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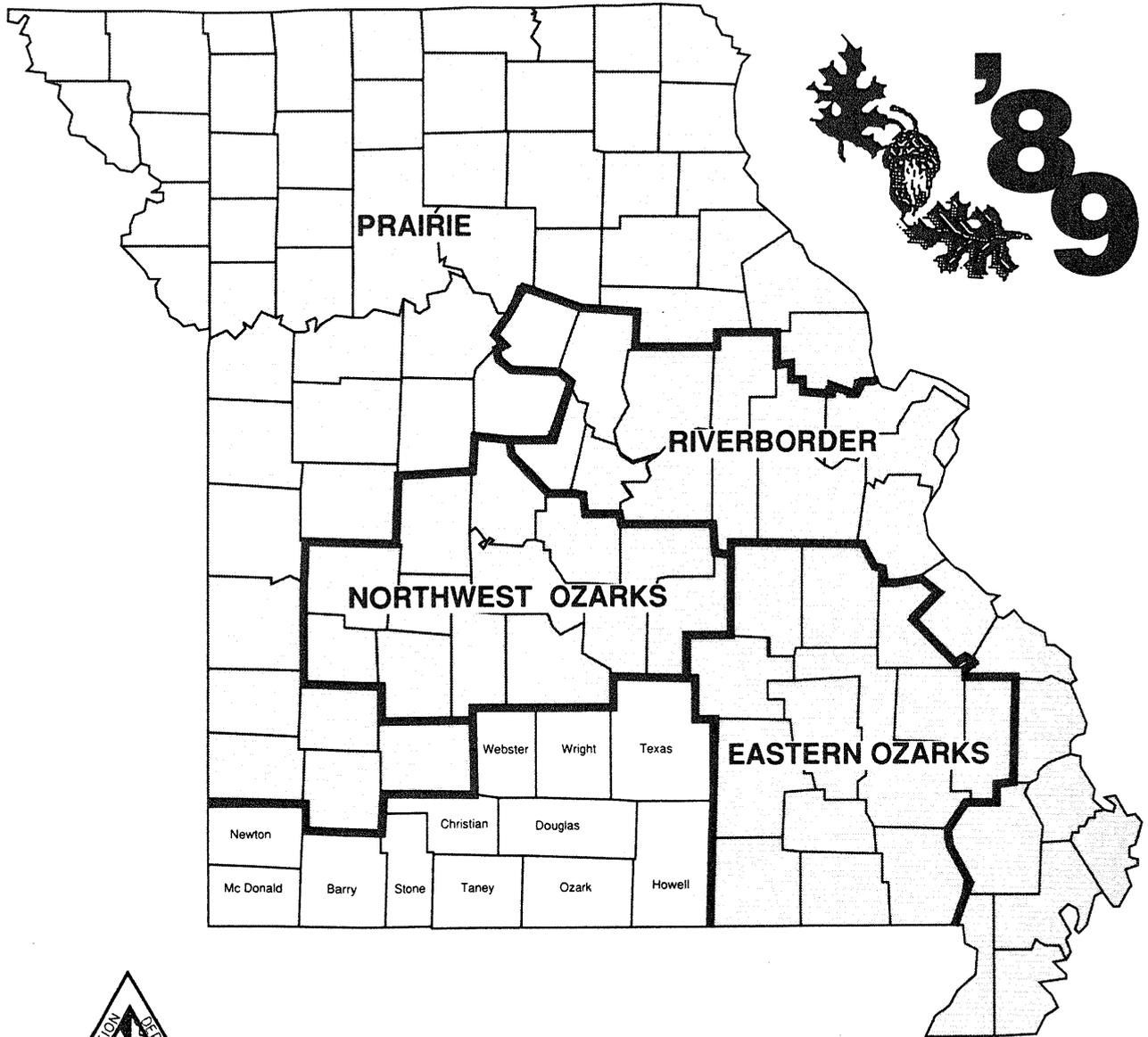
North Central  
Forest Experiment  
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Resource  
Bulletin NC-116



# Timber Resource of Missouri's **Southwest Ozarks**

Patrick D. Miles



**North Central Forest Experiment Station  
Forest Service—U.S. Department of Agriculture  
1992 Folwell Avenue  
St. Paul, Minnesota 55108  
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1990**

This report includes the most commonly used Forest Inventory and Analysis statistics. However, additional forest resource data can be provided to interested users. Persons requesting additional information that can be provided from the raw inventory data are expected to pay the retrieval costs. These costs range from less than \$100 for a relatively simple request to \$2,000 for a complex retrieval involving the services of a Forest Inventory and Analysis computer programmer. Requests will be filled so as to minimize the impact on the Forest Inventory and Analysis Work Unit.

Requests for unpublished information may be directed to:

Project Leader  
Forest Inventory and Analysis  
North Central Forest Experiment Station  
1992 Folwell Avenue  
St. Paul, Minnesota 55108  
Phone: (612) 649-5140

Area served: Illinois, Indiana, Iowa, Kansas, Michigan,  
Minnesota, Missouri, Nebraska, North Dakota,  
South Dakota, Wisconsin

Requests for unpublished information from the Missouri  
inventory may also be directed to:

State Forester  
Missouri Department of Conservation  
Forestry Division  
P.O. Box 180  
Jefferson City, Missouri 65102  
Phone: (314) 751-4115

## FOREWORD

Forest Inventory and Analysis (FIA) is a continuing endeavor as mandated by the Renewable Forest and Rangeland Resources Planning Act of 1974. Prior inventories were mandated by the McSweeney-McNary Forest Research Act of 1928. The objective of FIA is to periodically inventory the Nation's forest land to determine its extent, condition, and volume of timber, growth, and removals. Up-to-date resource information is essential to frame forest policies and programs. USDA Forest Service regional experiment stations are responsible for conducting these inventories and publishing summary reports for individual States. The North Central Forest Experiment Station is responsible for forest resource evaluation in Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, and Wisconsin.

Fieldwork for the Missouri Statewide forest inventory was begun in January 1987 and completed in June 1989. Reports on the three previous inventories of Missouri's timber resource are dated 1947, 1959, and 1972.

More accurate survey information was obtained during the 1989 survey than otherwise would have been feasible because of intensified field sampling. Such sampling was made possible by additional funding provided by the Missouri Department of Conservation. The Department also surveyed primary wood-using plants in the State. Data from this survey were used to help estimate the quantity of timber products harvested in the State. Missouri Department of Conservation personnel have also assisted in training field personnel, analyzing information obtained from the survey, and preparing this report.

Aerial photos used in the Missouri Forest Inventory were furnished by the USDA Agricultural Stabilization and Conservation Service and the Missouri Department of Natural Resources Geology and Land Survey.

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Patrick D. Miles

## HIGHLIGHTS

**NOTE:** Data from new forest inventories are often compared with data from earlier inventories to determine trends in forest resources. However, for the comparisons to be valid, the procedures used in the two inventories must be similar. As a result of our ongoing efforts to improve the efficiency and reliability of the inventory, several changes in procedures and definitions have occurred since 1972. Because some of these changes will make it inappropriate to directly compare the 1989 data with those published for 1972, data from the 1972 inventory will be reprocessed using the 1989 procedures and will be published in part in the State statistical report. Please refer to the Appendix section labeled "Comparing Missouri's fourth inventory with the third inventory" for more details.

## General

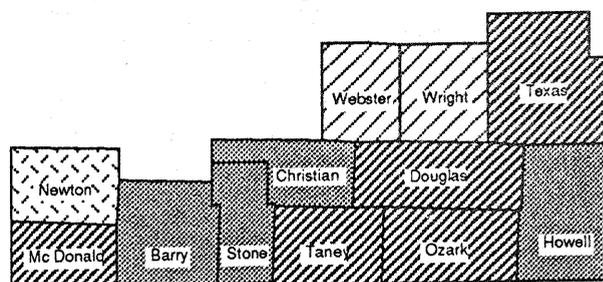
The Southwest Ozark Unit consists of 12 counties in the southwest corner of Missouri (see cover). It includes 5.5 million acres or 12 percent of the State's land area. The eastern counties have a rough, heavily forested terrain, typical of the Ozarks of southern Missouri. The hills give way to gently rolling prairie in the western counties. Glades—areas of shallow soil covered with grass and cedar and dotted with limestone outcrops—are prevalent in the White River Basin.

## Forest Area

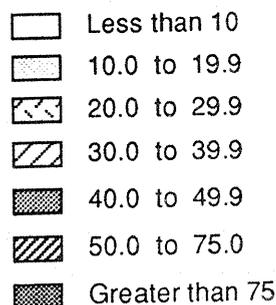
In 1989 48 percent (2.6 million acres) of the Unit was classified as forest land (see Definition of terms). Of this forest land 95 percent or 2.3 million acres was classified as timberland.

Reserved forest land totaled 9.3 thousand acres in 1972, all of which was in Taney County. By 1989 an additional 38.4 thousand acres of timberland had been reserved, 34 thousand of which were the result of newly designated National Forest wilderness areas. Increases occurred in Barry County (Piney Creek Wilderness Area), Ozark County (Devil's Backbone Wilderness Area), Stone County (Piney Creek), Taney County (Hercules-Glade Wilderness Area), and Texas County (Paddy Creek Wilderness Area).

Taney County (fig. 1) had the highest percentage of area in forest land (71 percent). Newton County had the smallest percentage (24 percent). Total forest area increased by 7 percent since the 1972 inventory. The largest increases occurred in Douglas County (19 percent) and Taney County (16 percent). Small declines occurred in Newton, Stone, and Wright Counties.



## Percent forest



Patrick D. Miles is an Operations Research Analyst with the North Central Forest Experiment Station, St. Paul, MN.

Figure 1.—Forest land as a percent of land area by county, Southwest Ozarks, 1989.

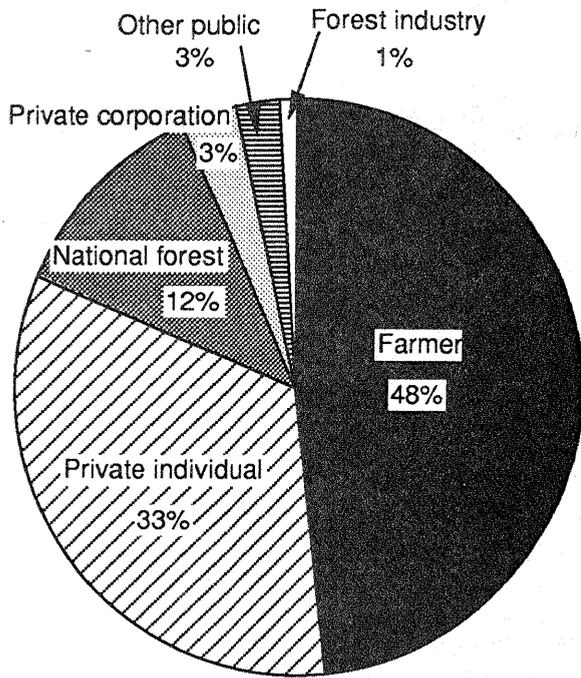


Figure 2.—Area of timberland by owner, Southwest Ozarks, 1989.

Farmers and miscellaneous private individuals own 81 percent of the timberland; the Mark Twain National Forest administers 11.7 percent (fig. 2).

The area of sawtimber stands increased by more than 19 percent from the previous inventory. There was an 8 percent decrease in poletimber area. Total acreage in sawtimber stands is 1.1 million acres (fig. 3).

### Volume

Growing-stock volume on timberland averaged 565 cubic feet per acre in 1989, an increase of nearly 40 percent from the adjusted 1972 volume per acre (see explanation of 1972 inventory volume adjustments in the survey procedures section).

Sawtimber volume on timberland averaged 1,505 board feet per acre in 1989, an increase of more than 45 percent from the adjusted 1972 volume per acre.

Hardwoods accounted for 86 percent of the growing-stock volume and 84 percent of the sawtimber volume (fig. 4).

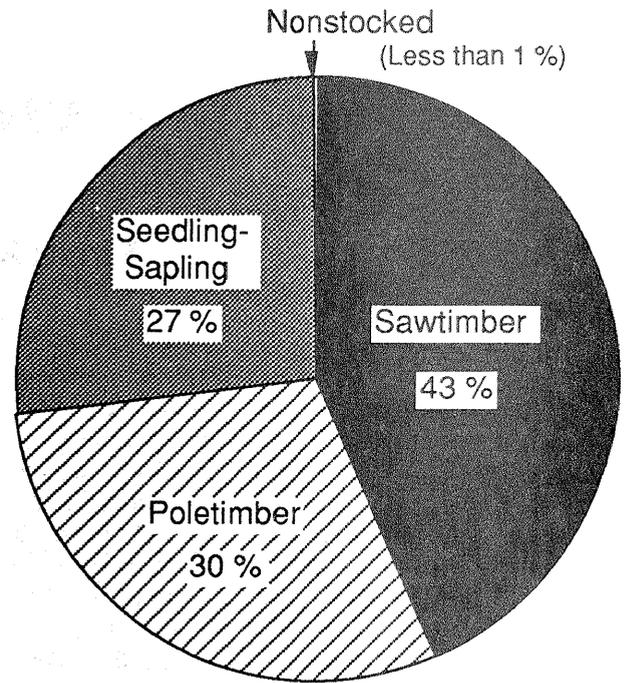


Figure 3.—Percent of timberland by stand-size class, Southwest Ozarks, 1989.

The oaks accounted for 73 percent (2.8 billion board feet) of the sawtimber volume, and shortleaf pine accounted for 14 percent (0.5 billion board feet) of sawtimber volume.

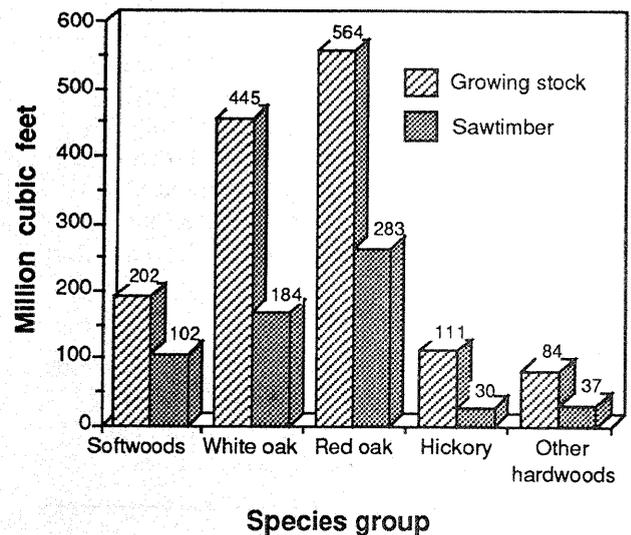


Figure 4.—Growing-stock and sawtimber volume by species group, Southwest Ozarks, 1989.

The volume in live cull trees is 903.8 million cubic feet; salvable dead tree volume is 6.7 million cubic feet.

Private owners hold 84 percent of growing-stock volume.

Although sycamore represents only 1.3 percent of sawtimber volume, it represents 22.2 percent of log grade 1 butt logs (fig. 5). Black walnut, which represents 1.4 percent of sawtimber volume, comprises 9.1 percent of log grade 1 butt logs.

### Stand Conditions

Net annual growth of growing-stock trees on timberland was 42.9 million cubic feet, 3.0 percent of inventory in 1988.

Net annual growth of growing-stock trees on timberland averaged 17.2 cubic feet per acre in 1989.

Annual mortality of growing stock amounted to 9.1 million cubic feet, 0.6 percent of inventory in 1988.

Net annual growth of sawtimber trees on timberland averaged 49.9 board feet per acre in 1989.

Annual mortality of sawtimber amounted to 19.9 million board feet, 0.5 percent of inventory in 1988.

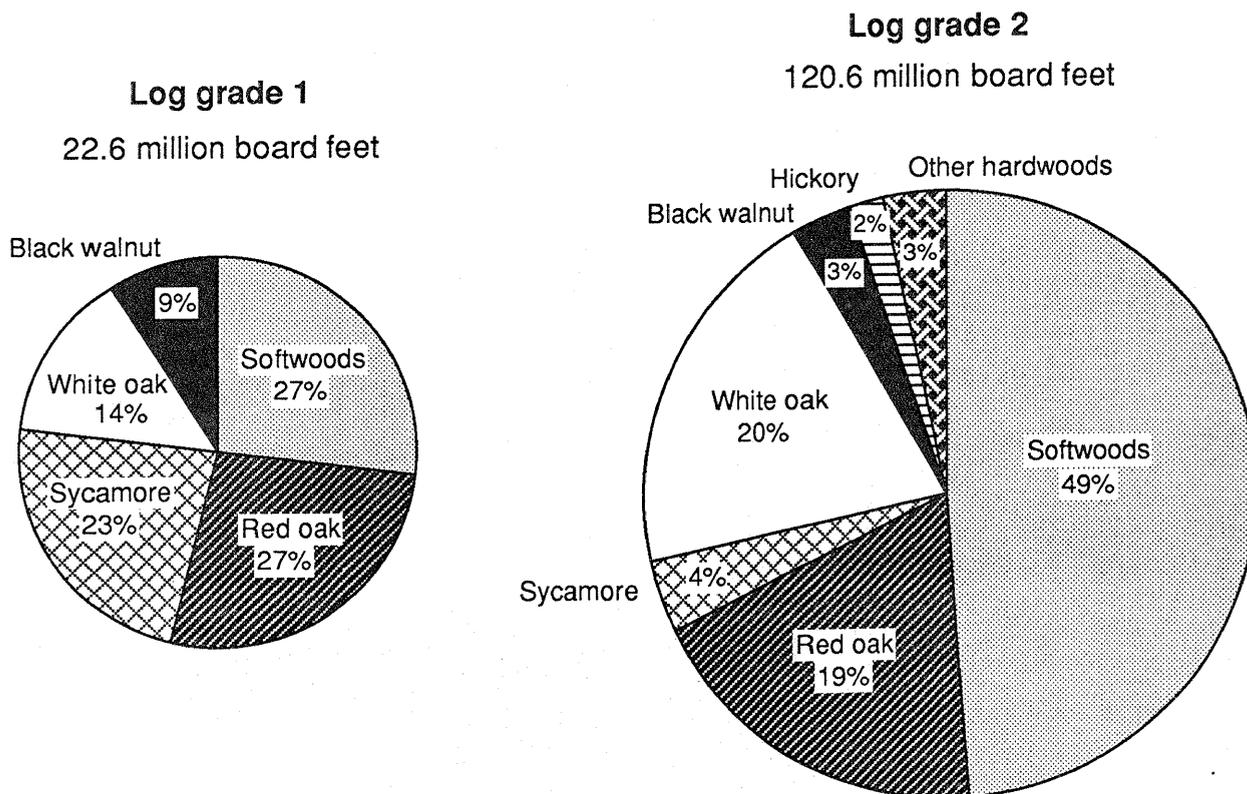


Figure 5.—Volume of sawtimber in trees with butt log grades 1 and 2, Southwest Ozarks, 1989.

### Timber Use

Timber removals from growing stock totaled 17.0 million cubic feet in 1989 (1.2 percent of inventory and 40 percent of growth).

Sawtimber removals totaled 49.9 million board feet in 1989 (1.3 percent of inventory and 41 percent of growth).

Average annual removals of white and red oak sawtimber were over 40 percent of 1988 growth; hickory removals were nearly two-thirds and softwoods were only one-third of growth (fig. 6).

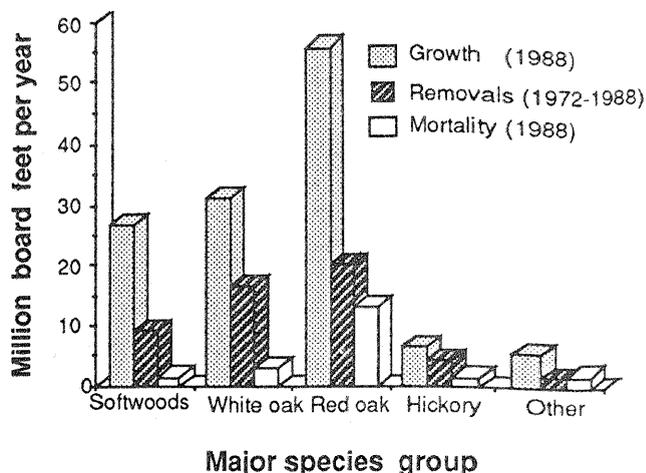


Figure 6.—Annual sawtimber growth, removals, and mortality by species group, Southwest Ozarks, 1989.

### APPENDIX

#### ACCURACY OF THE SURVEY

Forest Inventory and Analysis information is based on a sampling procedure designed to provide reliable statistics at the State and Survey Unit levels. Consequently, the reported figures are estimates only. A measure of reliability of these figures is given by sampling errors. These sampling errors mean that the chances are two out of three that if a 100-percent inventory had been taken, using the same methods, the results would have been within the limits indicated.

For example, the estimated growing-stock volume in the Unit in 1989, 1,411.9 million cubic feet, has a sampling error of ±2.6 percent (±36.7 million cubic feet). The growing-stock volume from a 100-percent inventory would be expected to fall between 1,375.2 and 1,448.6 million cubic feet (1,411.9 ± 36.7), there being a one in three chance that this is not the case.

The following tabulation shows the sampling errors for the 1989 Southwest Ozarks Forest Inventory:

Item	Unit totals	Sampling error
Growing stock	(Million cubic feet)	(Percent)
Volume (1989)	1,411.9	2.6
Growth (1988)	42.9	3.4
Average annual removals (1972-1988)	17.0	12.8
Sawtimber	(Million board feet)	
Volume (1989)	3,760.6	3.9
Growth (1988)	124.7	5.7
Average annual removals (1972-1988)	49.9	13.9
Timberland	(Thousand acres)	
Area (1989)	2,498.2	1.2

As survey data are broken down into sections smaller than Survey Unit totals, the sampling error increases. For example, the sampling error for timberland area in a particular county is higher than that for total timberland area in the Unit. For data smaller than Unit totals, use the following formula to compute error estimates:

$$E = \frac{(SE) \sqrt{(\text{Unit total area or volume})}}{\sqrt{(\text{Volume or area smaller than Unit total})}}$$

where:

E = sampling error in percent  
SE = Unit total error for area or volume

For example, to compute the error on the area of timberland in the black-scarlet oak type in the Unit, proceed as follows:

The total area of black-scarlet oak type in the Unit from table 3 = 995,300 acres

The total area of all timberland in the Unit from table 3 = 2,498,200

The Unit total error for timberland area from the above tabulation = 1.2 percent

Using the above formula:

$$\begin{aligned} \text{Error} &= \frac{(1.2) \sqrt{2,498,200}}{\sqrt{995,300}} \\ &= \pm 1.90 \text{ percent} \end{aligned}$$

## SURVEY PROCEDURES

The 1989 Missouri survey used a growth model-enhanced two-phase sample design. This sampling scheme and associated estimators are similar to sampling with partial replacement (SPR) in that a set of randomly located plots is available for remeasurement and a random set of new plots is established and measured. A significant feature of the new Missouri design is stratification for disturbance on the old sample and use of a growth model to improve regression estimates made on old undisturbed forest plots (fig. 7). The growth model used in the Missouri survey design was the Central States Stand and Tree Evaluation and Modeling System (STEMS).<sup>1</sup>

<sup>1</sup>Shifley, S.F. 1987. *A generalized system of models forecasting central states tree growth*. Res. Pap. NC-279. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 10 p.

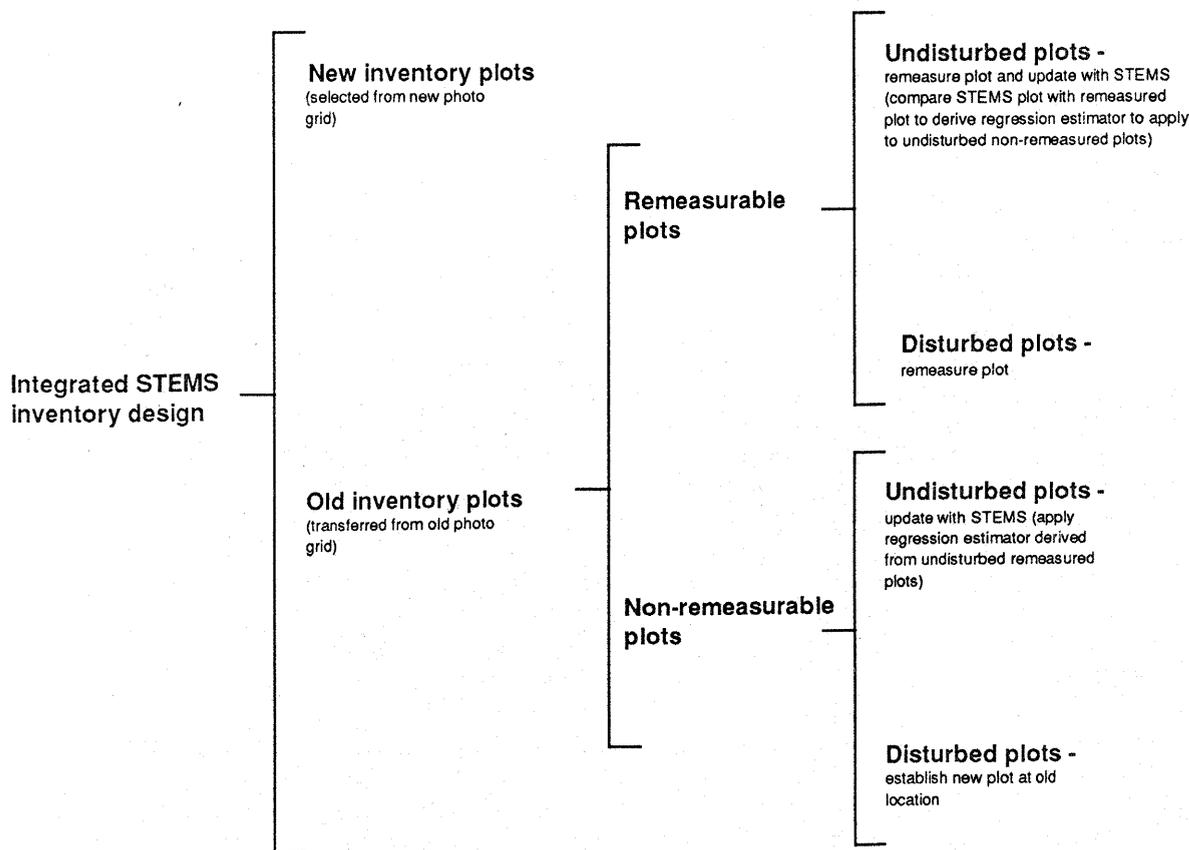


Figure 7.—Overview of the Missouri sample design.

The major steps in the new survey design were as follows:

### 1. Aerial photography (Phase 1)

In this phase two sets of random points were located on current aerial photography: a set of new photo plots and a set of relocated old photo plots (ground plot locations from the previous inventory). Photos were 1:20,000 and 1:40,000 scale black and white panchromatic prints provided by the ASCS and the Missouri Department of Natural Resources Geology and Land Survey. The year of photography for each county in the Unit is shown below.

County	Date	County	Date
Barry	1979	Ozark	1981
Christian	1982	Stone	1981
Douglas	1981	Taney	1981
Howell	1981	Texas	1981
Mc Donald	1982	Webster	1979
Newton	1980	Wright	1981

The locations of the plots used in the 1972 inventory were transferred to these new photographs. The photographs were then assembled into township mosaics, and a systematic grid of 121 1-acre photo plots (each plot representing approximately 190.4 acres) was overlaid on each township mosaic. Each of these plots (both the new systematic grid points and the old sample plots) was examined by aerial photogrammetrists and classified stereoscopically by land use. If trees were present, forest type and stand size-density class were recorded. Then all the old sample locations and a sample of the new photo plots were sent to the field for the field crew to verify the photo classification and to take further measurements. In all, 29,525 points (28,038 new and 1,489 old) were examined stereoscopically, as shown in the following tabulation.

Photo land class	Photo plots
Timberland	14,458
Reserved timberland	263
Questionable	720
Nonforest with trees	1,563
Nonforest without trees	12,193
Census water	314
All classes	29,525

### 2. Plot measurements (Phase 2)

On plots classified as timberland, wooded pasture, or windbreak (at least 120 feet wide), a ground plot was established, remeasured, or modelled. A ground plot consists of a 10-point cluster covering approximately 1 acre. At each point, trees 5.0 inches or more in d.b.h. were sampled on a 37.5 Basal Area Factor (BAF) variable-radius plot, and trees less than 5.0 inches d.b.h. were sampled on a 1/300-acre fixed-radius plot.

From the new photo plots, a random sample of ground plots was established and measures of land use, volume, mortality and cutting were recorded. These locations were monumented for future remeasurement. The procedures for the old inventory photo plots (old plot locations) was somewhat different. Old plots were classed as remeasurable (monumented) or nonremeasurable (not monumented and thus difficult to relocate in the field). Within both of these groups, old plots can additionally be identified as undisturbed or disturbed. Ground plots corresponding to remeasurable old inventory photo plots that were classified as undisturbed forest land were remeasured to obtain current land use, volume, growth and removals information.

All forest undisturbed remeasurable plots were projected to the current time using STEMS, which yields projected estimates of current volume and growth. The comparison of the projected and observed values for these plots provided local calibration data to adjust the projected values of the undisturbed nonremeasurable plots. The adjustment procedure is described by Smith<sup>2</sup> in a separate publication. All disturbed remeasurable plots were remeasured on the ground to assess changes since the last inventory. Disturbance as used here refers to any change on a plot that can be detected on aerial photos and that the STEMS growth processor cannot predict, such as catastrophic mortality, cutting, seedling stands, and land use change.

<sup>2</sup>Smith, W. Brad. 1983. *Adjusting the STEMS regional growth models to improve local predictions. Res. Note NC-297. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 5 p.*

Although not monumented during the 1972 inventory, nonmeasurable forest points play a crucial role in the new survey design. These points were carefully examined, comparing past and current aerial photography to determine which plots were undisturbed and which had conditions that could be simulated by STEMS. For those plots that could be updated, past and current photography was examined to determine that only normal growth and mortality had occurred. STEMS was then used to "grow" the old plot and tree data to produce an estimate of current data. Thus, these points became ground plots even though the information was obtained without actually visiting the plot. The plot record for each updated plot was sent to the field for verification of current ownership information. For points classified as disturbed, a new ground plot was established as close to the old location as possible. This allows information about land use trends to be recorded even though the old plot cannot be exactly located for remeasurement.

The estimation procedure for computing statistics from this sampling design was more complicated than the simple two-phase estimation procedure used in the past. In fact, this procedure yielded two independent samples, one coming from the new photo points and the other coming from the old photo points that are re-measured or updated. The following tabulation summarizes the distribution of ground plots for the new inventory design:

Ground land use class	Old plots remeasured	Old plots updated	Old plots replaced	New plots	Total plots
Timberland	269	125	259	263	916
Reserved timberland	8	1	1	43	53
Woodland	12	0	8	5	25
Reserved woodland	0	0	0	0	0
Nonforest with trees	30	21	54	51	156
Nonforest without trees	190	445	52	238	932
Census water	4	6	8	9	26
Total	515	600	374	609	2,108

### 3. Area estimates

Area estimates were made using two-phase estimation methods. In this type of estimation, a preliminary estimate of area by land use is made from the aerial photographs (phase 1) and corrected by the plot measurements (phase 2). A complete description of this estimation method is presented by Loetsch and Haller (1964)<sup>3</sup>.

### 4. Volume estimates

Estimates of volume per acre are made from the trees measured or modelled on the 10-point plots. Estimates of volume per acre were multiplied by the area estimates to obtain estimates of total volume. Net cubic foot volumes are based on equations developed by Hahn and Hansen (In prep.)<sup>4</sup> for use in the Central States.

<sup>3</sup>Loetsch, F.; Haller, K. E. 1964. *Forest inventory, volume I, statistics of forest inventory and information from aerial photographs*. BLV Verlagsgesellschaft Munch Basle Vienna. 436 p.

<sup>4</sup>Hahn, Jerold T.; Hansen, Mark H. (In prep.). *Tree volume equations for the Central States*. Res. Pap. NC-1. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station.

The Forest Service reports all board foot volume in International 1/4-inch rule. Conversion factors for local use rules are often useful. Board foot Doyle conversion factors were derived from full tree measurements taken throughout the Central States (Illinois, Indiana, Iowa, and Missouri), and an equation was developed by Wiant and Castenaeda (1977)<sup>5</sup>. Factors (multipliers) to convert board foot international volumes in this report to Doyle board feet by diameter class and softwoods and hardwoods are shown in the following tabulation:

D.B.H. (inches)	Doyle rule conversion factor	
	Softwoods	Hardwoods
9.0-10.9	0.3455	—
11.0-12.9	0.4780	0.4172
13.0-14.9	0.5992	0.5118
15.0-16.9	0.6908	0.5882
17.0-18.9	0.7685	0.6569
19.0-20.9	0.8573	0.7180
21.0-22.9	0.8645	0.7829
23.0-24.9	0.9276	0.8324
25.0-26.9	0.9493	0.8736
27.0-28.9	0.9710	0.9473
29.0+	1.1065	1.1349

#### 5. Growth and mortality estimates

On remeasurement plots, estimates of growth and mortality per acre come from the remeasured diameters of trees and from observation of trees that died between inventories. Growth is reported for 1988, the last year before the inventory, and is based on an assumption of constant basal area growth over the remeasurement period. Mortality is reported for 1988 also, and is based on an assumption of constant volume mortality over the remeasurement period. On new plots, where trees were not remeasured, estimates of growth and mortality were obtained by using STEMS to project the growth and mortality of trees for 1 year. Growth and mortality estimates for old undisturbed plots that were updated were derived in the same manner as remeasured plots. The STEMS growth model was

<sup>5</sup>Wiant, Harry V., Jr.; Castenaeda, Froylan. 1977. *Mesavage and Girard's volume tables formulated*. BLM4. Denver, CO: U.S. Department of Interior, Bureau of Land Management, Denver Service Center: 1-4.

adjusted by Survey Unit to meet local conditions. As with volume, total growth and mortality estimates were obtained by multiplying the per acre estimates by area estimates.

#### 6. Average annual removals estimates

Average annual growing-stock and sawtimber removals (1972 to 1988) were estimated from only the remeasurement plots. These estimates were obtained from trees measured in the last survey and cut or otherwise removed from the timberland base. New plots were not used to estimate removals. Because remeasurement plots make up about one-half of the total ground plots, average annual removals estimates have greater sampling errors than volume and growth estimates.

#### COMPARING MISSOURI'S FOURTH INVENTORY WITH THE THIRD INVENTORY

The following paragraphs highlight some of the procedural changes since the last inventory to assist the reader in analyzing data from this report:

New volume equations were developed for the Central States, and these equations were used to compute the 1989 volumes and also to recompute the 1972 volume for growth calculations. Although the adjustment differs by Survey Unit, the recomputed 1972 growing-stock and board foot volumes will generally be greater than those shown in the 1972 report.

Mortality figures published in the 1972 inventory report were based on field estimates from a limited number of remeasurement plots. Information gathered on a larger number of remeasurement plots during the current inventory was used to adjust the 1972 mortality figures. This adjustment will also affect the estimate of net growth for the 1972 inventory.

Past surveys used only growing-stock trees to determine stand-size class. Current survey procedures require that stand-size class be determined on the basis of all live trees. Therefore, direct comparisons of current inventory data to old inventory data by stand-size class may be misleading.

The basic building block for estimating forest area and timber volume has been changed from the Survey Unit to the county. In the past, the statistics were developed at the Unit level and prorated back to the county on the basis of photo-interpretation points. Direct development of county-level data helps users interested in more precise local data, but can make the outcome of comparisons with past estimates uncertain.

### LOG GRADE

In Missouri the butt log of every sawtimber sample tree was graded for quality on approximately one-third of the sample plots. The volume yield by log grade for species in this sample was used to distribute the volume of trees in the ungraded sample into log-grade classes by species group.

Logs were graded on the basis of external characteristics as indicators of quality. Hardwood species were graded according to "A guide to hardwood log grading" (1973)<sup>6</sup>. The best 12-foot section of the lowest 16-foot hardwood log, or the best 12-foot upper section if the butt log did not meet minimum log-grade standards, was graded as follows:

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<sup>6</sup>Rast, Everette D.; Sonderman, David L.; Gammon, Glenn L. 1973. *A guide to hardwood log grading*. Gen. Tech. Rep. NE-1. Upper Darby, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 31 p.

**Forest Service standard grades for hardwood factory saw logs**

Grading factors	Specifications								
	Log grade 1			Log grade 2				Log grade 3	
	Butts only	Butts & uppers		Butts & uppers				Butts & uppers	
Position in tree									
Scaling diameter, inches	13-15 <sup>1</sup>	16-19	20+	11+ <sup>2</sup>	12+				8+
Length without trim, feet		10+		10+	8-9	10-11	12+		8+
Required clear cuttings <sup>3</sup> of each of three best faces <sup>4</sup>	Min. length, feet	7	5	3	3	3	3	3	2
	Max. number	2	2	2	2	2	2	3	No limit
	Min. proportion of log length required in clear cutting	5/6	5/6	5/6	2/3	3/4	2/3	2/3	1/2
Maximum sweep & crook allowance	For logs with less than one-fourth of end in sound defects		15 percent				30 percent		50 percent
	For logs with more than one-fourth of end in sound defects		10 percent				20 percent		35 percent
Maximum scaling deduction		40 percent <sup>5</sup>				50 percent <sup>6</sup>		50 percent	

<sup>1</sup>Ash and basswood butts can be 12 inches if they otherwise meet requirements for small #1's.

<sup>2</sup>Ten-inch logs of all species can be #2 if they otherwise meet requirements for small #1's.

<sup>3</sup>A clear cutting is a portion of a face, extending the width of the face, that is free of defects.

<sup>4</sup>A face is one-fourth of the surface of the log as divided lengthwise.

<sup>5</sup>Otherwise #1 logs with 41-60-percent deductions can be #2.

<sup>6</sup>Otherwise #2 logs with 51-60-percent deductions can be #3.

**Forest Service standard specifications for hardwood construction logs (tie and timber logs)<sup>1</sup>**

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Position in tree	Butts and uppers
Min. diameter, small end	8 inches +
Min. length without trim	8 feet
Clear cuttings	No requirements
Sweep allowance	One-fourth of the diameter at the small end for each 8 feet of length.

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Sound surface defects:

Single knots	Any number, if no one knot has an average diameter above the callus in excess of one-third of the log diameter at point of occurrence.
Whorled knots	Any number, if the sum of knot diameters above the callus does not exceed one-third of the log diameter at point of occurrence.
Holes	Any number, provided none has a diameter over one-third of the log diameter at point of occurrence and none extends more than 3 inches into included timber <sup>2</sup> .

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Unsound surface defects :

Same requirements as for sound defects if they extend into included timber. No limit if they do not.

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End defects:

Sound	No requirements.
Unsound	None allowed; log must be sound internally, but will admit one shake not to exceed one-fourth the scaling diameter and will admit one longitudinal split not extending more than 5 inches into included timber.

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<sup>1</sup>These specifications are minimum for the class. If, from a group of logs, factory logs are selected first, thus leaving only nonfactory logs from which to select construction logs, then the quality range of the construction logs so selected is limited, and the class may be considered a grade. If selection for construction logs is given first priority, it may be necessary to subdivide the class into grades.

<sup>2</sup>Included timber is always square, and dimension is judged from small end.

### Log grades for southern pine logs

*Grade 1:* logs with three or four clear faces<sup>1</sup> and 16 inches minimum d.i.b.

*Grade 2:* logs with one or two clear faces and 12 inches minimum d.i.b.

*Grade 3:* logs with no clear faces and 6 inches minimum d.i.b.

After the tentative log grade is established from above, the log will be degraded one grade for each of the following, except that no log can be degraded below grade 3. Net scale after deduction for defect must be at least 50 percent of the gross contents of the log.

1. *Sweep.* Degrade any tentative 1 or 2 log one grade if sweep amounts to 3 or more inches and equals or exceeds one-third of the diameter inside bark at small end.
2. *Heart rot.* Degrade any tentative 1 or 2 log one grade if conk, massed hyphae, or other evidence of advanced heart rot is found anywhere in it.

<sup>1</sup>A face is one-fourth of the circumference in width extending full length of the log. Clear faces are those free of: knots measuring more than 1 inch in diameter, overgrown knots of any size, and holes more than one inch in diameter. Faces may be rotated to obtain the maximum number of clear ones.

### Log grades for eastern redcedar (Missouri special use)

Position in tree	Butts and uppers
D.B.H.	6 inches +
Min. diameter(ob), small end	5 inches +
Length without trim	7 feet
Clear cuttings	No requirements
Sweep allowance	Reasonably straight
Sound surface defects permitted:	
Single knot	Any number less than one-half of the log diameter at point of occurrence.
Whorled knots	Any number provided the sum of the diameter of knots 2 inches or larger in a 1-foot section does not exceed the diameter at that point.
Unsound defects permitted:	
	Any number, provided defect is not greater than one-half of the volume at any one point of occurrence.

**METRIC EQUIVALENTS OF UNITS USED IN THIS REPORT**

- 1 acre = 4,046.86 square meters or 0.405 hectare.
- 1,000 acres = 405 hectares.
- 1 cubic foot = 0.0283 cubic meter.
- 1 foot = 30.48 centimeters or 0.3048 meter.
- 1 inch = 25.4 millimeters, 2.54 centimeters, or 0.0254 meter.
- 1 pound = 0.454 kilograms.
- 1 ton = 0.907 metric tons.

**TREE SPECIES GROUPS IN MISSOURI<sup>7</sup>**

**SOFTWOODS**

- Shortleaf pine .....*Pinus echinata*
- Virginia pine .....*Pinus virginiana*
- Baldcypress .....*Taxodium distichum*
- Eastern redcedar .....*Juniperus virginiana*
- Other softwoods

- Scotch pine .....*Pinus sylvestris*

**HARDWOODS**

Select white oak<sup>8</sup>

- White oak .....*Quercus alba*
- Swamp white oak .....*Quercus bicolor*
- Bur oak .....*Quercus macrocarpa*
- Swamp chestnut oak .....*Quercus michauxii*
- Chinkapin oak .....*Quercus muehlenbergii*

Other white oak<sup>8</sup>

- Overcup oak .....*Quercus lyrata*
- Chestnut oak .....*Quercus prinus*
- Post oak .....*Quercus stellata*

Select red oak<sup>8</sup>

- Cherrybark oak .....*Quercus falcata*  
var. *pagodifolia*
- Northern red oak .....*Quercus rubra*
- Shumard oak .....*Quercus shumardii*  
var. *shumardii*

Other red oak<sup>8</sup>

- Scarlet oak .....*Quercus coccinea*
- Northern pin oak .....*Quercus ellipsoidalis*
- Southern red oak .....*Quercus falcata*
- Shingle oak .....*Quercus imbricaria*
- Black oak .....*Quercus velutina*
- Blackjack oak .....*Quercus marilandica*
- Pin oak .....*Quercus palustris*
- Willow oak .....*Quercus phellos*

<sup>7</sup> The common and scientific names are based on: Little, Elbert L. 1979. Check list of native and naturalized trees of the United States. *Agric. Handb.* 541. Washington, DC: U.S. Department of Agriculture, Forest Service. 375 p.

Select hickory<sup>8</sup>

- Pecan .....*Carya illinoensis*
- Shellbark hickory .....*Carya laciniosa*
- Shagbark hickory .....*Carya ovata*
- Mockernut hickory .....*Carya tomentosa*

Other hickory<sup>8</sup>

- Bitternut hickory .....*Carya cordiformis*
- Pignut hickory .....*Carya glabra*
- Black hickory .....*Carya texana*

- River birch<sup>8</sup> .....*Betula nigra*

Hard maple<sup>8</sup>

- Sugar maple .....*Acer saccharum*
- Soft maple<sup>9</sup>

- Red maple .....*Acer rubrum*

- Silver maple .....*Acer saccharinum*

Ash<sup>8</sup>

- Blue ash .....*Fraxinus quadrangulata*
- White ash .....*Fraxinus americana*

- Green ash .....*Fraxinus pennsylvanica*

- Cottonwood<sup>9</sup> .....*Populus deltoides*

- Basswood<sup>9</sup> .....*Tilia americana*

- Beech<sup>8</sup> .....*Fagus grandifolia*

- Black walnut<sup>8</sup> .....*Juglans nigra*

- Black cherry<sup>9</sup> .....*Prunus serotina*

- Butternut<sup>9</sup> .....*Juglans cinerea*

Elm

- Winged elm<sup>9</sup> .....*Ulmus alata*

- American elm<sup>9</sup> .....*Ulmus americana*

- Slippery elm<sup>9</sup> .....*Ulmus rubra*

- Rock elm<sup>8</sup> .....*Ulmus thomasii*

- Hackberry<sup>9</sup> .....*Celtis occidentalis*

- Sycamore<sup>9</sup> .....*Platanus occidentalis*

- Yellow-poplar<sup>9</sup> .....*Liriodendron tulipifera*

- Black willow<sup>9</sup> .....*Salix nigra*

- Sweetgum<sup>9</sup> .....*Liquidambar styraciflua*

Tupelo<sup>9</sup>

- Black tupelo .....*Nyssa sylvatica*  
var. *sylvatica*

- Swamp tupelo .....*Nyssa sylvatica*  
var. *biflora*

- Persimmon<sup>8</sup> .....*Diospyros virginiana*

- Sassafras<sup>9</sup> .....*Sassafras albidum*

Other hardwoods

- Ohio buckeye<sup>9</sup> .....*Aesculus glabra*

- Boxelder<sup>9</sup> .....*Acer negundo*

- Kentucky coffeetree<sup>8</sup> .....*Gymnocladus dioica*

- Black locust<sup>8</sup> .....*Robinia pseudoacacia*

<sup>8</sup> This species or species group is considered a hard hardwood, with an average specific gravity greater than 0.50.

<sup>9</sup> This species or species group is considered a soft hardwood, with an average specific gravity of 0.50 or less.

White mulberry <sup>9</sup> .....	<i>Morus alba</i>
Red mulberry <sup>9</sup> .....	<i>Morus rubra</i>
Honeylocust <sup>8</sup> .....	<i>Gleditsia triacanthos</i>
Northern catalpa <sup>8</sup> .....	<i>Catalpa speciosa</i>
Noncommercial species	
Osage-orange .....	<i>Maclura pomifera</i>
Eastern hophornbeam .....	<i>Ostrya virginiana</i>
Apple .....	<i>Malus</i> spp.
American hornbeam .....	<i>Carpinus caroliniana</i>
Wild plum .....	<i>Prunus</i> spp.
Eastern redbud .....	<i>Cercis canadensis</i>
Pawpaw .....	<i>Asimina triloba</i>
Hawthorn .....	<i>Crataegus</i> spp.

## DEFINITION OF TERMS

**Average annual removals from growing stock.**—The average net growing-stock volume in growing-stock trees removed annually for forest products (including roundwood products and logging residues) and for other uses (see Other removals). Average annual removals of growing stock are reported for a period of several years (1972 to 1988 in this report) and are based on information obtained from remeasurement plots (see Survey Procedures in Appendix).

**Average annual removals from sawtimber.**—The average net board foot sawtimber volume of live sawtimber trees removed annually for forest products (including roundwood products and other uses [see Other removals]). Average annual removals of sawtimber are reported for a period of several years (1972 to 1988 in this report) and are based on information obtained from remeasurement plots (see Survey Procedures in Appendix).

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

**Commercial species.**—Tree species presently or prospectively suitable for industrial wood products. (Note: Excludes species of typically small size, poor form, or inferior quality such as hophornbeam, osage-orange, and redbud.)

**Commercial forest land.**—(See Timberland).

**Cord.**—One standard cord is 128 cubic feet of stacked wood, including bark and air space. Cubic feet can be converted to standard cords by dividing by 79.

**County and municipal land.**—Land owned by counties and local public agencies or municipalities, or land leased to these governmental units for 50 years or more.

**Cropland.**—Land under cultivation within the past 24 months; including cropland harvested, crop failures, cultivated summer fallow, idle cropland used only for pasture, orchards, and land in soil improvement crops, but excluding land cultivated in developing improved pasture.

**Cull.**—Portions of a tree that are unusable for industrial wood products because of rot, missing or dead material, or other defect.

**Diameter class.**—A classification of trees based on diameter outside bark, measured at breast height (d.b.h.). Two-inch diameter classes are commonly used in Forest Inventory and Analysis, with the even inch the approximate midpoint for a class. For example, the 6-inch class includes trees 5.0 through 6.9 inches d.b.h.

**Diameter at breast height (d.b.h.).**—The outside bark diameter at 4.5 feet (1.37 m) above the forest floor on the uphill side of the tree. For determining breast height, the forest floor includes the duff layer that may be present, but does not include unincorporated woody debris that may rise above the ground line.

**Farm.**—Any place from which \$1,000 or more of agricultural products were produced and sold during the year.

**Farmer-owned land.**—Land owned by farm operators whether part of the farmstead or not. (Note: Excludes land leased by farm operators from nonfarm owners, such as railroad companies and States.)

**Forest land.**—Land at least 16.7 percent stocked by forest trees of any size, or formerly having

had such tree cover, and not currently developed for nonforest use. (Note: Stocking is measured by comparing specified standards with basal area and/or number of trees, age or size, and spacing.) The minimum area for classification of forest land is 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width of at least 120 feet to qualify as forest land. Unimproved roads and trails, streams, or other bodies of water or clearings in forest areas shall be classed as forest if less than 120 feet wide. (See Tree, Land, Timberland, Reserved forest land, Other forest land, Stocking, and Water.)

**Forest industry land.**—Land owned by companies or individuals that operate a primary wood-using plant.

**Forest type.**—A classification of forest land based on the species forming a plurality of live tree stocking. Major forest types in the State are:

*Shortleaf pine.*—Forests in which shortleaf pine comprises a plurality of the stocking. (Common associates include oak, hickory, and gum.)

*Eastern redcedar.*—Forests in which eastern redcedar comprises a plurality of the stocking. (Common associates include oak and hickory.)

*Eastern redcedar-hardwood.*—Forests in which hardwoods (usually upland oaks), comprise a plurality of the stocking but where eastern redcedar comprises 25 to 50 percent of the stocking. (Common associates include gum, hickory, and yellow-poplar.)

*Shortleaf pine-oak.*—Forests in which hardwoods (usually white, scarlet, chestnut, northern red, or black oaks), singly or in combination, comprise a plurality of the stocking but where shortleaf pine comprises 25 to 50 percent of the stocking.

*Post-blackjack oak.*—Forests in which post or blackjack oaks, singly or in combination, comprise a plurality of the stocking, and less than 25 percent of the stocking is in pines or eastern redcedar.

*Black-scarlet oak.*—Forests in which black oak or scarlet oaks, singly or in combination, comprise a plurality of the stocking, and less

than 25 percent of the stocking is in pines or eastern redcedar. (Common associates include yellow-poplar, elm, maple, and black walnut.)

*White oak.*—Forests in which white oak species, singly or in combination, comprise a plurality of the stocking, and less than 25 percent of the stocking is in pines or eastern redcedar.

*Oak-gum-cypress.*—Bottomland forests in which bottomland oaks such as pin, swamp white, and shingle oaks along with tupelo, blackgum, sweetgum, or cypress, singly or in combination, comprise a plurality of the stocking. (Common associates include cottonwood, willow, ash, elm, hackberry, and maple.)

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

*Cottonwood.*—Forests in which cottonwood comprises at least 50 percent of the stocking. (Associates include willow, elm, soft maple, and ash.)

*Maple-beech.*—Forests in which hard maple or beech, singly or in combination, comprises a plurality of the stocking. (Common associates include soft maple, elm, and basswood.)

**Growing-stock tree.**—A live tree of commercial species that meets specified standards of size, quality, and merchantability. (Note: Excludes rough, rotten, and dead trees.)

**Growing-stock volume.**—Net volume in cubic feet of growing-stock trees 5.0 inches d.b.h. and over, from 1 foot above the ground 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.

**Hard hardwoods.**—Hardwood species with an average specific gravity greater than 0.50 such as oaks, hard maple, hickories, and ash.

**Hardwoods.**—Dicotyledonous trees, usually broad-leaved and deciduous. (See Soft hardwoods and Hard hardwoods.)

**Idle farmland.**—Includes former cropland, orchards, improved pastures, and farm sites not tended within the past 2 years and presently less than 16.7 percent stocked with trees.

**Improved pasture.**—Land currently improved for grazing by cultivating, seeding, irrigating, or clearing of trees or brush and less than 16.7 percent stocked with live trees.

**Industrial wood.**—All roundwood products, except fuelwood.

**Land.**—A. *Bureau of the Census.* Dry land and land temporarily or partly covered by water such as marshes, swamps, and river flood plains (omitting tidal flats below mean high tide); streams, sloughs, estuaries, and canals less than one-eighth of a statute mile wide; and lakes, reservoirs, and ponds less than 40 acres in area.

B. *Forest Inventory and Analysis.* The same as the Bureau of the Census, except minimum width of streams, etc., is 120 feet and minimum size of lakes, etc., is 1 acre.

**Log grade.**—A log classification based on external characteristics as indicators of quality or value. (See Appendix for specific grading factors used.)

**Marsh.**—Nonforest land that characteristically supports low, generally herbaceous or shrubby vegetation and that is intermittently covered with water.

**Merchantable.**—Refers to a pulpwood or saw-log section that meets pulpwood or saw-log specifications, respectively.

**Miscellaneous Federal land.**—Federal land other than National Forest and land administered by the Bureau of Land Management or Bureau of Indian Affairs.

**Miscellaneous private land.**—Privately owned land other than forest-industry and farmer-owned land.

**Mortality.**—The volume of sound wood in growing-stock and sawtimber trees that die annually.

**National Forest land.**—Federal land that has been legally designated as National Forest or purchase units, and other land administered by the USDA Forest Service.

**Net annual growth of growing stock.**—The annual change in volume of sound wood in live sawtimber and poletimber trees and the total volume of trees entering these classes through ingrowth, less volume losses resulting from natural causes.

**Net annual growth of sawtimber.**—The annual change in the volume of live sawtimber trees and the total volume of trees reaching sawtimber size, less volume losses resulting from natural causes.

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

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

**Nonforest land.**—Land that has never supported forests, and land formerly forested where use for timber management is precluded by development for other uses. (Note: Includes areas used for crops, improved pasture, residential areas, city parks, improved roads of any width and adjoining clearings, power-line clearings of any width, and 1- to 40-acre areas of water classified by the Bureau of the Census as land. If intermingled in forest areas, unimproved roads and nonforest strips must be more than 120 feet wide and more than 1 acre in area to qualify as nonforest land.)

a. *Nonforest land without trees.*—Nonforest land with no live trees present.

b. *Nonforest land with trees.*—Nonforest land with one or more trees per acre at least 5 inches d.b.h.

**Nonstocked land.**—Forest land less than 16.7 percent stocked with all live trees.

**Other forest land.**—Forest land not capable of producing 20 cubic feet per acre per year of

industrial wood crops under natural conditions and not associated with urban or rural development. These sites often contain tree species that are not currently utilized for industrial wood production or trees of poor form, small size, or inferior quality that are unfit for industrial products. Unproductivity may be the result of adverse site conditions such as sterile soil, dry climate, poor drainage, high elevation, and rockiness. This land is not withdrawn from timber utilization.

**Pasture.**—Land presently used for grazing or under cultivation to develop grazing.

**Pastured timberland.**—Timberland for which the primary use is wood production, but is presently used for grazing.

**Physiographic class.**—A measure of soil and water conditions that affect tree growth on a site. The physiographic classes are:

*Xeric sites.*—Very dry soils where excessive drainage seriously limits both growth and species occurrence. Example: cedar barrens.

*Xeromesic sites.*—Moderately dry soils where excessive drainage limits growth and species occurrence to some extent. Example: dry oak ridge.

*Mesic sites.*—Deep, well-drained soils. Growth and species occurrence are limited only by climate.

*Hydromesic sites.*—Moderately wet soils where insufficient drainage or infrequent flooding limits growth and species occurrence to some extent. Example: better drained bottomland hardwood sites.

*Hydric sites.*—Very wet sites where excess water seriously limits both growth and species occurrence. Example: frequently flooded river bottoms and cypress swamps.

**Poletimber stand.**—(See Stand-size class.)

**Poletimber tree.**—A growing-stock tree of commercial species at least 5.0 inches d.b.h. but smaller than sawtimber size.

**Reserved forest land.**—Forest land withdrawn from timber utilization through statute, administrative regulation, designation, or exclusive use for Christmas tree production, as indicated by annual shearing.

**Rotten tree.**—A tree that does not meet regional merchantability standards because of excessive unsound cull. May include noncommercial tree species.

**Rough tree.**—A tree that does not meet regional merchantability standards because of excessive sound cull. May include noncommercial tree species.

**Salvable dead tree.**—A standing or down dead tree considered merchantable by regional standards.

**Sapling.**—A live tree 1.0 to 5.0 inches d.b.h.

**Sapling-seedling stand.**—(See Stand-size class.)

**Saw log.**—A log meeting minimum standards of diameter, length, and defect, including logs at least 8 feet long, sound and straight and with a minimum diameter outside bark (d.o.b.) for softwoods of 7.0 inches (9.0 inches for hardwoods) or other combinations of size and defect specified by regional standards.

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

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

**Sawtimber stand.**—(See Stand-size class.)

**Sawtimber tree.**—A growing-stock tree of commercial species containing at least a 12-foot saw log or two noncontiguous saw logs 8 feet or longer, and meeting regional specifications for freedom from defect. Softwoods must be at least 9.0 inches d.b.h. Hardwoods must be at least 11.0 inches d.b.h.

**Sawtimber volume.**—Net volume of the saw-log portion of live sawtimber in board feet, International 1/4-inch rule (unless specified otherwise) from stump to a minimum 7.0 inches top d.o.b. for softwoods and a minimum 9.0 inches top d.o.b. for hardwoods.

**Seedling.**—A live tree less than 1.0 inch d.b.h. that is expected to survive. Only softwood seedlings more than 6 inches tall and hardwood seedlings more than 1 foot tall are counted.

**Short-log (rough tree).**—Sawtimber-size trees of commercial species that contain at least one merchantable 8- to 11-foot saw log but not a 12-foot saw log.

**Site class.**—A classification of forest lands in terms of inherent capacity to grow crops of industrial wood. The class identifies the potential growth in merchantable cubic feet/acre/year at culmination of mean annual increment of fully stocked natural stands.

**Site index.**—An expression of forest site quality based on the height of a free-growing dominant or codominant tree of a representative species in the forest type at age 50.

**Soft hardwoods.**—Hardwood species with an average specific gravity less than 0.50 such as gum, yellow-poplar, cottonwood, red maple, basswood, and willow.

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

**Stand.**—A group of trees on a minimum of 1 acre of forest land that is stocked by forest trees of any size.

**Stand-age class.**—Age of the main stand. Main stand refers to trees of the dominant forest type and stand-size class.

**Stand-size class.**—A classification of stocked (see Stocking) forest land based on the size class of live trees on the area; that is, sawtimber, poletimber, or seedlings and saplings.

*Sawtimber stands.*—Stands with half or more of live stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

*Poletimber stands.*—Stands with half or more live stocking in poletimber and/or sawtimber trees, and with poletimber stocking exceeding that of sawtimber.

*Sapling-seedling stands.*—Stands with more than half of the live stocking in saplings and/or seedlings.

**State land.**—Land owned by States or leased to them for 50 years or more.

**Stocking.**—The degree of occupancy of land by trees, measured by basal area and/or the number of trees in a stand by size or age and spacing, compared to the basal area and/or number of trees required to fully utilize the growth potential of the land; that is, the stocking standard.

A stocking percent of 100 indicates full utilization of the site and is equivalent to 80 square feet of basal area per acre in trees 5.0 inches d.b.h. and larger. In a stand of trees less than 5.0 inches d.b.h., a stocking percent of 100 would indicate that the present number of trees is sufficient to produce 80 square feet of basal area per acre when the trees reach 5.0 inches d.b.h.

Stands are grouped into the following stocking classes:

*Overstocked stands.*—Stands in which stocking of live trees is 133 percent or more.

*Fully stocked stands.*—Stands in which stocking of trees is from 100.0 to 132.9 percent.

*Medium stocked stands.*—Stands in which stocking of trees is from 60.0 to 99.9 percent.

*Poorly stocked stands.*—Stands in which stocking of trees is from 16.7 to 59.9 percent.

*Nonstocked areas.*—Commercial forest land on which stocking of trees is less than 16.7 percent.

**Timberland.**—Forest land that is producing or capable of producing in excess of 20 cubic feet per acre per year of industrial wood crops under natural conditions, that is not withdrawn from timber utilization, and that is not associated with urban or rural development. Currently inaccessible and inoperable areas are included.

**Tree.**—A woody plant usually having one or more perennial stems, a more or less definitely formed crown of foliage, and a height of at least 12 feet at maturity.

**Tree size class.**—A classification of trees based on diameter at breast height, including sawtimber trees, poletimber trees, saplings, and seedlings.

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

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

**Urban forest land.**—Forest land closely associated with or in such proximity to urban nonforest land uses that is not likely to be managed for the production of industrial wood products on a continuing basis. Wood removed would be for land clearing, fuelwood, or aesthetic purposes. Such forest land may be associated with industrial, commercial, residential, or recreational nonforest uses. Residential subdivisions, industrial parks, golf course perimeters, airport buffer strips, and public urban parks that qualify as forest land are included.

**Water.**—Water Areas. Areas within a land mass persistently covered by water.

(a) *Bureau of the Census.*—Permanent inland water surfaces, such as lakes, reservoirs, and ponds at least 40 acres in area; and streams, sloughs, estuaries, and canals at least one-eighth of a statute mile wide.

(b) *Noncensus.*—Permanent inland water surfaces, such as lakes, reservoirs, and ponds from 1 to 39.9 acres in area; and streams, sloughs, estuaries, and canals from 120 feet to one-eighth of a statute mile wide.

**Windbreak.**—A group of trees whose primary use is to protect buildings currently in use.

**Wooded pasture.**—Improved pasture with more than 16.7 percent stocking in live trees but less than 25 percent stocking in growing-stock trees. Area is currently improved for grazing or there is other evidence of grazing.

**Wooded strip.**—An acre or more of natural continuous forest land that would otherwise meet survey standards for timberland except that it is less than 120 feet wide.

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Table 1.--Area of land by county and major land-use class, Southwest Ozarks Unit, Missouri, 1989

(In thousand acres)

County	Land area	Forest land				Nonforest land with trees	Nonforest land with trees, as a percent of land area
		All forest land	Timber-land	Timberland as a percent of land area	Other forest land		
Bary	495.0	217.2	201.7	40.7	3.5	23.6	4.8
Christian	360.9	152.4	143.5	39.8	8.9	5.4	1.5
Douglas	521.0	303.5	300.3	57.6	3.2	35.6	6.8
Howell	593.7	277.8	277.8	46.8	--	62.4	10.5
McDonald	345.9	184.7	184.7	53.4	--	12.0	3.5
Newton	401.1	97.6	97.6	24.3	--	37.4	9.3
Ozark	467.6	271.3	251.0	53.7	8.1	34.8	7.4
Stone	288.6	126.3	125.1	43.3	--	32.9	11.4
Taney	389.0	274.2	230.6	59.3	29.8	16.5	4.2
Texas	755.5	426.3	412.7	54.6	--	50.2	6.6
Webster	380.0	122.9	118.4	31.2	4.5	43.9	11.6
Wright	436.7	159.2	154.8	35.4	4.4	33.8	7.7
All counties	5,435.0	2,613.4	2,498.2	46.0	62.4	388.5	7.1

Table 2.--Area of timberland by county and ownership class, Southwest Ozarks Unit, Missouri, 1989  
(In thousand acres)

County	All owners	Ownership class							
		National forest	Misc. federal	State	County & municipal	Forest industry	Farmer	Misc. private corporation	Misc. private individual
Barry	201.7	42.3	--	2.5	--	--	107.3	6.0	43.6
Christian	143.5	41.5	--	--	--	--	57.8	2.7	41.5
Douglas	300.3	37.1	--	--	--	--	137.8	5.3	120.1
Howell	277.8	47.9	--	12.5	--	--	106.3	3.6	107.5
McDonald	184.7	--	--	3.4	--	--	54.2	9.6	117.5
Newton	97.6	--	8.3	--	--	--	47.8	10.0	31.5
Ozark	251.0	20.2	8.4	4.4	--	--	109.6	2.8	105.6
Stone	125.1	14.7	--	--	--	--	46.0	7.3	57.1
Taney	230.6	44.7	--	8.2	--	--	111.1	10.6	56.0
Texas	412.7	38.6	--	2.8	2.6	30.4	224.3	20.6	93.4
Webster	118.4	--	--	4.3	2.5	--	94.2	5.0	12.4
Wright	154.8	7.0	--	--	--	--	108.8	2.6	36.4
All counties	2,498.2	294.0	16.7	38.1	5.1	30.4	1,205.2	86.1	822.6

Table 3.--Area of timberland by county and forest type, Southwest Ozarks Unit, Missouri, 1989  
(In thousand acres)

County	All types	Forest type										Non-1 stocked	
		Short-leaf pine	Eastern redb cedar	Eastern redb cedar hardwood	Shortleaf pine - oak	Post-blackjack oak	Black-scarlet oak	White oak	Oak-gum-cypress	Elm-ash-soft maple	Cotton-wood		Maple-beech
Barry	201.7	--	10.4	16.1	6.0	23.5	114.9	19.9	--	--	10.9	--	--
Christian	143.5	--	2.7	10.0	--	9.0	71.3	40.9	--	3.5	6.1	--	--
Douglas	300.3	8.5	--	5.6	18.8	79.8	127.2	39.6	--	2.8	18.0	--	--
Howell	277.8	16.3	--	--	11.4	111.3	108.6	27.8	--	--	--	2.4	--
McDonald	184.7	--	--	4.1	--	23.0	116.9	38.7	--	--	2.0	--	--
Newton	97.6	--	--	--	--	35.2	42.8	12.0	--	3.6	4.0	--	--
Ozark	251.0	--	1.9	26.8	24.8	88.6	71.0	20.7	--	6.0	8.3	2.9	--
Stone	125.1	--	11.2	16.4	--	7.2	73.1	13.5	--	--	3.7	--	--
Taney	230.6	2.4	12.8	82.3	--	45.1	57.9	13.4	--	--	16.7	--	--
Texas	412.7	35.3	--	16.0	48.8	101.4	127.7	66.3	--	6.0	11.2	--	--
Webster	118.4	--	11.4	--	--	41.2	39.9	20.9	--	--	5.0	--	--
Wright	154.8	--	3.3	2.0	--	67.7	44.0	28.6	--	2.0	7.2	--	--
All counties	2,498.2	62.5	53.7	179.3	109.8	633.0	995.3	342.3	--	23.9	93.1	--	5.3

1 Nonstocked with all live trees.

Table 4.--Area of timberland by county and stand-size class, Southwest Ozarks Unit, Missouri, 1989

(In thousand acres)

County	All stands	Stand-size class			
		Sawtimber	Poletimber	Seedling & sapling	Non-stocked <sup>1</sup>
Barry	201.7	97.0	59.3	45.4	--
Christian	143.5	72.6	27.9	43.0	--
Douglas	300.3	146.1	92.9	61.3	--
Howell	277.8	107.8	81.6	86.0	2.4
McDonald	184.7	121.1	33.8	29.8	--
Newton	97.6	43.6	42.1	11.9	--
Ozark	251.0	110.0	77.7	60.4	2.9
Stone	125.1	37.6	52.2	35.3	--
Taney	230.6	70.6	84.2	75.8	--
Texas	412.7	173.6	102.8	136.3	--
Webster	118.4	55.3	31.8	31.3	--
Wright	154.8	50.9	55.2	48.7	--
All counties	2,498.2	1,086.2	741.5	665.2	5.3

<sup>1</sup> Nonstocked with all live trees.

Table 5.--Area of timberland by county and site class, Southwest Ozarks Unit, Missouri, 1989

(In thousand acres)

County	All classes	Site class (cubic feet of growth per acre per year)				
		165+	120-164	85-119	50-84	20-49
Barry	201.7	--	--	2.5	124.6	74.6
Christian	143.5	--	--	--	56.8	86.7
Douglas	300.3	--	--	--	185.5	114.8
Howell	277.8	--	--	2.9	176.6	98.3
McDonald	184.7	--	--	3.3	121.0	60.4
Newton	97.6	--	3.6	--	73.7	20.3
Ozark	251.0	--	--	2.8	119.7	128.5
Stone	125.1	--	3.7	--	66.2	55.2
Taney	230.6	--	--	--	63.8	166.8
Texas	412.7	--	--	3.8	164.5	244.4
Webster	118.4	--	--	--	66.3	52.1
Wright	154.8	--	--	7.2	77.4	70.2
All counties	2,498.2	--	7.3	22.5	1,296.1	1,172.3

Table 6.--Area of timberland by county and stocking class of growing-stock trees<sup>1</sup>, Southwest Ozarks Unit, Missouri, 1989

(In thousand acres)

County	All classes	Stocking percent of growing-stock trees				
		Non-stocked	Poorly stocked	Moderately stocked	Fully stocked	Over-stocked
Barry	201.7	2.5	55.5	119.0	22.7	2.0
Christian	143.5	5.4	62.6	72.1	0.7	2.7
Douglas	300.3	--	109.2	144.8	28.3	18.0
Howell	277.8	2.4	63.3	154.5	41.2	16.4
McDonald	184.7	1.4	86.5	67.4	29.4	--
Newton	97.6	--	37.9	51.1	8.6	--
Ozark	251.0	2.9	72.8	147.2	21.4	6.7
Stone	125.1	--	48.3	74.4	2.4	--
Taney	230.6	--	94.6	119.1	15.2	1.7
Texas	412.7	3.0	112.8	188.3	85.2	23.4
Webster	118.4	--	50.1	53.7	14.6	--
Wright	154.8	2.6	62.9	68.3	21.0	--
All counties	2,498.2	20.2	856.5	1,259.9	290.7	70.9

<sup>1</sup> This table is based on the stocking percent of growing-stock trees rather than that of all live trees, therefore, to use the definitions of stocking for this table, replace the term "all live" by "growing-stock".

Table 7.--Area of timberland by ownership class and stocking class of growing-stock trees<sup>1</sup>, Southwest Ozarks Unit, Missouri, 1989

(In thousand acres)

Ownership class	All classes	Stocking percent of growing-stock trees				
		Non-stocked	Poorly stocked	Moderately stocked	Fully stocked	Over-stocked
National forest	294.0	--	47.3	173.8	51.3	21.6
Miscellaneous federal	16.7	--	2.9	13.8	--	--
State	38.1	--	12.1	21.8	4.2	--
County and municipal	5.1	--	--	5.1	--	--
Forest Industry	30.4	3.0	2.6	11.0	13.8	--
Farmer	1,205.2	10.7	456.1	586.3	118.9	33.2
Miscellaneous private corporation	86.1	--	24.0	49.2	9.2	3.7
Miscellaneous private individual	822.6	6.5	311.5	398.9	93.3	12.4
All owners	2,498.2	20.2	856.5	1,259.9	290.7	70.9

<sup>1</sup> This table is based on the stocking percent of growing-stock trees rather than that of all live trees, therefore, to use the definitions of stocking for this table, replace the term "all live" by "growing-stock".

Table 8.--Area of timberland by forest type and ownership class, Southwest Ozarks Unit, Missouri, 1989  
(In thousand acres)

Forest type	Ownership class									
	All owners	National forest	Misc. federal	State	County & municipal	Forest industry	Farmer	Misc. private corporation	Misc. private individual	
Shortleaf pine	62.5	26.1	--	2.4	--	5.4	21.5	--	7.1	
Eastern redcedar	53.7	4.0	--	4.1	--	--	28.1	4.3	13.2	
E. redcedar-hardwood	179.3	24.1	--	5.1	--	--	81.5	6.1	62.5	
Shortleaf pine-oak	109.8	39.2	--	2.8	--	10.6	37.3	--	19.9	
Post-blackjack oak	633.0	34.1	2.8	13.6	2.6	--	327.0	16.1	236.8	
Black-scarlet oak	995.3	96.7	8.7	8.1	2.5	5.8	478.5	36.2	358.8	
White oak	342.3	52.5	5.2	--	--	5.6	142.6	19.4	117.0	
Oak-gum-cypress	--	--	--	--	--	--	--	--	--	
Elm-ash-soft maple	23.9	--	--	--	--	--	23.9	--	--	
Cottonwood	--	--	--	--	--	--	--	--	--	
Maple-beech	93.1	17.3	--	2.0	--	3.0	61.9	4.0	4.9	
Nonstocked	5.3	--	--	--	--	--	2.9	--	2.4	
All types	2,498.2	294.0	16.7	38.1	5.1	30.4	1,205.2	86.1	822.6	

Table 9.--Area of timberland by forest type and stand-size class, Southwest Ozarks Unit, Missouri, 1989

(In thousand acres)

Forest type	All stands	Stand-size class			
		Sawtimber	Poletimber	Seedling & sapling	Non-stocked <sup>1</sup>
Shortleaf pine	62.5	40.7	19.1	2.7	--
Eastern redcedar	53.7	9.2	12.2	32.3	--
E. redcedar-hardwood	179.3	27.4	80.5	71.4	--
Shortleaf pine-oak	109.8	44.4	44.6	20.8	--
Post-blackjack oak	633.0	253.3	191.4	188.3	--
Black-scarlet oak	995.3	485.0	271.6	238.7	--
White oak	342.3	187.1	91.5	63.7	--
Oak-gum-cypress	--	--	--	--	--
Elm-ash-soft maple	23.9	20.1	3.8	--	--
Cottonwood	--	--	--	--	--
Maple-beech	93.1	19.0	26.8	47.3	--
Nonstocked	5.3	--	--	--	5.3
<b>All types</b>	<b>2,498.2</b>	<b>1,086.2</b>	<b>741.5</b>	<b>665.2</b>	<b>5.3</b>

<sup>1</sup> Nonstocked with all live trees.



Table 1.1.--Number of growing-stock trees on timberland by species group and diameter class, Southwest Ozarks Unit, Missouri, 1989

(In thousand trees)

Species group	Diameter class (inches at breast height)													
	All classes	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+	
<b>Softwoods</b>														
Shortleaf pine	41,459	11,021	9,773	8,361	5,573	3,362	1,764	1,088	359	116	42	--	--	
Other yellow pines	32	--	--	--	32	--	--	--	--	--	--	--	--	
Baldcypress	--	--	--	--	--	--	--	--	--	--	--	--	--	
Eastern redcedar	98,801	55,493	25,950	12,784	3,425	871	189	80	6	--	3	--	--	
Other softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	
<b>Total</b>	<b>140,292</b>	<b>66,514</b>	<b>35,723</b>	<b>21,145</b>	<b>9,030</b>	<b>4,233</b>	<b>1,953</b>	<b>1,168</b>	<b>365</b>	<b>116</b>	<b>45</b>	<b>--</b>	<b>--</b>	
<b>Hardwoods</b>														
Select white oak	126,608	66,677	26,559	13,922	7,244	5,295	3,380	1,758	1,045	476	158	94	--	
Other white oak	143,002	79,514	31,659	15,726	8,560	3,597	2,092	1,152	460	170	52	20	--	
Select red oak	12,786	4,623	3,546	1,435	1,014	753	579	287	327	99	73	48	2	
Other red oak	287,967	159,738	63,545	27,750	15,004	9,098	5,730	3,557	1,969	897	377	281	21	
Select hickory	52,254	36,814	7,124	4,043	2,482	898	517	198	140	24	8	6	--	
Other hickory	117,277	82,582	22,711	6,173	3,564	1,306	620	164	98	54	5	--	--	
Basswood	277	234	21	--	--	--	4	18	--	--	--	--	--	
Beech	--	--	--	--	--	--	--	--	--	--	--	--	--	
Hard maple	11,684	10,386	1,065	123	7	36	54	11	2	--	--	--	--	
Soft maple	9,356	8,160	936	164	--	28	27	20	15	--	6	--	--	
Elm	68,973	54,147	11,232	2,758	619	152	50	15	--	--	--	--	--	
Ash	16,964	12,915	2,559	599	181	362	184	110	32	6	3	11	2	
Sycamore	4,189	2,658	696	203	148	163	138	79	38	36	15	14	1	
Cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	
Willow	822	636	186	--	--	--	--	--	--	--	--	--	--	
Hackberry	12,207	10,266	774	745	173	109	55	27	19	18	14	7	--	
Aspen	--	--	--	--	--	--	--	--	--	--	--	--	--	
Birch	132	132	--	--	--	--	--	--	--	--	--	--	--	
Sweetgum	156	156	--	--	--	--	--	--	--	--	--	--	--	
Tupelo	12,721	10,065	1,446	523	510	94	51	--	20	7	--	5	--	
Black cherry	9,952	8,313	1,239	230	67	51	28	13	11	--	--	--	--	
Black walnut	7,088	2,988	1,521	1,075	589	394	259	126	58	59	16	3	--	
Butternut	159	159	--	--	--	--	--	--	--	--	--	--	--	
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--	--	
Persimmon	19,407	17,097	2,046	264	--	--	--	--	--	--	--	--	--	
Sassafras	60,812	55,773	4,716	215	70	--	26	12	--	--	--	--	--	
Other hardwoods	101,489	89,499	10,860	787	122	100	15	39	28	22	8	9	--	
<b>Total</b>	<b>1,076,282</b>	<b>713,532</b>	<b>194,441</b>	<b>76,735</b>	<b>40,354</b>	<b>22,436</b>	<b>13,809</b>	<b>7,586</b>	<b>4,262</b>	<b>1,868</b>	<b>735</b>	<b>498</b>	<b>26</b>	
<b>All species</b>	<b>1,216,574</b>	<b>780,046</b>	<b>230,164</b>	<b>97,880</b>	<b>49,384</b>	<b>26,669</b>	<b>15,762</b>	<b>8,754</b>	<b>4,627</b>	<b>1,984</b>	<b>780</b>	<b>498</b>	<b>26</b>	

Table 12.--Net volume of timber on timberland by class of timber and species group,  
Southwest Ozarks Unit, Missouri, 1989

(In thousand cubic feet)

Class of timber	All species	Species group			
		Pine	Other softwoods	Soft hardwoods	Hard hardwoods
<b>Live trees</b>					
Growing-stock trees					
Sawtimber					
Saw-log portion	636,687	93,569	8,631	17,736	516,751
Upper stem portion	127,629	11,853	1,679	3,226	110,871
Total	764,316	105,422	10,310	20,962	627,622
Poletimber	647,575	48,047	38,008	20,619	540,901
All growing-stock trees	1,411,891	153,469	48,318	41,581	1,168,523
Cull trees					
Short-log trees	125,106	734	1,529	2,814	120,029
Rough trees					
Sawtimber	349,870	1,492	6,006	10,948	331,424
Poletimber	274,558	2,347	5,589	18,363	248,259
Total	624,428	3,839	11,595	29,311	579,683
Rotten trees					
Sawtimber	131,543	207	78	4,888	126,370
Poletimber	22,738	--	54	827	21,857
Total	154,281	207	132	5,715	148,227
All cull trees	903,815	4,780	13,256	37,840	847,939
All live trees	2,315,706	158,249	61,574	79,421	2,016,462
Salvable dead trees					
Sawtimber	2,792	1,086	--	--	1,706
Poletimber	3,927	287	--	375	3,265
Total	6,719	1,373	--	375	4,971
All classes of timber	2,322,425	159,622	61,574	79,796	2,021,433

Table 13.--Net volume of growing-stock trees on timberland by species group and diameter class, Southwest Ozarks Unit, Missouri, 1989

(In thousand cubic feet)

Species group	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+		
<b>Softwoods</b>													
Shortleaf pine	153,299	19,006	28,871	32,652	27,846	25,070	12,164	5,318	2,372	--	--	--	--
Other yellow pines	170	--	170	--	--	--	--	--	--	--	--	--	--
Baldcypress	--	--	--	--	--	--	--	--	--	--	--	--	--
Eastern redcedar	48,318	23,806	14,202	6,423	2,252	1,326	164	--	145	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>Total</b>	<b>201,787</b>	<b>42,812</b>	<b>43,243</b>	<b>39,075</b>	<b>30,098</b>	<b>26,396</b>	<b>12,328</b>	<b>5,318</b>	<b>2,517</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<b>Hardwoods</b>													
Select white oak	266,673	30,607	35,925	48,063	48,679	37,860	31,701	19,235	8,162	6,441	--	--	--
Other white oak	178,765	34,426	40,133	29,507	28,507	22,888	12,948	6,373	2,545	1,438	--	--	--
Select red oak	54,455	3,399	5,474	6,875	8,971	6,525	10,333	4,261	4,051	4,134	432	--	--
Other red oak	514,709	62,059	72,544	80,943	82,366	76,956	59,614	35,788	19,900	20,908	3,631	--	--
Select hickory	49,017	8,926	12,267	8,648	7,807	4,747	4,529	1,146	486	461	--	--	--
Other hickory	62,435	13,336	17,308	12,318	9,514	3,850	3,390	2,449	270	--	--	--	--
Basswood	436	--	--	--	50	386	--	--	--	--	--	--	--
Beech	--	--	--	--	--	--	--	--	--	--	--	--	--
Hard maple	1,709	240	45	403	728	228	65	--	--	--	--	--	--
Soft maple	2,691	501	--	314	509	484	528	--	355	--	--	--	--
Elm	9,596	4,638	2,763	1,172	758	265	--	--	--	--	--	--	--
Ash	12,916	1,153	888	3,307	2,456	2,575	951	228	204	851	303	--	--
Sycamore	13,628	491	889	1,714	2,393	2,125	1,398	1,929	1,017	1,160	512	--	--
Cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--
Willow	--	--	--	--	--	--	--	--	--	--	--	--	--
Hackberry	7,349	1,602	926	859	816	576	658	666	809	437	--	--	--
Aspen	--	--	--	--	--	--	--	--	--	--	--	--	--
Birch	--	--	--	--	--	--	--	--	--	--	--	--	--
Sweetgum	--	--	--	--	--	--	--	--	--	--	--	--	--
Tupelo	5,602	903	1,924	803	731	--	648	240	--	353	--	--	--
Black cherry	2,279	426	303	391	426	335	398	--	--	--	--	--	--
Black walnut	19,489	2,186	2,626	3,478	3,591	2,536	1,704	2,369	814	185	--	--	--
Butternut	--	--	--	--	--	--	--	--	--	--	--	--	--
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--	--
Persimmon	577	577	--	--	--	--	--	--	--	--	--	--	--
Sassafras	1,263	377	267	--	332	287	--	--	--	--	--	--	--
Other hardwoods	6,515	1,281	493	822	192	882	841	937	411	656	--	--	--
<b>Total</b>	<b>1,210,104</b>	<b>167,128</b>	<b>194,775</b>	<b>199,617</b>	<b>198,826</b>	<b>163,505</b>	<b>129,706</b>	<b>75,621</b>	<b>39,024</b>	<b>37,024</b>	<b>4,878</b>	<b>4,878</b>	<b>4,878</b>
<b>All species</b>	<b>1,411,891</b>	<b>209,940</b>	<b>238,018</b>	<b>238,692</b>	<b>228,924</b>	<b>189,901</b>	<b>142,034</b>	<b>80,939</b>	<b>41,541</b>	<b>37,024</b>	<b>4,878</b>	<b>4,878</b>	<b>4,878</b>

Table 14.--Net volume of growing stock in the saw-log portion of sawtimber trees on timberland by species group and diameter class, Southwest Ozarks Unit, Missouri, 1989

Species group	(In thousand cubic feet)									
	Diameter class (inches at breast height)									
	All classes	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
Softwoods	93,569	26,736	24,745	23,147	11,531	5,112	2,298	--	--	--
Shortleaf pine	--	--	--	--	--	--	--	--	--	--
Other yellow pines	--	--	--	--	--	--	--	--	--	--
Baldcypress	8,631	5,152	1,975	1,209	155	--	140	--	--	--
Eastern redcedar	--	--	--	--	--	--	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--	--
Total	102,200	31,888	26,720	24,356	11,686	5,112	2,438	--	--	--
Hardwoods	125,002	--	35,427	30,981	27,598	17,377	7,540	6,079	--	--
Select white oak	58,860	--	20,128	18,261	11,093	5,690	2,335	1,353	--	--
Other white oak	33,451	--	6,809	5,448	9,134	3,894	3,780	3,962	424	--
Select red oak	249,390	--	60,106	63,152	51,967	32,344	18,433	19,836	3,552	--
Other red oak	15,099	--	5,442	3,848	3,889	1,038	448	434	--	--
Select hickory	15,279	--	6,755	3,116	2,955	2,203	250	--	--	--
Other hickory	357	--	36	321	--	--	--	--	--	--
Basswood	--	--	--	--	--	--	--	--	--	--
Beech	731	--	493	182	56	--	--	--	--	--
Hard maple	1,581	--	393	397	463	--	328	--	--	--
Soft maple	753	--	549	204	--	--	--	--	--	--
Elm	6,122	--	1,689	2,120	821	205	190	802	295	--
Ash	9,143	--	1,794	1,785	1,235	1,773	949	1,101	506	--
Sycamore	--	--	--	--	--	--	--	--	--	--
Cottonwood	--	--	--	--	--	--	--	--	--	--
Willow	3,378	--	591	465	576	590	748	408	--	--
Hackberry	--	--	--	--	--	--	--	--	--	--
Aspen	--	--	--	--	--	--	--	--	--	--
Birch	--	--	--	--	--	--	--	--	--	--
Sweetgum	1,600	--	503	--	557	210	--	330	--	--
Tupelo	924	--	302	274	348	--	--	--	--	--
Black cherry	9,000	--	2,504	2,005	1,457	2,116	744	174	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--
Butternut	--	--	--	--	--	--	--	--	--	--
Yellow-poplar	--	--	--	--	--	--	--	--	--	--
Persimmon	446	--	214	232	--	--	--	--	--	--
Sassafras	3,371	--	123	707	713	839	373	616	--	--
Other hardwoods	--	--	--	--	--	--	--	--	--	--
Total	534,487	--	143,858	133,498	112,862	68,279	36,118	35,095	4,777	--
All species	636,687	31,888	170,578	157,854	124,548	73,391	38,556	35,095	4,777	--

Table 15.--Net volume of sawtimber trees on timberland by species group and diameter class, Southwest Ozarks Unit, Missouri, 1989

(In thousand board feet)<sup>1</sup>

Species group	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+					
<b>Softwoods</b>														
Shortleaf pine	543,821	163,227	143,032	131,089	64,737	28,753	12,983	--	--	--	--	--	--	--
Other yellow pines	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Baldcypress	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Eastern redcedar	55,254	35,688	11,670	6,532	754	--	610	--	--	--	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>Total</b>	<b>599,075</b>	<b>198,915</b>	<b>154,702</b>	<b>137,621</b>	<b>65,491</b>	<b>28,753</b>	<b>13,593</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<b>Hardwoods</b>														
Select white oak	727,866	--	239,352	183,083	150,442	89,286	37,243	28,460	--	--	--	--	--	--
Other white oak	370,006	--	142,186	112,761	64,412	31,261	12,455	6,931	--	--	--	--	--	--
Select red oak	191,538	--	44,370	32,609	51,707	21,223	20,019	19,782	--	--	--	--	--	1,828
Other red oak	1,474,548	--	408,398	382,422	295,807	176,510	97,095	99,232	--	--	--	--	--	15,084
Select hickory	92,842	--	37,727	22,978	21,984	5,555	2,360	2,238	--	--	--	--	--	--
Other hickory	96,552	--	47,115	19,099	16,840	12,161	1,337	--	--	--	--	--	--	--
Basswood	2,198	--	252	1,946	--	--	--	--	--	--	--	--	--	--
Beech	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hard maple	4,786	--	3,389	1,087	310	--	--	--	--	--	--	--	--	--
Soft maple	8,202	--	2,213	2,120	2,314	--	1,555	--	--	--	--	--	--	--
Elm	4,710	--	3,491	1,219	--	--	--	--	--	--	--	--	--	--
Ash	34,867	--	11,047	11,974	4,477	1,085	972	4,051	--	--	--	--	--	1,261
Sycamore	47,519	--	10,539	9,692	6,415	8,907	4,706	5,389	--	--	--	--	--	1,871
Cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Willow	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hackberry	17,633	--	3,812	2,623	3,040	2,900	3,420	1,838	--	--	--	--	--	--
Aspen	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sweetgum	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tupelo	9,026	--	3,394	--	2,979	1,102	--	1,551	--	--	--	--	--	--
Black cherry	5,319	--	1,964	1,547	1,808	--	--	--	--	--	--	--	--	--
Black walnut	53,197	--	17,217	12,194	8,102	11,079	3,784	821	--	--	--	--	--	--
Butternut	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Persimmon	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sassafras	2,870	--	1,544	1,326	--	--	--	--	--	--	--	--	--	--
Other hardwoods	17,845	--	900	4,070	3,876	4,251	1,868	2,880	--	--	--	--	--	--
<b>Total</b>	<b>3,161,524</b>	<b>--</b>	<b>978,910</b>	<b>802,750</b>	<b>634,513</b>	<b>365,320</b>	<b>186,814</b>	<b>173,173</b>	<b>20,044</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<b>All species</b>	<b>3,760,599</b>	<b>198,915</b>	<b>1,133,612</b>	<b>940,371</b>	<b>700,004</b>	<b>394,073</b>	<b>200,407</b>	<b>173,173</b>	<b>20,044</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>

<sup>1</sup>International 1/4-inch rule.

Table 16.--Net volume of growing stock and sawtimber on timberland by county and species group, Southwest Ozarks Unit, Missouri 1989

County	Growing stock						Sawtimber						
	All species	Species group			All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
		Thousand cubic feet	Thousand cubic feet	Thousand cubic feet									
Barry	121,634	2,548	7,110	3,393	108,583	322,427	3,503	6,117	3,786	309,021			
Christian	81,034	659	1,186	3,378	75,811	232,920	3,413	--	9,173	220,334			
Douglas	196,231	29,642	1,465	7,945	157,179	558,644	128,898	1,552	21,660	406,534			
Howell	180,266	30,105	720	1,005	148,436	495,889	98,839	526	1,497	395,027			
McDonald	109,281	655	701	2,870	105,055	326,252	3,057	2,130	5,112	315,953			
Newton	59,388	--	99	2,915	56,374	154,282	--	--	4,904	149,378			
Ozark	132,009	17,303	8,849	5,714	100,143	326,617	49,106	16,606	16,582	244,323			
Stone	57,385	1,060	4,882	759	50,684	138,035	2,486	5,840	1,685	128,024			
Taney	90,793	3,510	20,478	3,328	63,477	189,239	3,910	18,459	8,566	158,304			
Texas	241,684	67,471	1,226	6,270	166,717	667,262	250,609	2,755	14,681	399,217			
Webster	65,256	--	688	587	63,981	171,950	--	--	--	171,950			
Wright	76,930	516	914	3,417	72,083	177,082	--	1,269	6,961	168,852			
All counties	1,411,891	153,469	48,318	41,581	1,168,523	3,760,599	543,821	55,254	94,607	3,066,917			

<sup>1</sup> International 1/4-inch rule.

Table 17.--Net volume of live trees and growing stock on timberland by ownership class and species group, Southwest Ozarks Unit, Missouri, 1989  
(In thousand cubic feet)

Ownership class	Live trees						Growing stock						
	All species	Species group			All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
		Thousand cubic feet	Thousand cubic feet	Thousand cubic feet									
National forest	319,131	67,688	9,106	5,075	237,262	227,198	66,545	6,737	2,144	151,772			
Miscellaneous federal State	13,344	--	574	1,220	11,550	7,214	--	382	377	6,455			
County and municipal	39,350	4,751	3,574	512	30,513	21,629	4,486	2,616	71	14,456			
Forest industry	4,663	--	--	--	4,663	2,398	--	--	--	2,398			
Farmer	31,205	13,855	--	384	16,966	25,003	13,630	--	213	11,160			
Miscellaneous private corporation	1,083,988	44,522	28,198	47,211	964,057	649,279	42,459	22,504	24,556	559,760			
Miscellaneous private individual	72,870	1,650	3,369	2,738	65,113	42,068	1,650	2,814	1,344	36,260			
All owners	2,315,706	158,249	61,574	79,421	2,016,462	1,411,891	153,469	48,318	41,581	1,168,523			

Table 18.--Net volume of sawtimber trees on timberland by species group and butt log grade, Southwest Ozarks Unit, Missouri, 1989

(In thousand board feet)<sup>1</sup>

Species group	All grades	Butt log grade			
		1	2	3	Tie and timber
<b>Softwoods</b>					
Shortleaf pine	543,821	9,923	92,875	441,023	--
Other yellow pines	--	--	--	--	--
Baldcypress	--	--	--	--	--
Eastern redcedar	55,254	--	--	55,254 <sup>2</sup>	--
Other softwoods	--	--	--	--	--
<b>Total</b>	<b>599,075</b>	<b>9,923</b>	<b>92,875</b>	<b>496,277</b>	<b>--</b>
<b>Hardwoods</b>					
Select white oak	727,866	2,778	48,567	259,849	416,672
Other white oak	370,006	6,471	11,111	99,715	252,709
Select red oak	191,538	--	8,227	26,104	157,207
Other red oak	1,474,548	15,578	50,075	245,087	1,163,808
Select hickory	92,842	--	3,751	4,454	84,637
Other hickory	96,552	--	5,690	27,134	63,728
Basswood	2,198	--	--	--	2,198
Beech	--	--	--	--	--
Hard maple	4,786	--	--	1,353	3,433
Soft maple	8,202	--	--	--	8,202
Elm	4,710	--	--	4,710	--
Ash	34,867	--	--	24,252	10,615
Sycamore	47,519	10,023	8,833	16,905	11,758
Cottonwood	--	--	--	--	--
Willow	--	--	--	--	--
Hackberry	17,633	--	5,598	8,825	3,210
Aspen	--	--	--	--	--
Birch	--	--	--	--	--
Sweetgum	--	--	--	--	--
Tupelo	9,026	--	3,133	1,616	4,277
Black cherry	5,319	453	773	1,586	2,507
Black walnut	53,197	4,532	7,731	15,858	25,076
Butternut	--	--	--	--	--
Yellow-poplar	--	--	--	--	--
Persimmon	--	--	--	--	--
Sassafras	2,870	--	--	920	1,950
Other hardwoods	17,845	--	--	17,845	--
<b>Total</b>	<b>3,161,524</b>	<b>39,835</b>	<b>153,489</b>	<b>756,213</b>	<b>2,211,987</b>
<b>All species</b>	<b>3,760,599</b>	<b>49,758</b>	<b>246,364</b>	<b>1,252,490</b>	<b>2,211,987</b>

<sup>1</sup> International 1/4-inch rule.

<sup>2</sup> Includes 9,879 thousand board feet of volume from sawtimber-sized, Grade 5 eastern redcedar trees graded for special use. (See Log Grades for Eastern Redcedar in the Appendix.)

Table 19.--Net annual growth of growing stock and sawtimber on timberland by county and species group, Southwest Ozarks Unit, Missouri, 1988

County	Growing stock					Sawtimber				
	All species	Species group			Hard hardwoods	All species	Pine	Species group		Hard hardwoods
		Other softwoods	Soft hardwoods	Hard hardwoods				Other softwoods	Soft hardwoods	
		----- Thousand cubic feet -----								
Barry	3,706	164	373	101	3,068	612	591	3	10,599	
Christian	2,493	14	51	91	2,337	81	--	546	5,916	
Douglas	6,183	631	71	268	5,213	3,473	34	600	16,282	
Howell	5,127	952	24	48	4,103	4,178	18	-4	12,460	
McDonald	2,844	15	31	93	2,705	67	171	51	9,234	
Newton	1,630	--	5	58	1,567	--	--	30	4,802	
Ozark	4,554	624	411	181	3,338	2,257	765	296	6,784	
Stone	1,494	43	222	61	1,168	47	235	-222	2,689	
Taney	2,710	69	803	100	1,738	373	1,128	515	3,050	
Texas	7,971	2,447	69	396	5,059	9,831	63	801	14,572	
Webster	1,951	--	45	37	1,869	--	562	--	5,085	
Wright	2,268	43	77	193	1,955	--	42	259	5,786	
All counties	42,931	5,002	2,182	1,627	34,120	20,919	3,609	2,875	97,259	

<sup>1</sup> International 1/4-inch rule.

Table 20.--Average annual timber removals of growing stock and sawtimber on timberland by county and species group, Southwest Ozarks Unit, Missouri, 1988

County	Growing stock					Sawtimber				
	All species	Species group			Hard hardwoods	All species	Pine	Species group		Hard hardwoods
		Other softwoods	Soft hardwoods	Hard hardwoods				Other softwoods	Soft hardwoods	
		----- Thousand board feet -----								
Barry	1,955	1,363	--	--	592	3,099	--	--	2,076	
Christian	169	--	--	--	169	--	--	--	482	
Douglas	1,616	208	--	--	1,408	802	--	--	4,216	
Howell	2,171	145	--	--	2,026	744	--	--	7,928	
McDonald	531	--	--	--	531	--	--	--	1,795	
Newton	625	--	--	--	625	--	--	--	1,125	
Ozark	1,540	157	--	--	1,383	805	--	--	4,133	
Stone	1,267	--	28	--	1,239	--	--	--	1,563	
Taney	2,115	--	--	39	2,076	--	--	--	6,685	
Texas	3,058	770	--	--	2,288	2,367	--	--	7,790	
Webster	792	--	--	--	792	--	--	--	1,015	
Wright	1,184	--	--	173	1,011	--	--	794	2,493	
All counties	17,023	2,643	28	212	14,140	7,817	--	794	41,301	

<sup>1</sup> International 1/4-inch rule.

Table 21.--Net annual growth and average annual removals of growing stock and sawtimber on timberland by species group, Southwest Ozarks Unit, Missouri, 1988

Species group	Growing stock		Sawtimber	
	Growth	Removals	Growth	Removals
	<i>Thousand cubic feet</i>		<i>Thousand board feet<sup>1</sup></i>	
Softwoods				
Shortleaf pine	5,002	2,643	20,919	7,817
Other yellow pines	--	--	--	--
Baldcypress	--	--	--	--
Eastern redcedar	2,182	28	3,609	--
Other softwoods	--	--	--	--
Total	7,184	2,671	24,528	7,817
Hardwoods				
Select white oak	8,324	2,390	26,349	6,514
Other white oak	3,864	3,460	6,843	10,900
Select red oak	1,340	838	4,216	2,612
Other red oak	17,050	5,665	51,156	16,466
Select hickory	950	357	3,044	1,372
Other hickory	1,484	1,068	3,265	2,720
Basswood	14	--	122	--
Beech	--	--	--	--
Hard maple	-13	--	270	--
Soft maple	242	--	486	--
Elm	313	39	-292	--
Ash	165	72	218	343
Sycamore	455	173	1,531	794
Cottonwood	--	--	--	--
Willow	--	--	--	--
Hackberry	343	--	847	--
Aspen	--	--	--	--
Birch	--	--	--	--
Sweetgum	--	--	--	--
Tupelo	79	--	46	--
Black cherry	188	--	160	--
Black walnut	432	290	1,451	374
Butternut	-7	--	-25	--
Yellow-poplar	--	--	--	--
Persimmon	55	--	--	--
Sassafras	132	--	71	--
Other hardwoods	337	--	376	--
Total	35,747	14,352	100,134	42,095
All species	42,931	17,023	124,662	49,912

<sup>1</sup> International 1/4-inch rule.

Table 22.--Net annual growth and average annual removals of growing stock on timberland by ownership class and species group, Southwest Ozarks Unit, Missouri, 1988

(In thousand cubic feet)

Ownership class	Growth						Removals						
	All species	Species group			All species	Pine	Other softwoods	Hard hardwoods	All species	Species group			All species
		Pine	Other softwoods	Soft hardwoods						Pine	Other softwoods	Hard hardwoods	
National forest	6,936	2,229	209	100	4,398	2,048	7	3,817	2,048	7	--	1,762	
Miscellaneous federal	302	--	49	7	246	--	--	--	--	--	--	--	
State	626	61	73	7	485	--	--	602	--	--	--	602	
County and municipal	43	--	--	--	43	--	--	--	--	--	--	--	
Forest industry	831	433	--	10	388	24	--	137	24	--	--	113	
Farmer	19,758	1,230	1,184	1,113	16,231	571	21	9,243	571	21	39	8,612	
Miscellaneous private corporation	1,679	70	170	43	1,396	--	--	309	--	--	--	309	
Miscellaneous private individual	12,756	979	497	347	10,933	--	--	2,915	--	--	173	2,742	
All owners	42,931	5,002	2,182	1,627	34,120	2,643	28	17,023	2,643	28	212	14,140	

Table 23.--Net annual growth and average annual removals of sawtimber on timberland by ownership class and species group, Southwest Ozarks Unit, Missouri, 1988

(In thousand board feet)<sup>1</sup>

Ownership class	Growth						Removals						
	All species	Species group			All species	Pine	Other softwoods	Hard hardwoods	All species	Species group			All species
		Pine	Other softwoods	Soft hardwoods						Pine	Other softwoods	Hard hardwoods	
National forest	22,012	9,745	-115	66	12,316	5,391	--	10,570	5,391	--	--	5,179	
Miscellaneous federal	543	--	14	36	493	--	--	--	--	--	--	--	
State	1,942	372	352	--	1,218	--	--	2,809	--	--	--	2,809	
County and municipal	322	--	--	--	322	--	--	--	--	--	--	--	
Forest industry	2,965	1,162	--	45	1,758	--	--	274	--	--	--	274	
Farmer	60,414	5,556	2,854	2,187	49,817	2,426	--	25,626	2,426	--	--	23,200	
Miscellaneous private corporation	3,929	125	87	--	3,717	--	--	1,294	--	--	--	1,294	
Miscellaneous private individual	32,535	3,959	417	541	27,618	--	--	9,339	--	--	794	8,545	
All owners	124,662	20,919	3,609	2,875	97,259	7,817	--	49,912	7,817	--	794	41,301	

<sup>1</sup> International 1/4-inch rule.

Table 24.--Annual mortality of growing stock and sawtimber on timberland by species group, Southwest Ozarks Unit, Missouri, 1988

Species group	Growing stock	Sawtimber
	<i>Thousand cubic feet</i>	<i>Thousand board feet</i> <sup>1</sup>
<b>Softwoods</b>		
Shortleaf pine	365	1,207
Other yellow pines	--	--
Baldcypress	--	--
Eastern redcedar	74	222
Other softwoods	--	--
<b>Total</b>	<b>439</b>	<b>1,429</b>
<b>Hardwoods</b>		
Select white oak	483	1,012
Other white oak	1,067	1,952
Select red oak	463	1,649
Other red oak	4,801	10,665
Select hickory	342	544
Other hickory	471	773
Basswood	--	--
Beech	--	--
Hard maple	10	10
Soft maple	25	73
Elm	421	443
Ash	134	465
Sycamore	124	373
Cottonwood	--	--
Willow	--	--
Hackberry	63	118
Aspen	--	--
Birch	--	--
Sweetgum	--	--
Tupelo	33	70
Black cherry	21	14
Black walnut	143	233
Butternut	14	39
Yellow-poplar	--	--
Persimmon	25	--
Sassafras	29	27
Other hardwoods	42	19
<b>Total</b>	<b>8,711</b>	<b>18,479</b>
<b>All species</b>	<b>9,150</b>	<b>19,908</b>

<sup>1</sup> International 1/4-inch rule.

Table 25.--Area of nonforest land with trees by county and land use class, Southwest Ozarks Unit, Missouri, 1989  
(In thousand acres)

County	All classes	Land use class							
		Cropland with trees	Improved pasture with trees	Wooded strips	Idle farmland with trees	Marsh with trees	Urban and other with trees	Windbreaks	Wooded pasture
Barry	23.6	--	12.8	--	--	--	9.2	1.6	--
Christian	5.4	--	1.2	--	--	--	2.7	--	1.5
Douglas	35.6	--	28.0	2.9	--	--	--	--	4.7
Howell	62.4	--	48.4	--	--	--	--	--	14.0
McDonald	12.0	--	2.2	--	--	--	1.1	--	8.7
Newton	37.4	--	18.9	--	--	--	--	--	18.5
Ozark	34.8	--	11.4	2.1	--	--	1.9	4.8	14.6
Stone	32.9	--	9.9	15.2	--	--	7.8	--	--
Taney	16.5	--	8.2	--	--	--	--	--	8.3
Texas	50.2	--	27.3	4.6	--	--	7.2	--	11.1
Webster	43.9	--	30.3	2.5	--	--	2.0	--	9.1
Wright	33.8	--	12.5	--	--	--	--	--	21.3
All counties	388.5	--	211.1	27.3	--	--	31.9	6.4	111.8

Table 26.--Net volume of short-log trees on timberland by species group and diameter class, Southwest Ozarks Unit, Missouri, 1989

Species group	(In thousand cubic feet)													
	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+					
<b>Softwoods</b>														
Shortleaf pine	734	--	344	196	194	--	--	--	--	--	--	--	--	--
Other yellow pines	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Baldcypress	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Eastern redcedar	1,529	548	729	179	73	--	--	--	--	--	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>Total</b>	<b>2,263</b>	<b>548</b>	<b>1,073</b>	<b>375</b>	<b>267</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<b>Hardwoods</b>														
Select white oak	42,939	--	6,129	8,846	9,820	8,543	5,283	3,332	986					
Other white oak	25,809	--	5,569	6,684	6,498	3,100	2,636	1,322	--					
Select red oak	4,057	--	848	505	1,175	475	--	892	162					
Other red oak	35,858	--	6,984	7,686	8,163	3,726	3,445	5,343	511					
Select hickory	2,117	--	899	475	350	393	--	--	--					
Other hickory	4,935	--	1,446	2,049	963	--	244	233	--					
Basswood	190	--	--	--	--	--	--	--	190					
Beech	--	--	--	--	--	--	--	--	--					
Hard maple	432	--	--	--	--	--	432	--	--					
Soft maple	1,219	--	--	--	338	217	--	--	664					
Elm	692	--	177	321	--	--	--	194	--					
Ash	1,343	--	--	605	233	--	276	229	--					
Sycamore	118	--	--	118	--	--	--	--	--					
Cottonwood	--	--	--	--	--	--	--	--	--					
Willow	--	--	--	--	--	--	--	--	--					
Hackberry	--	--	--	--	--	--	--	--	--					
Aspen	--	--	--	--	--	--	--	--	--					
Birch	--	--	--	--	--	--	--	--	--					
Sweetgum	--	--	--	--	--	--	--	--	--					
Tupelo	595	--	384	--	129	82	--	--	--					
Black cherry	--	--	--	--	--	--	--	--	--					
Black walnut	1,839	--	547	531	428	--	--	333	--					
Butternut	--	--	--	--	--	--	--	--	--					
Yellow-poplar	--	--	--	--	--	--	--	--	--					
Persimmon	--	--	--	--	--	--	--	--	--					
Sassafras	338	--	--	338	--	--	--	--	--					
Other hardwoods	362	--	--	--	122	240	--	--	--					
<b>Total</b>	<b>122,843</b>	<b>--</b>	<b>22,983</b>	<b>28,158</b>	<b>28,219</b>	<b>16,776</b>	<b>12,316</b>	<b>11,878</b>	<b>2,513</b>					
<b>All species</b>	<b>125,106</b>	<b>548</b>	<b>24,056</b>	<b>28,533</b>	<b>28,486</b>	<b>16,776</b>	<b>12,316</b>	<b>11,878</b>	<b>2,513</b>					

Table 27.--Net volume of short-log trees on timberland by species group and diameter class, Southwest Ozarks Unit, Missouri, 1989

Species group	All classes	(In thousand board feet) <sup>1</sup>									
		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+		
<b>Softwoods</b>											
Shortleaf pine	2,892	--	1,445	779	668	--	--	--	--	--	--
Other yellow pines	--	--	--	--	--	--	--	--	--	--	--
Baldcypress	--	--	--	--	--	--	--	--	--	--	--
Eastern redcedar	6,667	2,603	3,173	654	237	--	--	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--
<b>Total</b>	<b>9,559</b>	<b>2,603</b>	<b>4,618</b>	<b>1,433</b>	<b>905</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<b>Hardwoods</b>											
Select white oak	125,893	--	19,376	27,078	29,205	24,680	14,814	8,565	2,175	--	--
Other white oak	83,004	--	19,965	22,990	20,676	9,146	7,236	2,991	--	--	--
Select red oak	11,623	--	2,574	1,523	3,493	1,370	--	2,304	359	--	--
Other red oak	107,653	--	23,283	24,720	25,196	11,020	9,625	13,130	679	--	--
Select hickory	6,274	--	2,880	1,406	988	1,000	--	--	--	--	--
Other hickory	15,256	--	4,715	6,408	2,905	--	676	552	--	--	--
Basswood	426	--	--	--	--	--	--	--	426	--	--
Beech	--	--	--	--	--	--	--	--	--	--	--
Hard maple	1,075	--	--	--	--	--	1,075	--	--	--	--
Soft maple	2,777	--	--	--	872	565	--	--	1,340	--	--
Elm	2,195	--	553	1,070	--	--	--	572	--	--	--
Ash	4,004	--	--	1,921	719	--	817	547	--	--	--
Sycamore	258	--	--	258	--	--	--	--	--	--	--
Cottonwood	--	--	--	--	--	--	--	--	--	--	--
Willow	--	--	--	--	--	--	--	--	--	--	--
Hackberry	--	--	--	--	--	--	--	--	--	--	--
Aspen	--	--	--	--	--	--	--	--	--	--	--
Birch	--	--	--	--	--	--	--	--	--	--	--
Sweetgum	--	--	--	--	--	--	--	--	--	--	--
Tupelo	1,707	--	1,118	--	364	225	--	--	--	--	--
Black cherry	--	--	--	--	--	--	--	--	--	--	--
Black walnut	5,971	--	2,029	1,905	1,432	--	--	605	--	--	--
Butternut	--	--	--	--	--	--	--	--	--	--	--
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--
Persimmon	--	--	--	--	--	--	--	--	--	--	--
Sassafras	988	--	--	988	--	--	--	--	--	--	--
Other hardwoods	1,008	--	--	--	348	660	--	--	--	--	--
<b>Total</b>	<b>370,112</b>	<b>--</b>	<b>76,493</b>	<b>90,267</b>	<b>86,198</b>	<b>48,666</b>	<b>34,243</b>	<b>29,266</b>	<b>4,979</b>	<b>--</b>	<b>--</b>
<b>All species</b>	<b>379,671</b>	<b>2,603</b>	<b>81,111</b>	<b>91,700</b>	<b>87,103</b>	<b>48,666</b>	<b>34,243</b>	<b>29,266</b>	<b>4,979</b>	<b>--</b>	<b>--</b>

<sup>1</sup> International 1/4-inch rule.

Table 29.--Net volume of sawtimber on timberland by species group and forest type, Southwest Ozarks Unit, Missouri, 1989

(In thousand board feet) <sup>1</sup>

Species group	All types	Forest type										Maple-beech	Non-2 stocked		
		Short-leaf pine	Eastern redcedar	Eastern redcedar hardwood	Shortleaf pine - oak	Post-blackjack oak	Black-scarlet oak	White oak	Oak-gum-cypress	Elm-ash-soft maple	Cotton-wood				
Softwoods	543,821	257,734	--	--	162,945	37,864	55,680	27,658	--	--	1,940	--	--	--	--
Shortleaf pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other yellow pines	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Baldcypress	55,254	526	13,233	22,748	--	8,948	5,066	4,223	--	--	--	--	--	510	--
Eastern redcedar	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	599,075	258,260	13,233	22,748	162,945	46,812	60,746	31,881	--	--	1,940	--	--	510	--
Hardwoods	727,866	5,487	--	7,049	27,979	70,379	257,563	348,098	--	--	3,622	--	--	7,689	--
Select white oak	370,006	2,609	--	16,528	10,102	240,837	75,609	16,238	--	--	--	--	--	8,083	--
Other white oak	191,538	--	--	1,106	--	3,999	136,299	39,645	--	--	1,216	--	--	9,273	--
Select red oak	1,474,548	15,266	1,791	12,115	55,244	284,231	964,508	134,610	--	--	--	--	--	6,783	--
Other red oak	92,842	--	--	1,229	1,966	21,797	43,474	24,376	--	--	--	--	--	--	--
Select hickory	96,552	4,383	--	382	1,247	29,653	45,302	15,233	--	--	--	--	--	352	--
Other hickory	2,198	--	--	--	--	--	--	1,946	--	--	--	--	--	252	--
Basswood	4,786	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hard maple	8,202	--	--	--	--	--	941	1,087	--	--	--	--	--	2,758	--
Soft maple	4,710	--	--	--	--	--	991	--	--	--	5,503	--	--	1,708	--
Elm	34,867	--	1,214	--	--	--	2,211	--	--	--	1,285	--	--	--	--
Ash	47,519	--	--	3,155	--	3,651	11,871	12,718	--	--	3,472	--	--	--	--
Sycamore	--	--	--	--	--	1,945	5,342	15,321	--	--	15,777	--	--	9,134	--
Cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Willow	17,633	--	--	1,667	--	--	1,184	6,616	--	--	5,538	--	--	2,628	--
Hackberry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aspen	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sweetgum	9,026	--	--	--	850	800	5,417	1,959	--	--	--	--	--	--	--
Tupelo	5,319	--	--	--	--	1,354	610	1,808	--	--	--	--	--	1,547	--
Black cherry	53,197	--	--	--	802	4,984	21,518	14,724	--	--	4,482	--	--	6,687	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Butternut	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Persimmon	2,870	--	--	--	--	--	1,544	1,326	--	--	--	--	--	--	--
Sassafras	17,845	--	--	--	--	1,122	--	14,444	--	--	--	--	--	2,279	--
Other hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	3,161,524	27,745	3,005	43,231	98,190	664,752	1,574,384	650,149	--	--	40,895	--	--	59,173	--
All species	3,760,599	286,005	16,238	65,979	261,135	711,564	1,635,130	682,030	--	--	42,835	--	--	59,683	--

<sup>1</sup> International 1/4-inch rule.<sup>2</sup> Nonstocked with all live trees.

Miles, Patrick D.

1990. **Timber resource of Missouri's Southwest Ozarks.** Resour. Bull. NC-116. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 44 p.

Timber inventory report for twelve county area in southwest Missouri. Forest land comprises approximately half the land area of these counties. Timber removals are less than half of growth. Timber volume and growth continue to increase as large areas of regenerated stands achieve sawtimber size. Highlights and statistics are presented on area, volume, growth, mortality and removals.

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KEY WORDS: Area, volume, growth, removals, mortality.

Our job at the North Central Forest Experiment Station is creating, evaluating, and disseminating information and technology to improve management and use of our natural resources.

As a new generation of forests emerges in our region, managers are confronted with two unique challenges: (1) Dealing with the great diversity in composition, quality, and ownership of the forests, and (2) Reconciling the conflicting demands of the people who use them. Helping the forest manager meet these challenges while protecting the environment is what research at North Central is all about.

