93	218	34
Sweetgum	4785	1844	980	713	665	314	217	25	10	18	...
Blackgum	4610	1832	1236	765	374	176	151	48	...	28	...
White ash	10025	3621	2729	1613	779	620	331	157	109	57	8
Other ashes	4977	2190	1300	621	461	133	123	71	55	23	...
Sycamore	1104	355	133	198	87	104	33	40	87	68	...
Basswood	852	258	126	159	50	100	62	57	19	21	...
Yellow-poplar	12447	3416	2132	1663	1446	1413	928	665	349	414	22
Magnolia	72	...	72	...	...	...	...	...	...	...	...
Black walnut	4804	1869	1016	936	494	270	124	12	65	18	...
Black cherry	1627	636	217	347	113	174	58	83	...	...	...
American elm	3868	1479	1020	686	296	251	32	39	32	20	13
Other elms	9772	5947	2119	1146	296	126	86	27	9	16	...
River birch	10	...	...	...	...	...	...	10	...	...	...
Hackberry	10599	3528	3685	1468	953	626	185	62	50	43	...
Black locust	5085	1826	2063	635	176	254	53	52	19	8	...
Other locusts	1193	562	238	282	87	24	...	...	...	...	...
Sassafras	9073	3657	2317	1616	713	416	210	75	61	7	...
Dogwood	560	328	233	...	...	...	...	...	...	...	...
Other commercial	1917	890	382	296	198	107	19	15	...	10	...
Total hardwoods	208763	71409	50761	34311	20127	14875	7665	4700	2369	2313	232
All species	242768	91673	60366	36902	21211	15119	7810	4756	2379	2320	232

Table 34—*Volume of growing-stock trees on timberland by detailed species and diameter class, Central Tennessee Counties, 1989*

Species	All classes	Diameter class (inches at breast height) 5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 & larger
	Million cubic feet										
Shortleaf pine	0.5	0.1	...	...	...	...	0.4	...	...	...	...
Loblolly pine	11.6	1.1	5.8	3.1	1.4	...	0.3	...	...	...	...
Virginia pine	2.5	0.3	0.7	0.4	...	0.7	0.4	...	...	...	...
E. white pine	3.1	0.5	0.3	0.9	1.4	...	...	...	...	...	...
Redcedar	120.3	42.5	39.9	18.6	11.3	3.8	2.7	1.2	0.2	0.2	...
Total softwoods	138.1	44.5	46.7	23.0	14.0	4.5	3.8	1.2	0.2	0.2	...
Select white oaks	262.9	16.0	28.4	38.3	38.6	45.1	40.0	21.3	16.2	18.2	0.9
Select red oaks	111.5	2.3	9.3	12.5	16.2	19.8	14.9	19.3	6.0	10.3	1.0
Other white oaks	157.3	8.1	15.9	27.2	19.5	24.6	21.3	12.3	11.7	11.6	5.2
Other red oaks	269.9	9.8	20.1	35.2	42.3	44.7	31.3	31.8	20.2	29.8	4.7
Other hickories	357.7	28.2	60.2	75.1	61.8	62.7	31.5	19.7	6.6	8.2	3.6
Persimmon	10.8	3.5	2.8	1.9	2.0	...	0.5	...	...	...	...
Hard maple	168.7	17.1	19.9	26.3	27.9	29.9	16.1	14.5	7.7	7.2	2.1
Soft maple	34.8	4.4	5.6	6.6	1.9	1.8	2.8	2.4	2.4	5.5	1.2
Boxelder	11.8	1.2	2.3	2.1	2.4	1.4	...	1.0	...	1.2	...
Beech	88.1	3.4	8.1	7.0	13.6	14.3	8.3	10.3	4.6	15.3	3.2
Sweetgum	52.0	4.1	6.0	8.2	12.6	8.8	8.4	1.5	0.5	1.8	...
Blackgum	33.7	4.1	6.2	7.0	5.0	4.0	4.0	2.2	...	1.3	...
White ash	91.1	8.3	15.6	14.9	12.0	14.5	11.2	6.0	4.7	3.5	0.4
Other ashes	40.5	4.9	6.7	6.5	8.0	2.9	4.7	2.5	2.9	1.5	...
Sycamore	19.0	1.2	0.8	1.5	1.2	2.2	1.2	1.7	4.4	4.8	...
Basswood	15.1	0.9	0.6	1.4	1.4	2.3	2.1	3.0	1.2	2.2	...
Yellow-poplar	245.7	8.9	14.7	19.3	29.5	40.5	35.4	34.4	21.9	37.5	3.6
Magnolia	0.8	...	0.8	...	...	...	...	...	...	...	...
Black walnut	40.8	4.8	5.8	9.2	6.7	5.7	3.7	0.7	3.0	1.2	...
Black cherry	18.0	2.0	1.1	4.0	1.6	4.2	2.0	3.0	...	...	...
American elm	29.9	3.2	5.0	6.2	4.0	5.1	1.0	1.5	1.4	1.2	1.2
Other elms	44.2	11.9	10.2	10.2	4.4	2.7	2.4	1.2	0.5	0.6	...
River birch	0.3	...	...	...	...	...	...	0.3	...	...	...
Hackberry	75.7	7.7	17.2	13.0	13.7	11.9	5.2	2.1	2.6	2.3	...
Black locust	34.3	4.4	11.6	6.5	2.7	4.9	1.5	1.6	0.7	0.5	...
Other locusts	7.3	1.1	1.2	3.1	1.3	0.5	...	...	...	...	...
Sassafras	69.9	9.3	14.0	15.5	11.1	8.3	6.0	2.4	2.8	0.5	...
Dogwood	0.9	0.5	0.4	...	...	...	...	...	...	...	...
Other commercial	12.0	1.3	1.7	2.3	2.8	1.9	0.5	0.8	...	0.8	...
Total hardwoods	2304.7	172.7	292.2	361.2	344.2	364.6	256.2	197.6	122.0	166.9	27.1
All species	2442.7	217.2	338.9	384.2	358.3	369.1	260.0	198.8	122.2	167.0	27.1

Table 35–*Volume of growing stock in the saw-log portion of sawtimber trees on timberland by detailed species and diameter class, Central Tennessee Counties, 1989*

Species	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 & larger
	Million cubic feet								
Shortleaf pine	0.4	...	...	...	0.4	...	...	...	...
Loblolly pine	3.9	2.4	1.2	...	0.2	...	...	...	...
Virginia pine	1.5	0.3	...	0.7	0.4	...	...	...	...
E. white pine	2.1	0.8	1.3	...	...	...	...	...	...
Redcedar	31.4	14.7	9.5	3.5	2.5	1.0	0.2	0.2	...
Total softwoods	39.2	18.2	12.0	4.2	3.5	1.0	0.2	0.2	...
Select white oaks	143.9	...	29.1	35.6	32.7	17.5	13.2	15.2	0.6
Select red oaks	70.1	...	11.7	15.9	12.1	16.0	5.0	8.5	0.9
Other white oaks	82.3	...	14.2	19.9	17.6	8.7	9.2	9.2	3.5
Other red oaks	165.0	...	30.5	36.5	25.7	26.4	17.2	24.7	4.1
Other hickories	154.5	...	46.1	51.8	26.0	16.0	5.5	5.9	3.2
Persimmon	1.9	...	1.5	...	0.4	...	...	...	...
Hard maple	80.8	...	20.6	22.5	12.6	11.5	6.3	5.9	1.5
Soft maple	14.5	...	1.3	1.4	2.3	2.0	2.1	4.2	1.1
Boxelder	4.7	...	1.7	1.1	...	0.8	...	1.1	...
Beech	54.5	...	9.5	11.6	6.8	8.0	3.7	11.9	2.9
Sweetgum	25.9	...	8.1	7.4	7.0	1.4	0.4	1.7	...
Blackgum	13.2	...	3.4	3.2	3.7	2.0	...	1.1	...
White ash	41.9	...	8.9	11.7	9.0	5.2	3.6	3.1	0.3
Other ashes	18.4	...	6.0	2.6	3.7	2.2	2.5	1.3	...
Sycamore	13.2	...	0.8	1.5	1.1	1.6	3.9	4.4	...
Basswood	10.0	...	1.1	1.7	1.8	2.6	1.0	1.8	...
Yellow-poplar	170.5	...	21.2	33.3	31.0	29.5	19.4	33.0	3.2
Black walnut	15.6	...	4.9	4.1	2.9	0.6	2.3	0.8	...
Black cherry	8.7	...	1.4	3.4	1.6	2.4	...	...	...
American elm	11.6	...	2.8	3.8	0.8	1.3	1.1	0.8	1.0
Other elms	8.5	...	2.9	1.9	1.9	0.9	0.4	0.5	...
River birch	0.2	...	...	...	...	0.2	...	...	...
Hackberry	27.6	...	9.6	8.8	3.7	1.7	1.9	1.8	...
Black locust	8.6	...	2.0	3.2	1.2	1.2	0.6	0.4	...
Other locusts	1.0	...	0.7	0.3	...	...	...	...	...
Sassafras	23.6	...	7.4	6.5	5.2	1.9	2.1	0.4	...
Other commercial	4.7	...	1.7	1.4	0.4	0.5	...	0.7	...
Total hardwoods	1175.5	...	248.9	291.0	211.1	162.1	101.7	138.4	22.4
All species	1214.7	18.2	260.9	295.2	214.5	163.1	101.8	138.5	22.4

Table 36–*Volume of timber on timberland by species and class of timber, Central Tennessee Counties, 1989*

Species	All live	Growing stock	Rough	Rotten
	Million cubic feet			
Shortleaf pine	0.5	0.5	...	...
Loblolly pine	11.6	11.6	...	...
Virginia pine	2.7	2.5	0.2	...
E. white pine	3.6	3.1	0.4	...
Redcedar	148.1	120.3	26.7	1.0
Total softwoods	166.5	138.1	27.4	1.0
Select white oaks	284.3	262.9	17.3	4.1
Select red oaks	115.9	111.5	1.4	3.0
Other white oaks	171.7	157.3	10.6	3.8
Other red oaks	288.1	269.9	10.4	7.9
Other hickories	379.7	357.7	16.8	5.2
Persimmon	11.6	10.8	0.7	0.1
Hard maple	203.3	168.7	27.2	7.4
Soft maple	46.3	34.8	5.4	6.1
Boxelder	20.6	11.8	8.6	0.2
Beech	114.0	88.1	7.4	18.4
Sweetgum	54.8	52.0	2.5	0.4
Blackgum	38.8	33.7	4.0	1.0
White ash	108.8	91.1	15.4	2.2
Other ashes	46.7	40.5	5.3	0.9
Sycamore	22.2	19.0	2.7	0.5
Basswood	15.4	15.1	0.2	0.1
Yellow-poplar	251.1	245.7	2.5	2.9
Magnolia	0.8	0.8	...	...
Black walnut	47.6	40.8	5.5	1.3
Black cherry	22.6	18.0	4.4	0.2
American elm	38.7	29.9	8.3	0.5
Other elms	52.5	44.2	7.7	0.7
River birch	0.5	0.3	...	0.2
Hackberry	107.5	75.7	27.4	4.5
Black locust	46.4	34.3	7.6	4.4
Other locusts	9.1	7.3	1.1	0.7
Sassafras	78.5	69.9	6.8	1.7
Dogwood	4.7	0.9	3.7	0.1
Holly	0.4	...	0.4	...
Other commercial	24.8	12.0	12.0	0.8
Total hardwoods	2607.4	2304.7	223.3	79.4
Noncommercial	44.8	...	44.8	...
All species	2818.6	2442.7	295.5	80.4

Table 37–*Volume of sawtimber for tree grade 1 on timberland by detailed species and diameter class, Central Tennessee Counties, 1989*

Species	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 & larger
	Million board feet								
Redcedar	142.4	68.2	44.1	17.2	10.1	2.7	...	...	...
Total softwoods	142.4	68.2	44.1	17.2	10.1	2.7	...	...	...
Select white oaks	94.1	...	...	...	13.6	25.9	18.0	33.5	3.0
Select red oaks	36.0	...	...	...	3.1	14.9	8.8	9.2	...
Other white oaks	23.3	...	...	...	3.8	6.1	6.8	3.6	2.9
Other red oaks	98.6	...	...	...	9.9	22.3	21.6	33.9	10.9
Other hickories	29.5	...	...	...	4.3	18.6	6.6	...	...
Hard maple	3.4	...	...	...	3.4	...	...	...	...
Soft maple	5.8	...	...	...	5.8	...	...	...	...
Boxelder	4.1	...	...	...	...	4.1	...	...	...
Sweetgum	20.3	...	...	...	10.0	...	...	10.4	...
Blackgum	15.8	...	...	...	5.9	9.9	...	...	...
White ash	46.4	...	...	...	21.6	9.2	6.2	9.5	...
Other ashes	19.4	...	...	...	4.8	3.3	7.8	3.5	...
Sycamore	15.9	...	...	...	3.6	...	6.9	5.3	...
Basswood	4.8	...	...	...	...	...	...	4.8	...
Yellow-poplar	123.6	...	...	...	6.6	17.1	28.6	71.3	...
Other elms	1.9	...	...	...	...	...	...	1.9	...
Hackberry	4.3	...	...	...	2.5	...	...	1.7	...
Sassafras	2.0	...	...	...	2.0	...	...	...	...
Other commercial	8.0	...	...	...	...	3.3	...	4.7	...
Total hardwoods	557.0	...	...	...	100.8	134.8	111.4	193.3	16.8
All species	699.4	68.2	44.1	17.2	110.9	137.5	111.4	193.3	16.8

Table 38–*Volume of sawtimber for tree grade 2 on timberland by detailed species and diameter class, Central Tennessee Counties, 1989*

Species	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 & larger
	Million board feet								
Shortleaf pine	1.9	...	...	...	1.9	...	...	...	...
Loblolly pine	3.3	1.2	2.1	...	...	...	...	...	...
E. white pine	4.8	...	4.8	...	...	...	...	...	...
Total softwoods	10.0	1.2	6.9	...	1.9	...	...	...	...
Select white oaks	229.0	...	...	69.9	62.4	40.4	35.8	20.5	...
Select red oaks	99.3	...	...	25.0	9.6	41.3	5.7	14.9	2.8
Other white oaks	102.7	...	...	17.9	29.4	3.8	24.5	20.1	7.1
Other red oaks	243.0	...	...	47.5	34.0	56.1	37.7	52.4	15.3
Other hickories	218.1	...	...	98.8	62.3	38.7	5.7	12.7	...
Hard maple	58.5	...	...	14.8	23.2	4.0	3.9	12.7	...
Soft maple	13.8	...	...	...	...	2.7	5.9	5.2	...
Beech	3.8	...	...	1.6	2.2	...	...	...	...
Sweetgum	15.0	...	...	7.7	2.3	5.1	...	...	...
Blackgum	10.9	...	...	6.9	2.1	...	...	2.0	...
White ash	81.8	...	...	45.5	12.0	12.1	8.9	3.2	...
Other ashes	25.4	...	...	5.2	9.1	6.2	4.9	...	...
Sycamore	13.8	...	...	...	...	3.4	2.3	8.1	...
Basswood	29.2	...	...	2.8	...	14.6	4.3	7.5	...
Yellow-poplar	215.1	...	...	39.0	50.2	41.1	27.2	47.0	10.6
Black walnut	22.5	...	...	9.8	6.7	...	5.9	...	...
Black cherry	12.4	...	...	9.9	...	2.5	...	...	...
American elm	15.5	...	...	4.1	3.4	6.4	...	1.6	...
Other elms	8.5	...	...	1.5	7.0	...	...	...	...
Hackberry	24.8	...	...	4.8	5.6	5.5	5.5	3.5	...
Black locust	8.8	...	...	...	3.2	3.0	2.6	...	...
Sassafras	33.1	...	...	8.7	13.9	3.8	6.7	...	...
Other commercial	2.7	...	...	2.7	...	...	...	...	...
Total hardwoods	1487.8	...	...	424.0	338.6	290.4	187.7	211.3	35.8
All species	1497.7	1.2	6.9	424.0	340.5	290.4	187.7	211.3	35.8

Table 39–*Volume of sawtimber for tree grade 3 on timberland by detailed species and diameter class, Central Tennessee Counties, 1989*

Species	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 & larger
	Million board feet								
Loblolly pine	17.1	11.5	4.3	...	1.3	...	...	...	...
Virginia pine	3.9	1.7	...	...	2.1	...	...	...	...
E. white pine	4.7	2.9	1.8	...	...	...	...	...	...
Total softwoods	25.6	16.1	6.1	...	3.4	...	...	...	...
Select white oaks	381.9	...	128.2	101.0	92.9	23.2	18.1	18.4	...
Select red oaks	188.9	...	59.1	38.8	24.0	38.4	8.7	16.8	3.1
Other white oaks	246.4	...	60.9	65.9	49.5	27.3	17.1	22.5	3.0
Other red oaks	440.9	...	118.9	105.2	85.9	50.0	35.0	45.8	...
Other hickories	451.9	...	185.6	149.4	40.3	31.7	14.3	10.7	19.9
Persimmon	11.1	...	8.4	...	2.7	...	...	...	...
Hard maple	229.7	...	59.0	59.9	27.4	41.9	24.2	14.4	2.9
Soft maple	36.2	...	6.2	7.9	3.7	6.2	7.3	4.9	...
Boxelder	4.7	...	3.5	1.2	...	...	...	...	...
Beech	60.2	...	10.6	2.8	16.1	6.2	2.7	15.6	6.2
Sweetgum	79.5	...	29.8	23.6	22.5	3.7	...	...	...
Blackgum	26.2	...	9.6	8.0	8.6	...	...	...	...
White ash	94.8	...	43.2	20.9	12.5	8.0	6.0	2.7	1.4
Other ashes	51.9	...	28.6	8.6	8.6	...	4.1	2.1	...
Sycamore	29.9	...	2.5	2.7	2.7	2.7	13.1	6.3	...
Basswood	16.7	...	6.7	7.1	...	...	2.9	...	...
Yellow-poplar	406.6	...	82.1	107.5	66.1	46.1	45.5	54.2	5.1
Black walnut	49.3	...	23.0	9.8	7.5	4.1	2.5	2.5	...
Black cherry	12.9	...	1.2	3.3	2.3	6.1	...	...	...
American elm	31.3	...	11.6	6.5	1.6	...	7.5	2.2	1.9
Other elms	21.9	...	12.8	5.4	1.4	2.2	...	...	...
Hackberry	36.7	...	14.5	10.5	5.2	3.4	2.0	1.3	...
Black locust	17.3	...	3.5	8.8	1.6	1.1	...	2.2	...
Other locusts	3.1	...	1.3	1.8	...	...	...	...	...
Sassafras	69.1	...	31.0	19.6	7.7	7.8	2.9	...	...
Other commercial	9.9	...	5.5	2.2	2.2	...	...	...	...
Total hardwoods	3009.2	...	947.4	778.5	493.0	310.2	213.9	222.7	43.4
All species	3034.8	16.1	953.6	778.5	496.4	310.2	213.9	222.7	43.4

Table 40–*Volume of sawtimber for tree grade 4 on timberland by detailed species and diameter class, Central Tennessee Counties, 1989*

Species	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 & larger
	Million board feet								
Select white oaks	112.5	...	30.2	24.4	25.8	15.3	6.6	10.1	...
Select red oaks	74.7	...	5.3	30.4	29.1	...	...	9.8	...
Other white oaks	87.7	...	15.7	21.5	18.1	12.7	6.5	6.9	6.3
Other red oaks	155.1	...	41.0	52.9	16.9	22.8	6.8	14.7	...
Other hickories	211.7	...	71.0	63.9	50.2	11.2	2.9	12.5	...
Hard maple	167.9	...	59.1	50.5	22.6	18.4	8.8	8.5	...
Soft maple	19.9	...	1.3	...	2.4	3.3	...	11.9	1.0
Boxelder	14.0	...	5.0	3.3	...	0.5	...	5.2	...
Beech	198.6	...	38.9	58.6	20.6	30.4	15.2	27.8	7.0
Sweetgum	25.4	...	10.3	7.9	7.2	...	...	...	...
Blackgum	15.1	...	7.8	1.6	3.0	2.7	...	...	...
White ash	6.7	...	3.7	1.7	1.3	...	...	...	...
Other ashes	7.8	...	3.8	2.0	2.1	...	...	...	...
Sycamore	8.3	...	1.3	4.0	...	2.9	...	...	...
Basswood	5.3	...	...	...	5.3	...	...	...	...
Yellow-poplar	261.1	...	41.5	45.6	54.8	75.7	11.9	31.6	...
Black walnut	11.4	...	4.1	4.8	...	...	2.4	...	...
Black cherry	16.5	...	5.3	3.9	3.0	4.3	...	...	...
American elm	18.1	...	2.2	10.1	...	...	...	...	5.8
Other elms	10.9	...	2.8	2.4	...	3.4	2.3	...	...
Hackberry	83.1	...	35.0	29.6	9.4	1.8	4.9	2.4	...
Black locust	15.8	...	7.3	6.0	2.5	...	...	...	...
Other locusts	1.5	...	1.5	...	...	...	...	...	...
Sassafras	15.5	...	7.1	4.5	1.3	...	...	2.6	...
Other commercial	3.6	...	3.6	...	...	...	...	...	...
Total hardwoods	1548.1	...	404.9	429.7	275.5	205.4	68.3	144.1	20.1
All species	1548.1	...	404.9	429.7	275.5	205.4	68.3	144.1	20.1

Graphics

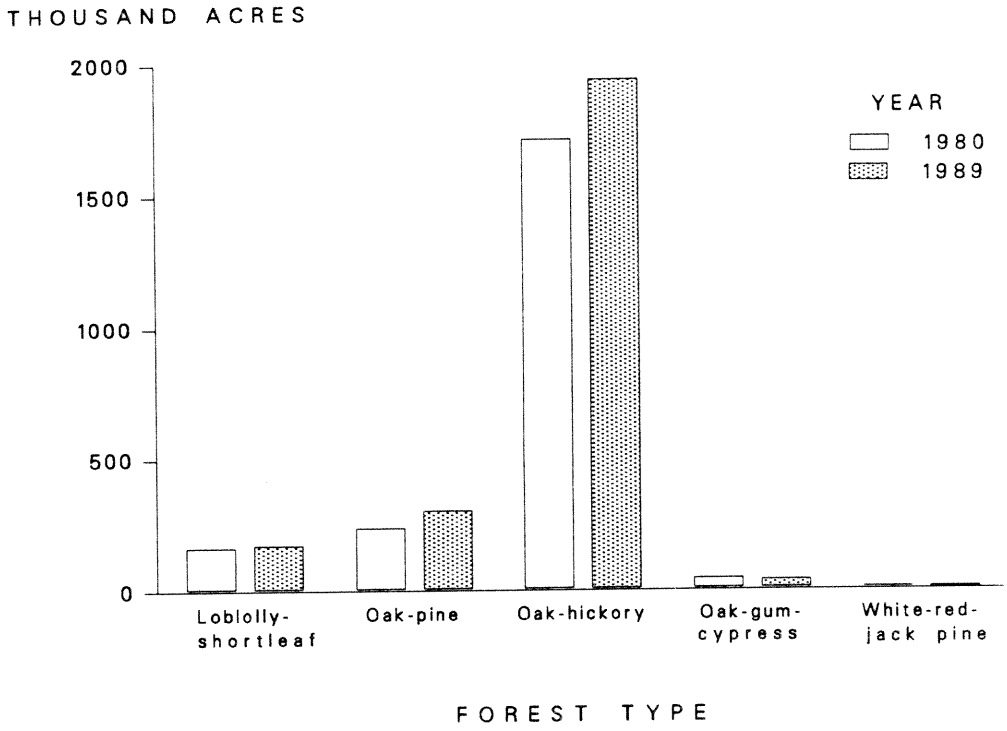

Figure 1.--Area of timberland by forest type, Central Tennessee, 1980 and 1989.

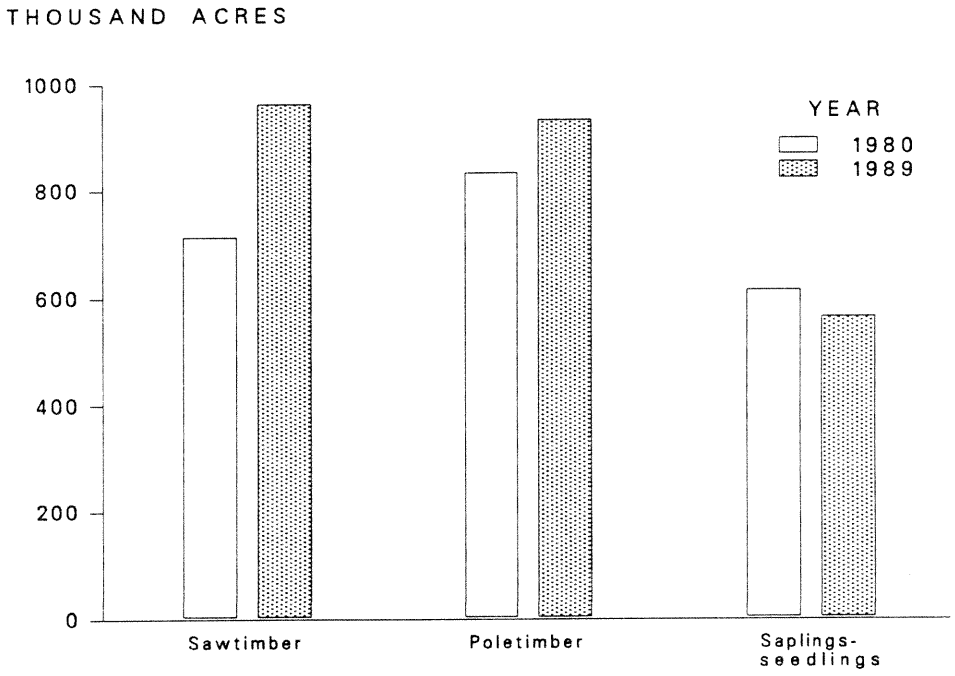

Figure 2.--Area of timberland by stand-size class, Central Tennessee, 1980 and 1989.

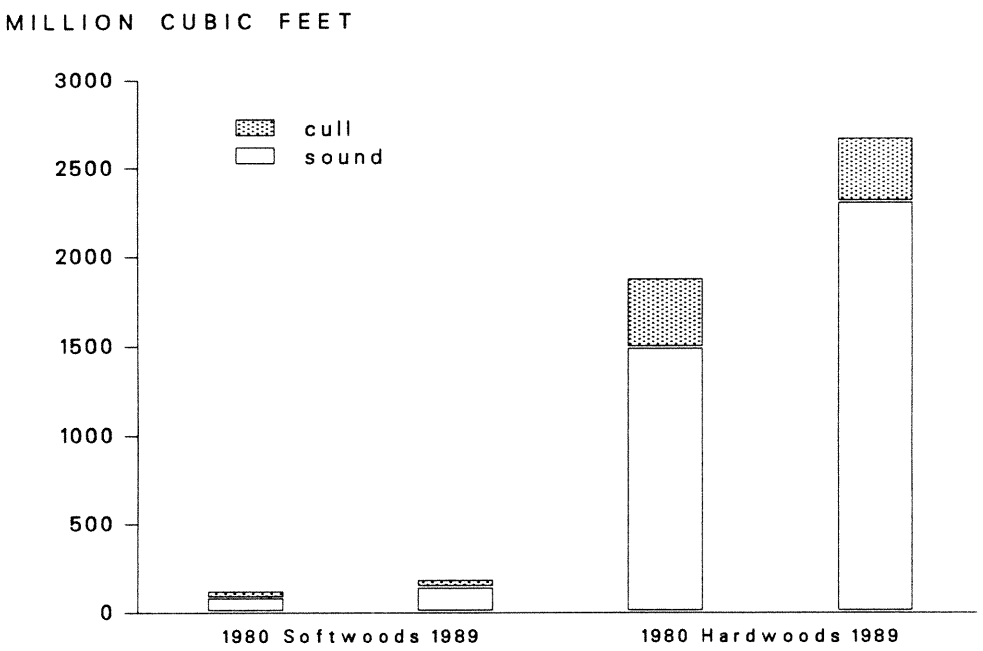

Figure 3.--Volume of timber on timberland by species group and class of timber, Central Tennessee, 1980 and 1989.

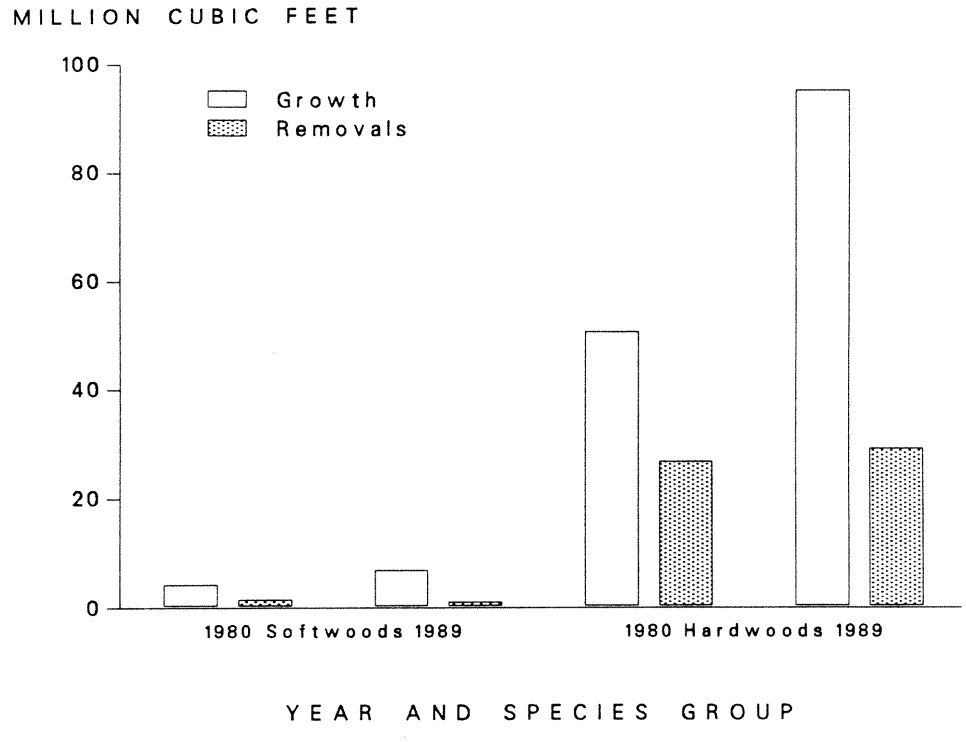

Figure 4.--Average net annual growth and average annual removals of growing stock on timberland by species group, Central Tennessee, 1980 and 1989.

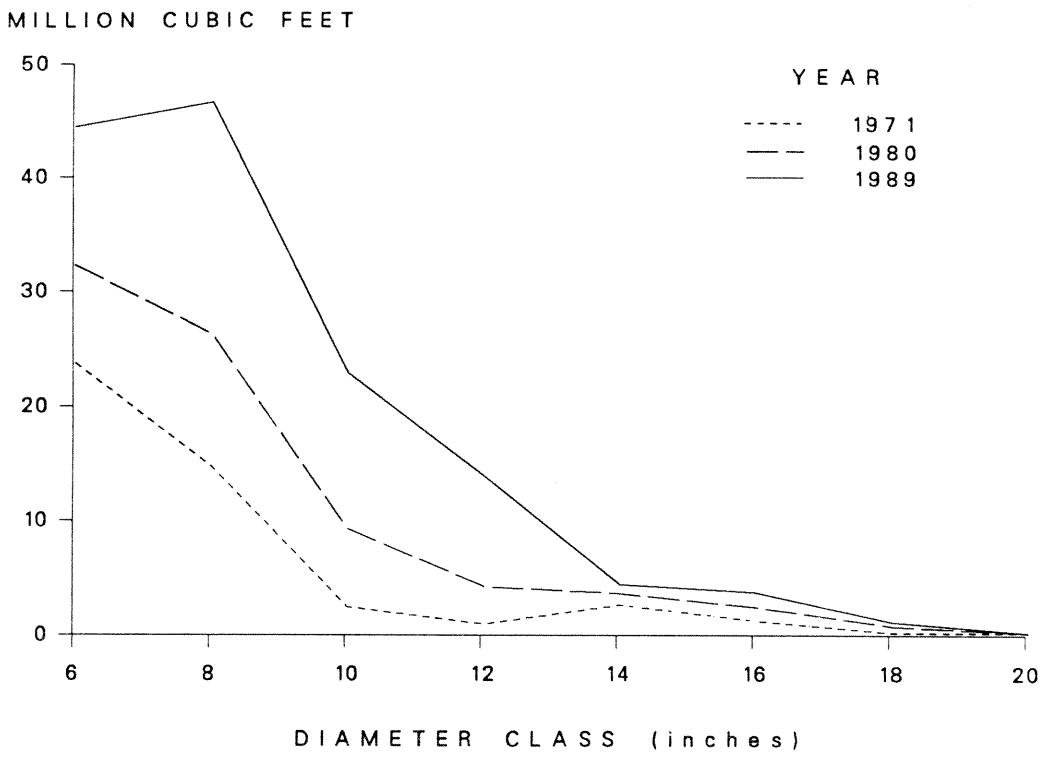

Figure 5.--Volume of softwood growing stock on timberland by diameter class, Central Tennessee, 1971, 1980, and 1989.

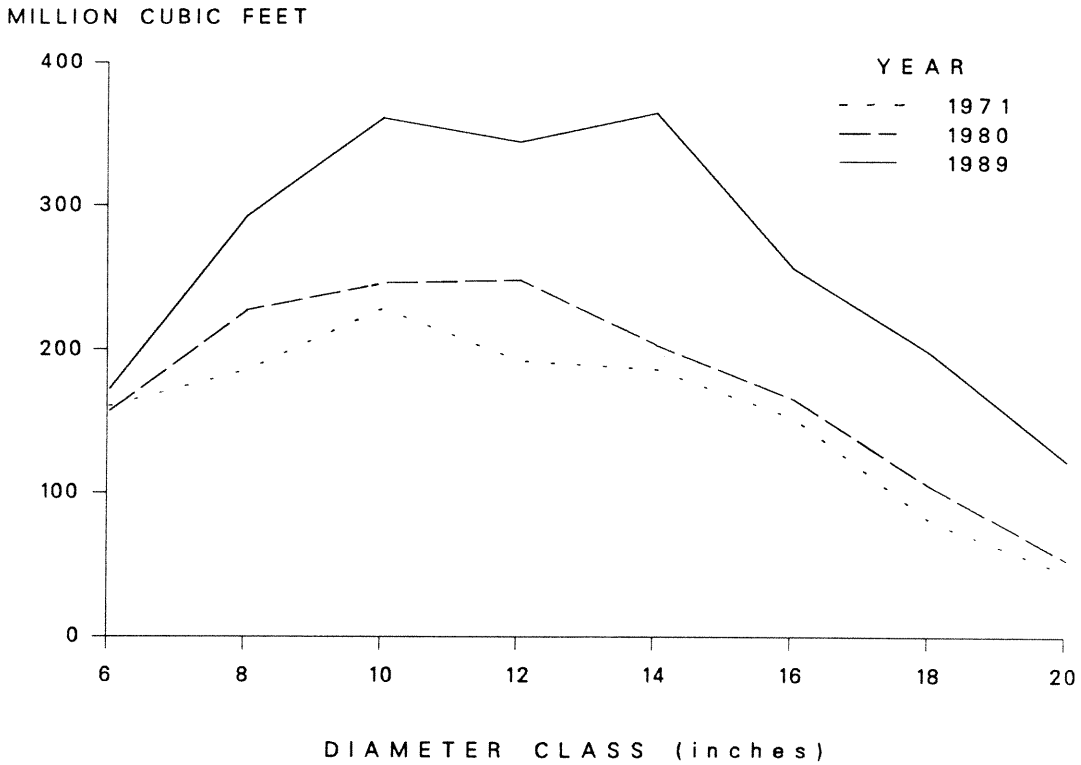

Figure 6.--Volume of hardwood growing stock on timberland by diameter class, Central Tennessee, 1971, 1980, and 1989.

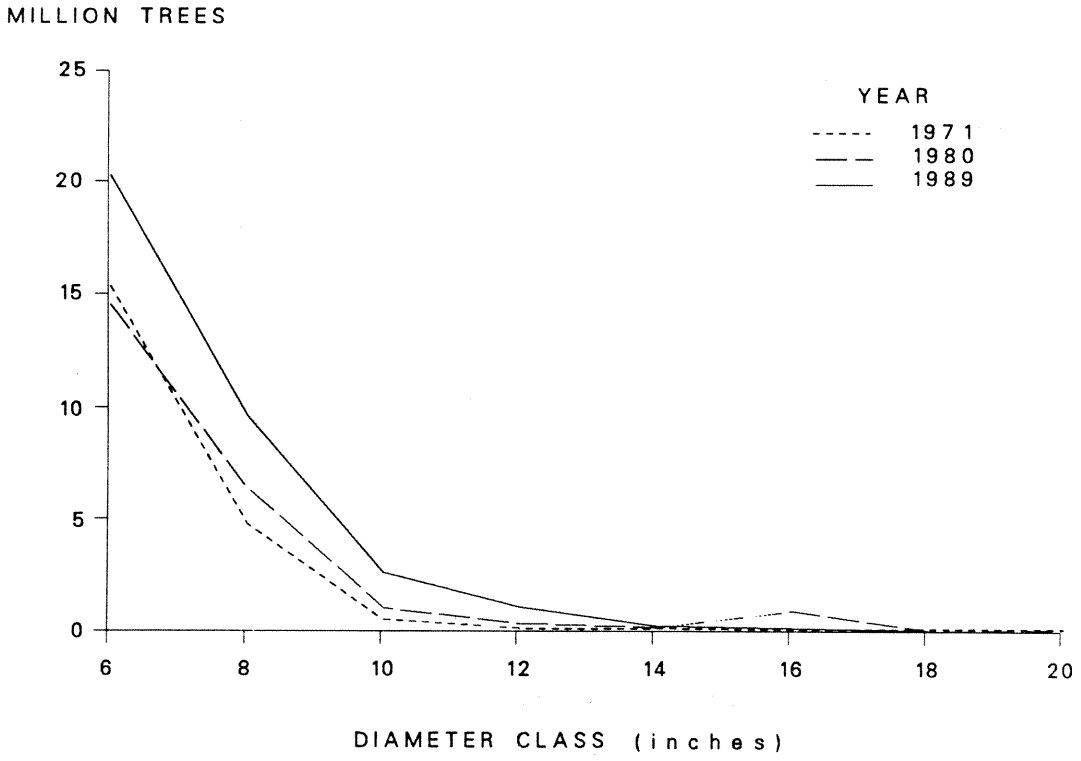

Figure 7.--Number of softwood growing-stock trees on timberland by diameter class, Central Tennessee, 1971, 1980, and 1989.

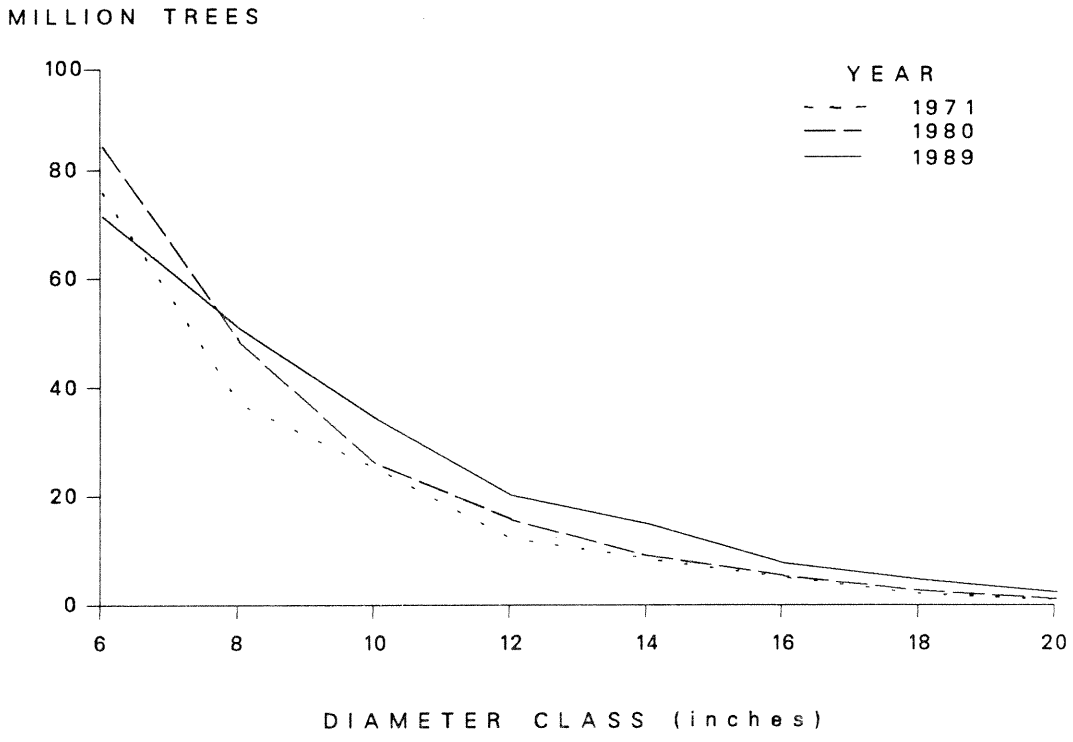

Figure 8.--Number of hardwood growing-stock trees on timberland by diameter class, Central Tennessee, 1971, 1980, and 1989.

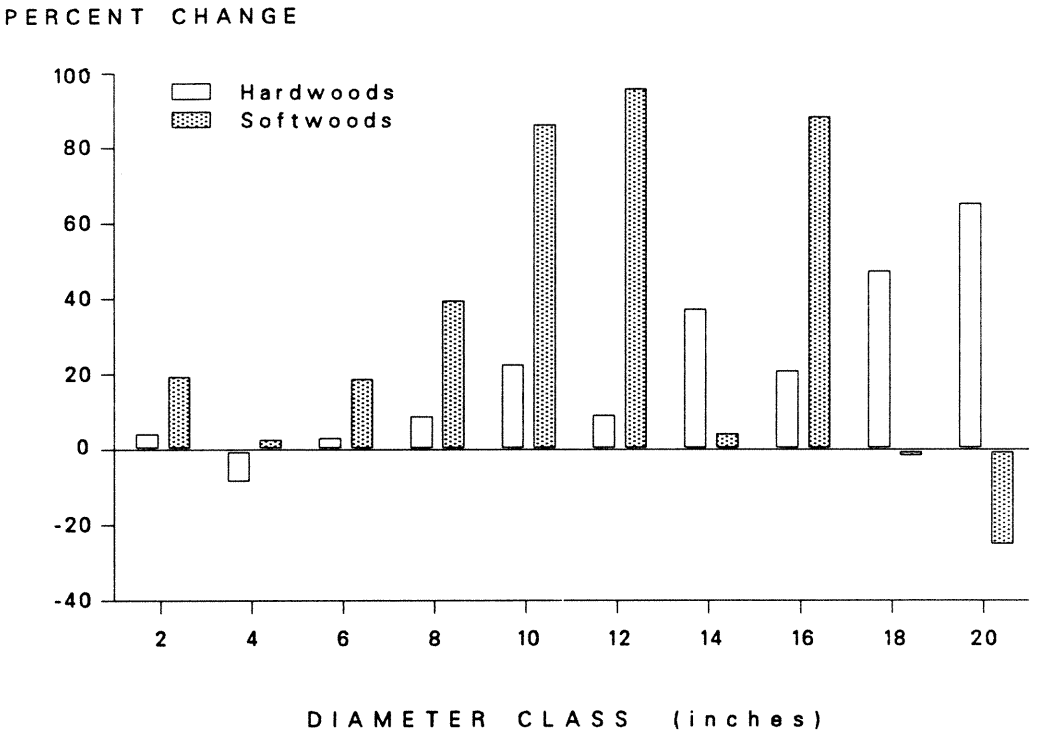

Figure 9.--Percent change in the number of live trees on timberland by species group and diameter class, Central Tennessee, 1980 and 1989.