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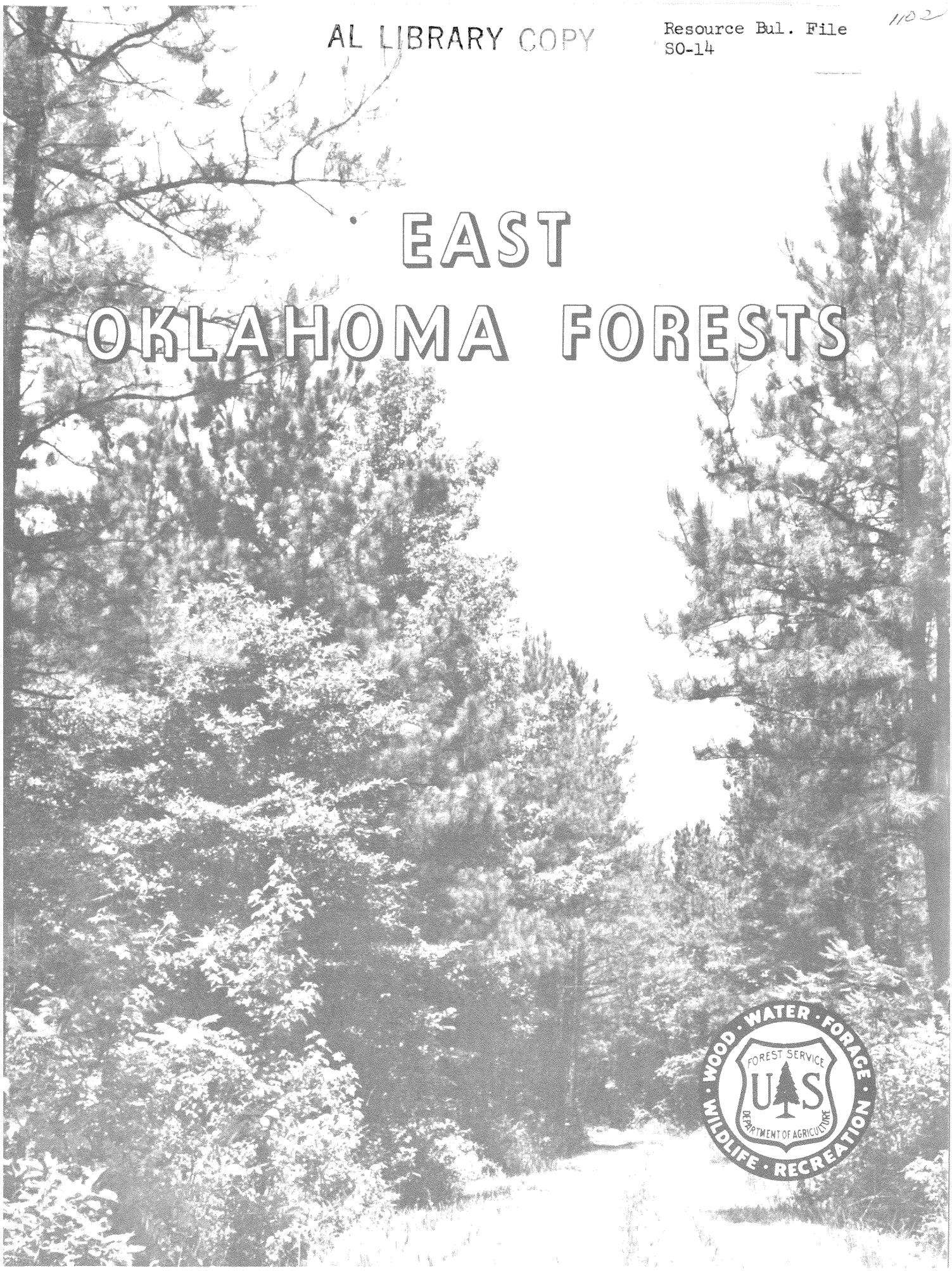
# EAST OKLAHOMA FORESTS



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# Foreword

This report presents the principal findings of the latest Forest Survey of east Oklahoma, completed in 1966 by the Southern Forest Experiment Station. The survey, which was undertaken as one phase of the continuing nationwide inventory being conducted by the USDA Forest Service, provides up-to-date information on the kind, amount, and condition of forest resources; the industries they support; and the possibilities for improving wood production. Comparison with the previous survey of 1956 helps to clarify timber trends.

The field work, compilation of data, and preparation of this report represent the combined efforts of many people. Generous assistance from the Oklahoma Division of Forestry and from Dierks Forests, Inc., made it possible to keep the field work ahead of the schedule that could have been maintained with regularly allotted funds. The very material aid of these organizations, and of the individuals in them, is gratefully acknowledged.

# EAST OKLAHOMA FORESTS

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*and*
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**U. S. DEPARTMENT OF AGRICULTURE**
FOREST SERVICE

**SOUTHERN FOREST EXPERIMENT STATION**
New Orleans, Louisiana

1968

*Photos by*
*Oklahoma Division of Forestry*

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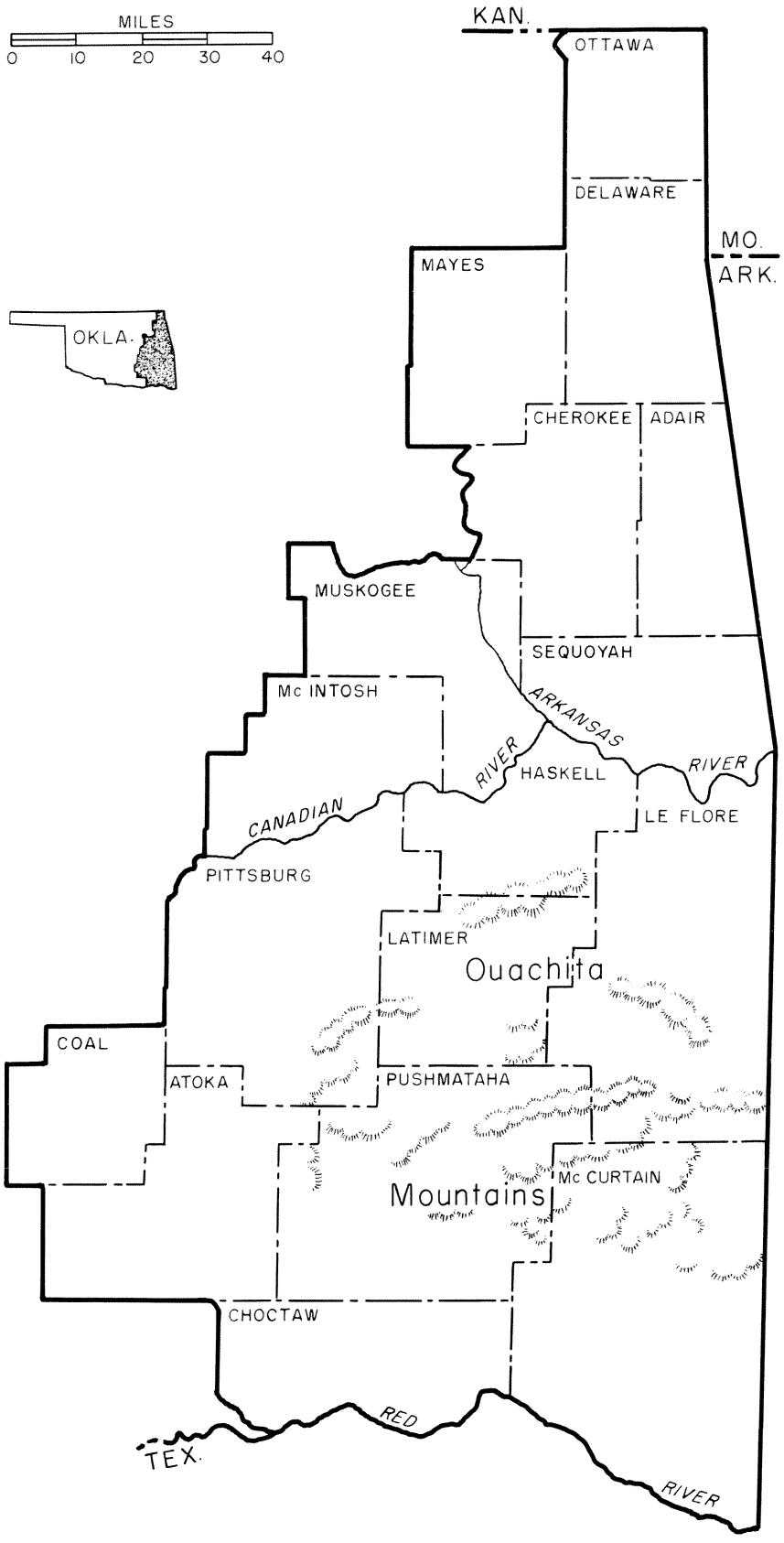


Figure 1.—*Counties included in Forest Survey of east Oklahoma.*

# Highlights

The 17 counties designated as east Oklahoma in this report encompass the main belt of commercial timberland in the State (fig. 1). Forests occupy 5.5 million acres or some 57 percent of the total land area. During the decade that elapsed between the 1956 and 1966 surveys, the acreage of forest land declined about 5 percent. The modest drop in forest area was largely due to land clearing for agriculture. About 4.8 million acres of the total forest area is commercial forest land. The remaining 13 percent is classified as noncommercial. Most of the latter acreage consists of land that is simply incapable of yielding crops of industrial wood.

There has been little change in the general pattern of forest landownership during the past decade. Public and forest industry lands still comprise some 30 percent of the commercial forest area. The rest is held by farmers and miscellaneous private owners who are generally engaged in occupations or enterprises not directly connected with timber growing.

Stocking of commercial forest land has increased noticeably since 1956, when the previous inventory was made. Average basal area per acre in growing stock trees has risen from 27 to 32 square feet, a 19 percent gain. Pine accounted for most of the gain. Despite this encouraging trend, much of the available growing space is not being used effectively. Rough and rotten trees that have little or no commercial value occupy one-third of the available growing space.

Pine timber volume has risen 31 percent since 1956. East Oklahoma forests now support 754 million cubic feet in softwood growing stock trees, nearly all shortleaf and loblolly pine. Volume in softwoods large enough to contain at least one saw log is 2.5 billion board feet, an increase of 32 percent. Because east Oklahoma's timber economy is saw-log oriented, demand is heavy for large trees. The distribution of tree size classes in softwoods, however, was adequate to supply the demand and still leave some growth to improve the forest inventory.

Trends in hardwood differ greatly from those for pine. The volume of hardwood growing stock on commercial forest land totals 824 million cubic feet, or about 1 percent less than in 1956. Hardwood sawtimber volume stands at 1.8 billion board feet, a decline of 7 percent. The drop in hardwood volume was chiefly in trees of large diameter that are usually preferred for making lumber.

Roundwood products harvested in east Oklahoma totaled 30 million cubic feet in 1965—17 percent less than was reported in 1955. Increases in saw logs, charcoal wood, poles, piling, and pine posts were offset by losses in other items. Most of the decline is attributable to fuelwood.

The net growth of growing stock trees exceeded the volume of timber removed from commercial forest land by 20 million cubic feet in 1965. Growth and cut relationships, however, differ for softwood and hardwood. Softwood growth—41 million cubic feet—was more than double the volume removed in 1965. By contrast, the volume of hardwood removed was slightly greater than the 21 million cubic feet of hardwood growth.

The forests of east Oklahoma are capable of producing far more timber than they are currently growing. Net annual growth presently totals only 13 cubic feet per acre. Yet it is estimated that the commercial forest area is inherently capable of growing nearly 50 cubic feet per acre. Regeneration and stand improvement efforts must be greatly intensified in order to narrow the gap between current and potential growth. The need for such effort is most evident on private, nonindustrial holdings that make up more than two-thirds of the commercial forest land. Improving timber productivity on such holdings would strongly enhance the possibilities for expansion of basic forest industries.

# The Forest Resource

## LESS FOREST AREA

Forests occupy 5.5 million acres or 57 percent of the land in east Oklahoma. This is about 5 percent less acreage than there was in 1956. The reduction was widespread. Twelve of the 17 counties in east Oklahoma have less forest area today than they did in 1956.

Some 4.8 million acres are presently classed as commercial forest land. The other 0.7 million are regarded as noncommercial, either because they are in some kind of public ownership on which the timber is reserved from cutting or because the timber-growing capacity is extremely low.

Present standards for commercial forest land are more demanding than those used on the 1956 forest survey, for they include the requirement that the land must be capable of at least 20 cubic feet per acre of annual growth. By this new definition, 588,000 acres classified as commercial in 1956 would have been reported as noncommercial. After this acreage is discounted, the estimate of commercial forest land for 1956 is 5.0 million acres.

Since 1956, 396,000 acres of commercial forest land have been diverted to agriculture and other uses, while 169,000 acres reverted to commercial forest. The net result of these shifts in land use is that commercial forest area has declined 227,000 acres or 4 percent.

## STABLE OWNERSHIP PATTERN

The general pattern of forest landownership in east Oklahoma has been remarkably stable over the past decade. Public and forest-industry holdings, characteristically the most intensively managed lands, still account for some 30 percent of the commercial forest area. The 566,000 acres of public lands are divided among Federal, State, county, and municipal ownership. Among the public holdings, a decline of 153,000 acres in Indian ownership was largely offset by additions to forest lands held by other public agencies. All of the 869,000 acres in industrial ownership is made up of lumber company holdings. Both the industrial and public ownerships are concentrated in the counties south of the Arkansas River.

The bulk of the commercial forest land—3.4 million acres—is held by farmers and miscellaneous private owners. Average stand conditions are poorer on lands held by these groups than on public and industry lands. Although the holdings of farmers and miscellaneous private owners make up 70 percent of the commercial forest land, they presently support only 50 percent of the growing stock and 43 percent of the sawtimber. The extensive area in these ownerships makes them of prime importance as a source of future timber supplies.

## HARDWOOD TYPES PREDOMINATE

Hardwood cover types occupy most of the commercial forest land in east Oklahoma.[1] In the uplands, oak-hickory is the predominant type on 2.9 million acres or 60 percent of the forest area. Bottom land forests of oak-gum-cypress and elm-ash-cottonwood are found on nearly 0.5 million acres.

Forests in which pine makes up at least 25 percent of the stand prevail on some 1.5 million acres. Shortleaf pine is the leading softwood and is found mainly in the Ouachita Mountains.

Differences between specifications in the 1956 and 1966 surveys limit meaningful comparison of shifts in forest type acreage. The decline of more than 200,000 acres in oak-hickory stands since the previous survey, however, can be largely ascribed to the concentration of land clearing in this type.

[1] A map detailing the major forest types in the South is available upon request from the Southern Forest Experiment Station. The scale is 40 miles to the inch.

## STOCKING IMPROVING

Stocking of commercial forest land has improved noticeably. Since 1956, the average basal area per acre of all live trees 5.0 inches d.b.h. and larger has increased from 38 to 42 square feet. At the same time, the pine component of the basal area rose from 18 to 23 percent.

The gain in stocking is also evident in the smaller tree sizes. Planting and natural regeneration have contributed to a 17-percent increase in numbers of 2- and 4-inch trees since 1956. The average stand now has 444 trees per acre of sapling size. Many of these young trees can be expected to contribute to the development of more productive timber stands in the future.

Despite these encouraging trends, there is still considerable opportunity for improvement. Only 1 acre in 4, for example, is at least 70 percent stocked in terms of trees that qualify as growing stock—that is, trees whose quality is such that now or in the future they will yield at least one saw log. Much of the available growing space is occupied by rough and rotten trees of little or no commercial value. Altogether, such trees encumber about one-third of the forest area.

## SLIGHTLY LESS HARDWOOD

Hardwood growing stock on commercial forest land totals 824 million cubic feet. Post oak —a low-value hardwood—is the most common species and makes up 23 percent of the volume. All other oaks add up to 33 percent, hickory to 14 percent, and other hardwoods to 30 percent.

Growing stock volume now is about 1 percent less than in 1956.[2] During the interval between surveys, volume losses in trees 10 inches and larger in diameter were partly offset by gains in smaller trees (fig. 2). Most of the decline in growing stock was in large sawtimber—that is, trees 16 inches and larger in d.b.h. Today trees of these sizes make up about 20 percent of the growing stock. In 1956, they made up some 22 percent of an even larger hardwood inventory.

[2] In order to permit comparison of current volumes with earlier estimates, the previous estimates have been adjusted in accordance with present standards for classification of commercial forest land and for tree measurement.

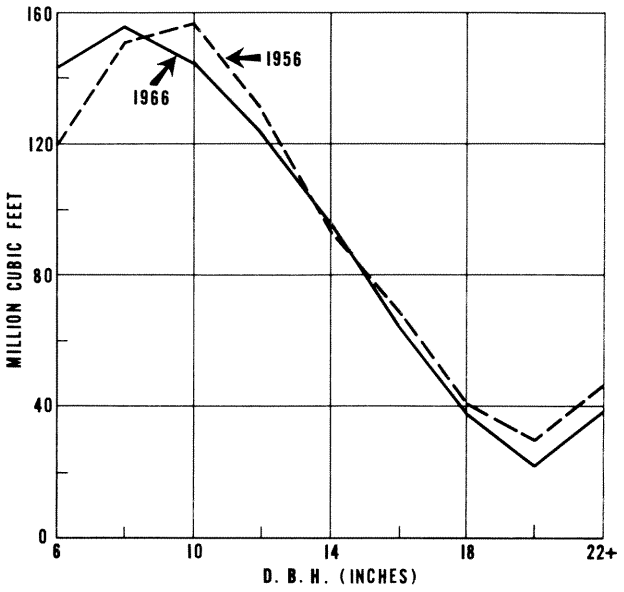


Figure 2.—*Hardwood growing stock volume by tree diameter, 1956 and 1966.*

The sawtimber component of the hardwood inventory totals 1.8 billion board feet. This volume represents a 7-percent decline since 1956. By definition, sawtimber excludes hardwoods less than 11.0 inches in diameter. Thus, the increase in smaller trees, which helped to offset growing stock losses, is not included in the sawtimber change.

Some 28 percent of the sawtimber volume is in logs of grades 1 and 2. These are the logs normally most in demand for factory lumber and other products requiring clear material. About 50 percent of the hardwood sawtimber is made up of grade 3, which is the lowest or marginal log grade suitable for standard factory lumber. The remaining volume is in tie and timber logs that are presently suited only to low-value end uses such as crating and crossties (table I).

Table I. *Sawtimber volume by log grade and tree diameter, 1966*

| Species group and d.b.h. class (inches) | All grades | Grade 1[1] | Grade 2 | Grade 3 | Lower grades |
|---|---|---|---|---|---|
| | | *Million board feet* | | | |
| Softwood: | | | | | |
| 10 to 12 | 1,233.1 | 5.5 | 49.3 | 824.1 | 354.2 |
| 14 to 18 | 1,152.5 | 12.2 | 275.1 | 457.2 | 408.0 |
| 20 and up | 123.0 | 10.2 | 38.2 | 32.7 | 41.9 |
| Total | 2,508.6 | 27.9 | 362.6 | 1,314.0 | 804.1 |
| Hardwood: | | | | | |
| 12 | 503.4 | ... | 18.0 | 326.8 | 158.6 |
| 14 to 18 | 961.4 | 64.6 | 244.6 | 463.3 | 188.9 |
| 20 and up | 335.8 | 109.0 | 64.2 | 122.0 | 40.6 |
| Total | 1,800.6 | 173.6 | 326.8 | 912.1 | 388.1 |

[1] All cedar saw logs were graded as No. 1.

In addition to growing stock trees, east Oklahoma forests support 777 million cubic feet of sound volume in rough and rotten hardwoods. Although these trees do not meet growing stock specifications, and hence are unsuitable for sawn products, many of them contain usable amounts of boltwood.

## BIG GAIN IN PINE

Softwood comprises nearly half of the total growing stock; the volume now stands at 754 million cubic feet, of which 90 percent is in Le Flore, McCurtain, and Pushmataha Counties.

Shortleaf pine makes up 92 percent of the softwood (fig. 3). The rest is largely loblolly pine, but includes some cypress and redcedar.

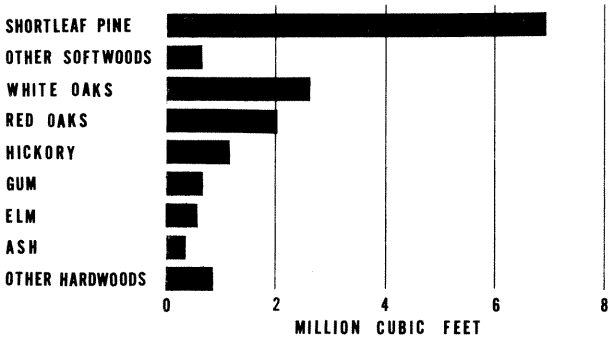


Figure 3.—*Growing stock by species.*

Since 1956, the volume of softwood growing stock has increased 31 percent and sawtimber volume has risen 32 percent.[2] These percentage gains were achieved on relatively small bases. The softwood volume in the loblolly-shortleaf pine and oak-pine types averages only 482 cubic feet per acre, including 1,610 board feet of sawtimber. Almost all the pine is found in these two types.

More than four-fifths of the recent gain in softwood growing stock volume occurred in trees 6 to 14 inches in diameter (fig. 4). The rest was in trees of larger size. Additionally, numbers of sapling-size softwoods—2 to 4 inches in diameter—have increased a third. These young trees can be counted on to further improve the growing stock as they attain merchantable size.

Although public and industrial ownerships make up only 30 percent of the commercial forest land, they support three-fourths of the softwood growing stock. The management programs on these holdings account for a sizable portion of the softwood gain. Moreover, these ownerships provide a firm foundation on which future gains can be realized.

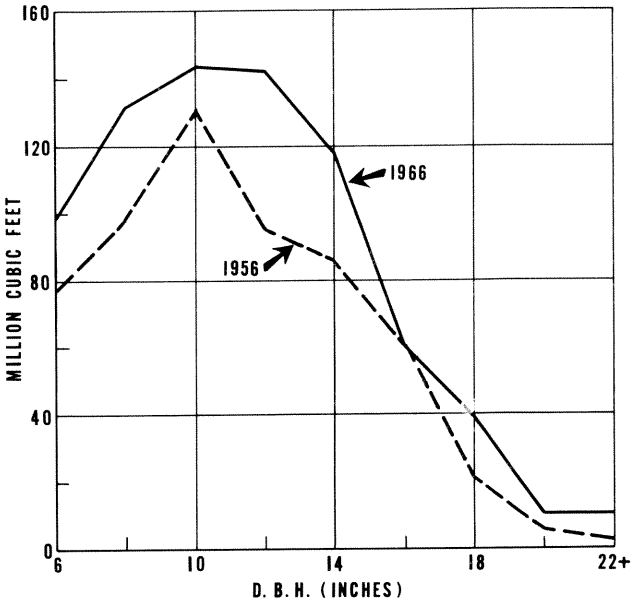


Figure 4.—*Softwood growing-stock volume by tree diameter, 1956 and 1966.*

Softwood volume has also risen on private, nonindustrial holdings, but here softwood is frequently a minor component of the forest. Alltogether, for example, softwoods account for only one-fourth of the volume in these ownerships. Public protection of forest land generally has permitted pine to become established and survive on farm and miscellaneous holdings. Additionally, the increase in softwood on these holdings appears to derive in part from lack of industrial cutting opportunities.

The potential acreage of pine type greatly exceeds the 1.5 million acres classed as loblolly-shortleaf pine or oak-pine. In all there are some 2.7 million acres of commercial forest land capable of growing pine—as evidenced by pine's present or former occurrence.

## PINE GROWTH EXCEEDS REMOVALS

East Oklahoma's growing stock inventory increased by 20.3 million cubic feet in 1965.

A slight loss in hardwood volume was offset by a substantial gain in softwood.

Softwood growth exceeded mortality and removals by 21.6 million cubic feet. Timber mortality attributable to fires, insects, disease, and other natural causes amounted to 5 percent of the gross growth. Timber removed for products, land clearing, and the like offset 44 percent of the gross growth. The remaining 51 percent was the indicated increase in softwood growing stock (fig. 5).

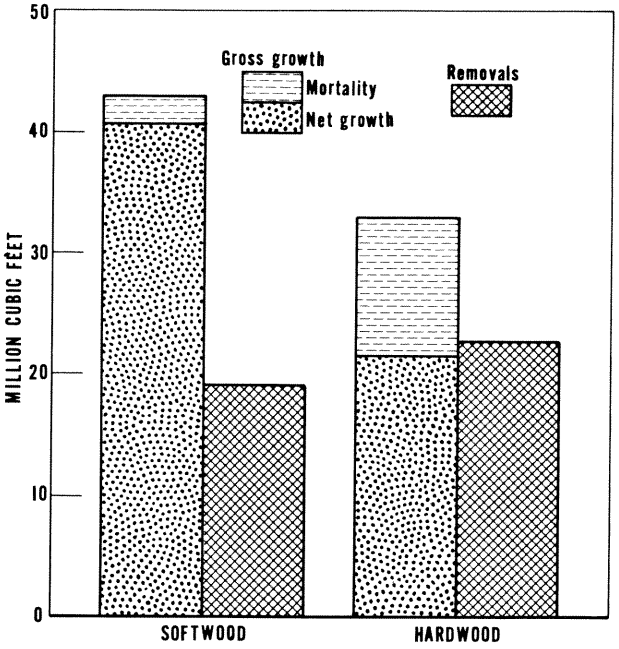


Figure 5.—*Growth, mortality, and removals of growing stock, 1965.*

Nearly all of the 19.1 million cubic feet of softwood removals were used for products. Because east Oklahoma's timber economy is saw-log oriented, demand is heavy for large trees. However, the distribution of size classes in the softwood inventory was adequate to supply the demand and still leave some growth to improve the stand.

In hardwoods, gross growth was less than the sum of removals and mortality. The hardwood loss was 1.3 million cubic feet. Gross growth was 32.9 million cubic feet, but mortality amounted to 35 percent of this volume and removals were equivalent to 69 percent. Taken together, these items resulted in a small loss of inventory.

Hardwood removals totaled 22.7 million cubic feet of growing stock. Of this, half was used for products. The rest was made up of growing stock deadened or destroyed in land clearing, harvesting, or cultural operations.

Although sawtimber volume in east Oklahoma is also rising, it is not gaining as rapidly as growing stock. Softwoods account for all of the increase in sawtimber. For these species, net growth exceeded removals by more than 50 percent in 1965. For hardwoods, sawtimber removals were in excess of growth by 40 percent.

Long-term resource trends are discussed in another section of this report. For the immediate future, however, it appears that the softwood growing stock volume will continue increasing at the present rate of almost 3 percent per year. But the hardwood inventory will remain at about its present level.

# Timber Products Output

Roundwood products harvested from east Oklahoma forests totaled 30 million cubic feet in 1965. More than half was pine; the rest was hardwood. McCurtain County was the major producer, followed by Pushmataha and Le Flore. These counties accounted for virtually all of the pine timber harvested and for 40 percent of the hardwood.

Total roundwood output in 1965 was about 17 percent less than was reported in 1955. Increases in saw logs, charcoal wood, poles, piling, and pine posts were offset by losses in other items. Most of the decline was in fuelwood.

Saw logs totaled 104 million board feet in 1965, more than half the total roundwood output. Nearly four-fifths were pine. Most of the hardwood was oak; the remainder was largely gum. All but 7 percent of the logs were sawn by east Oklahoma mills.

At least 110 sawmills were active in east Oklahoma during 1965 (fig. 6). Eighty percent of the logs sawn went to the seven largest sawmills. Most of these mills saw mainly pine. Of the smaller sawmills in east Oklahoma, a few are active throughout the year. But the majority are part-time ventures. Some of the part-time operators are farmers who saw to order for local consumption. Others are crosstie producers who work when demand for ties is high. Operating a sawmill on an intermittent basis is largely made possible by using machinery long since depreciated to a nominal value.

Fuelwood ranks second among all roundwood products in terms of volume. Nearly all of it is hardwood. Estimated annual consumption of roundwood for domestic fuel dwindled from 198,000 cords to less than 82,000 in the last decade. The decline is largely due to the

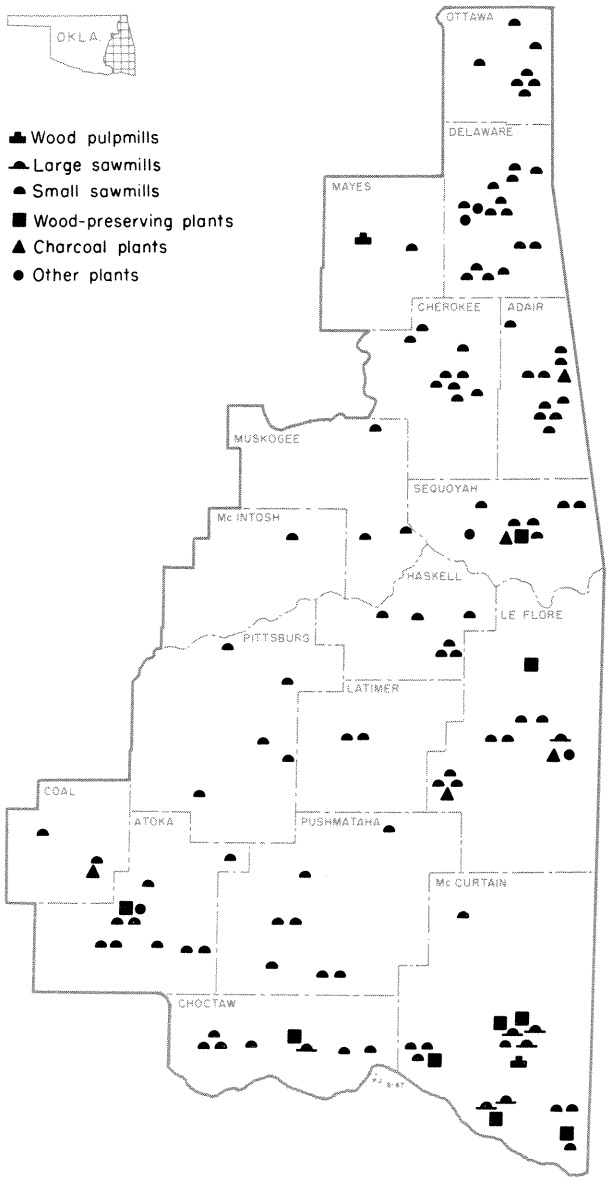


Figure 6. —*Location of primary wood-using plants.*

substitution of more convenient fuels for heating and cooking in rural areas. Rising urbanization and per capita income are expected to further reduce domestic fuelwood consumption. An additional 22,000 cord equivalents of fuelwood were salvaged from mill residues in 1965; most of the volume was pine used for industrial fuel.

The 4.2 million fence posts harvested in 1965 made up 9 percent of the roundwood output. Although fewer hardwoods are now being cut for posts than in 1955, there is still a lively market for pine posts. Nearly all of the 3.4 million pine posts cut in 1965 were treated at wood-preserving plants in east Oklahoma. These plants also imported an additional 2.8 million pine posts. Cedar and hardwood are used untreated.

East Oklahoma produced 20,000 cords of pulpwood bolts in 1965. Most of the bolts were hardwood. Another 53,000 cord equivalents were manufactured from pine sawmill chips. The total, which is almost double the 1955 output, reflects recent gains in the region's pulping capacity. Construction of new facilities in neighboring States is likely to stimulate Oklahoma bolt markets in the next few years.

All other roundwood products made up 2.9 million cubic feet or 9 percent of the 1965 harvest. Of the total, 1.8 million cubic feet was hardwood cut for charcoal. Pine poles and piling made up an additional 0.5 million cubic feet. The remainder was hardwood, primarily furniture stock and handle stock.

The processing of roundwood by east Oklahoma wood-using industries resulted in 9.8 million cubic feet of wood residues in 1965. Two-thirds of this material was converted into products. The greatest part of the used portion was chips for the pulp industry. Other uses included fuel, both industrial and domestic, livestock bedding, and soil mulch. Of the 3.4 million cubic feet of unused residues, two-fifths was fine material unsuitable for chipping, such as sawdust and shavings.

# Timber Supply Outlook

Long-term resource projections are subject to many uncertainties, since the future forest situation depends upon numerous man-directed factors. Nevertheless, it is often useful to determine the volume of timber that might be available in the future under a reasonable set of assumptions. One set of assumptions is that current trends in forest management will continue, and a projection on this basis is shown here as prospective available cut. Present levels of management, however, are far from ideal. Hence a second projection was made to represent an upward trend in management. The latter projection assumes that by the end of a specified planning period a desirable distribution of tree size-classes can be maintained. This projection is referred to as potential available cut.

## PROSPECTIVE AVAILABLE CUT

The projection of prospective cut shows the volume of timber that will be available if the growth and cut of growing stock are gradually brought into balance at the end of 30 years. The difference between growth and cut was reduced by an equal amount during each year of the period. Moreover, it was assumed that radial growth, mortality rates, and the distribution of cut by diameter classes would remain unchanged. The results of this projection are shown in figures 7 and 8.

In 1965, the margin of softwood growth over timber removals was quite favorable. This situation permits removals to increase greatly in the next 30 years. In fact, the available cut of growing stock in 1995 will be four times the present harvest.

Although the growth and cut of softwood growing stock will be equal in 1995, the sawtimber cut will exceed growth by a significant amount. As shown in figure 7, softwood sawtimber growth does not change appreciably during the projection period. The reason for this is that the distribution of cutting within the stand is heavily weighted toward trees of large diameter. Thus, timber stands at the end of the period will contain few large trees but many small ones (fig. 9). This situation cannot continue if saw logs are to remain the primary timber product in Oklahoma. But if a greater proportion of the harvest is taken from trees of small diameter, the projected cut of growing stock can be maintained without depleting the sawtimber inventory.

In 1965, growth and removals of hardwood growing stock were nearly equal. As growth and cut are brought into balance, little change takes place in the total volume of hardwood growing stock. Meanwhile, both growth and removals gradually increase to twice their initial volume. This condition results from the distribution of timber cut. Because the cut exceeds growth for large trees, the inventory in such trees is eventually reduced (fig. 10). The growth, therefore, is concentrated on the faster growing trees of small diameter.

As with softwoods, the hardwood projection uncovers an imbalance between growing stock and sawtimber. The shift in tree sizes is largely responsible. Also important, however, is the heavy concentration of rough and rotten trees. At present, two-thirds of the sawtimber-size trees do not possess the attributes necessary for saw logs. Consequently, much of the volume growth in this portion of the stand occurs on trees that do not contribute to the sawtimber inventory. Unless this situation is remedied, it is likely that customary harvesting practices will further intensify an already undesirable condition.

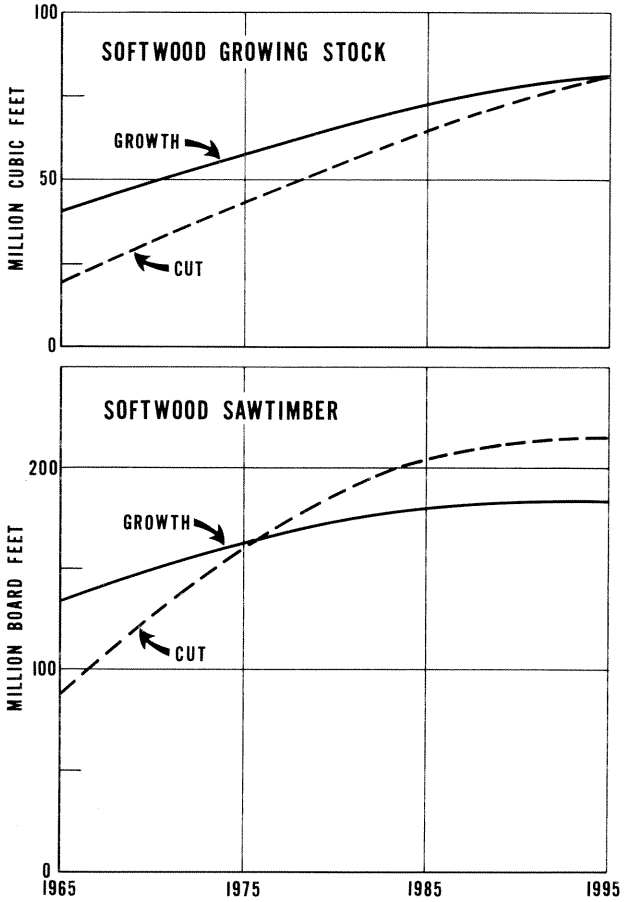


Figure 7.—*Prospective growth and cut of softwood, 1965-1995, east Oklahoma.*

## POTENTIAL AVAILABLE CUT

The projection of potential cut indicates the volume of timber that might be available in 50 years if management efforts are intensified. To provide the potential cut of timber would require the development of well-stocked stands that contain a higher proportion of large trees than currently exist. The inventory needed to support the potential cut is shown in figures 9 and 10.

In this projection it was assumed that the area of commercial forest would remain constant but that the acreage currently occupied by oak-pine forest types will eventually be converted to pure pine. This area, together with the acreage already in pine, would provide 1.5 million acres of pinelands.

Another important assumption is that the proportion of growing stock trees in the hardwood inventory can be increased. Nearly three-fifths of the hardwood stand in trees 5 inches in d.b.h. and larger consists of rough and rotten trees. To attain the potential cut, it will be essential for forest managers to accelerate timber stand improvement in order to make more space available for thrifty trees. For this projection, it was assumed that measures would be taken to increase the proportion of hardwood growing stock trees to 50 percent of the stand in all size classes.

It was found that east Oklahoma forests might be expected to yield 120 million cubic feet of growing stock annually. About two-thirds of the volume would be softwood. The total is slightly less than the 126 million cubic feet that would be available under the projection of prospective cut. The important difference is in the kinds of timber that would be available. The resource could sustain a much larger harvest of sawtimber-size trees with the intensified management envisaged under the potential-cut projection. The prospective avail-

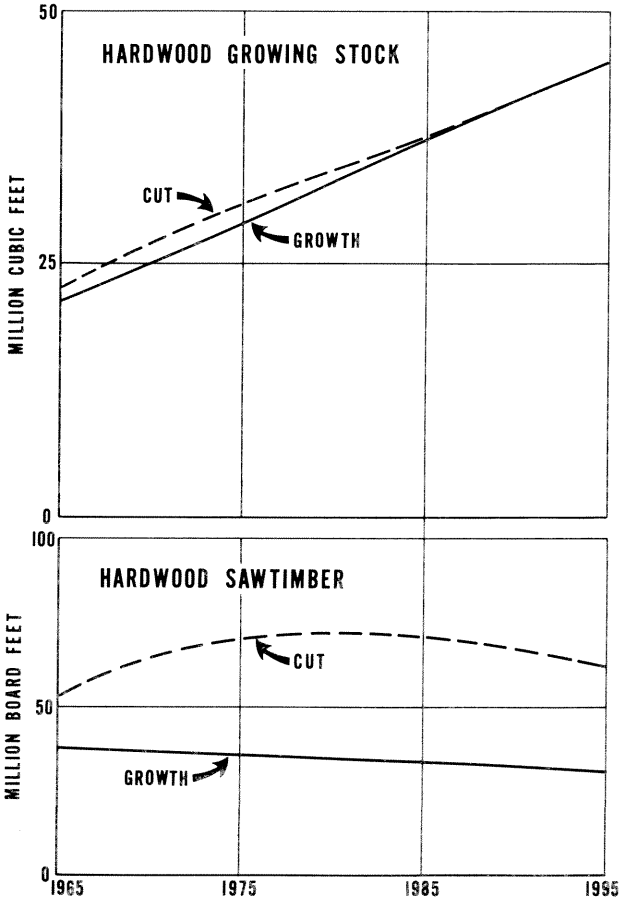


Figure 8.—*Prospective growth and cut of hardwood, 1965-1995, east Oklahoma.*

able cut of sawtimber is only 214 million board feet annually, while the potential harvest could be 345 million board feet. The marked difference between the prospective and the potential sawtimbr cut provides one indication of the opportunity that is available for improving Oklahoma's timber situation.

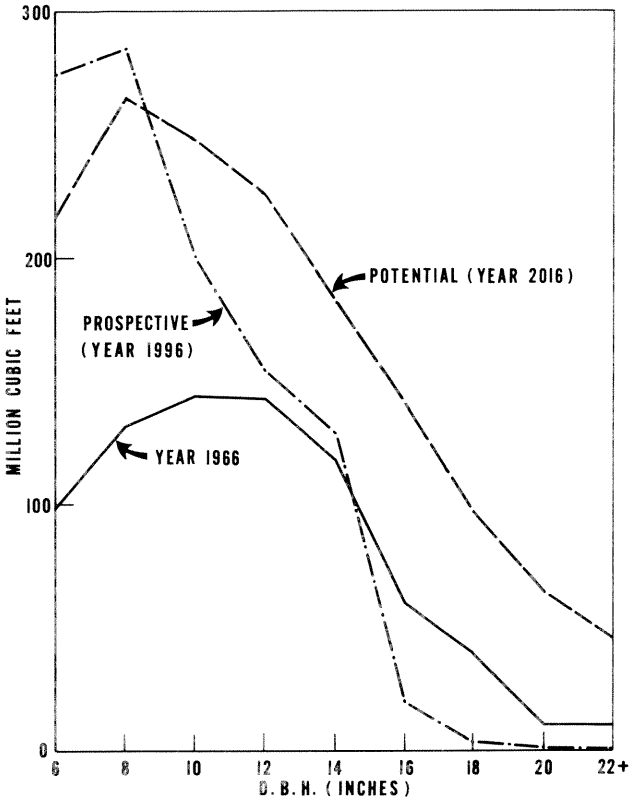


Figure 9.—*Comparison of 1966 softwood growing stock with prospective and potential inventories.*

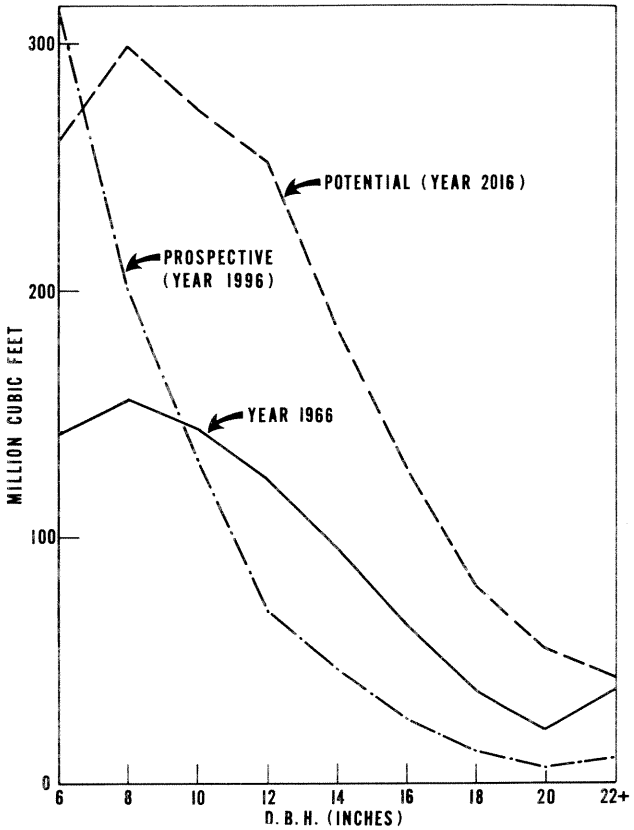


Figure 10.—*Comparison of 1966 hardwood growing stock with prospective and potential inventories.*

# Management Opportunities

Timber growth in east Oklahoma is far below its potential. About one-third of the commercial forest land is inherently capable of growing in excess of 50 cubic feet per acre annually. The rest can grow between 20 and 50 cubic feet. For all commercial sites combined, average growth potential is 49 cubic feet per acre. By contrast, current net annual growth is only 13 cubic feet. There are numerous opportunities to increase timber growth.

## STAND TREATMENTS

Of the commercial forest land, 165,000 acres are 70 percent or more stocked with desirable trees. Such stands generally do not require any special treatments to insure a high level of growth. Three-fifths of this productive acreage is in forest industry holdings.

Another 736,000 acres are 40 to 70 percent stocked with desirable trees. About one-fourth of this area is expected to attain full stocking without treatment. But 560,000 acres of the total will require special measures such as cull-tree control.

About four-fifths of the commercial forest acreage, 3.9 million acres, is less than 40 percent stocked with desirable trees. Some 2.5 million of these acres, however, are 40 percent or better stocked with trees that are still acceptable as growing stock. Many of these stands probably afford opportunities for improvement, especially the 446,000 acres that are at least 70 percent stocked. Moreover, planting may be needed on some pine sites.

About 1.5 million acres of commercial forest land are presently contributing very little timber. This acreage does not even support 40 percent stocking in trees good enough to be accepted as growing stock. In fact, rough and rotten trees plus nonstocked areas make up three-fourths of this acreage. Regeneration will be required to bring these acres into production. Most of this nonproductive land is in private, nonindustrial ownership. At least 425,000 of these 1.5 million acres are pine sites that could be restored to full productivity through site preparation and planting or seeding.

## PROTECTION

Reducing timber losses from fire, insects, disease, and other natural agents represents another important means of increasing future timber supplies. Total mortality of growing stock in 1965 was equivalent to more than two-fifths of the volume cut for timber products. In addition, an unknown volume of growth was lost as a result of damage to trees that were not actually killed. Destructive agents can also cause defects that reduce the grade and value of standing timber.

## UTILIZATION

Improvements in timber utilization afford another means of extending available wood supplies in east Oklahoma. Logging and plant residues together totaled 8.4 million cubic feet in 1965. An additional 9.9 million cubic feet of unused material resulted from land clearing and cultural operations. Although full use of this 18.3 million cubic feet is not presently feasible, advances are possible. The very limited use for the 786 million cubic feet of rough and rotten trees in the standing inventory, however, dwarfs other utilization problems.

## CONDITIONS IN GENERAL

The reinventory of east Oklahoma found forest conditions noticeably changed since the earlier survey of 1956. The level of softwood growth has been high enough to support forest industry's need for timber and at the same time permit a sizable buildup in the pine inventory. Moreover, the immediate outlook is for further gains in pine volume.

The hardwood situation is much less encouraging. The inventory of hardwood sawtimber is less now that it was a decade ago. In the absence of more intensive management, prospects appear to be dim for any substantial improvement in the quantity and quality of hardwoods. Improving hardwood resources will require large-scale efforts to insure both the prompt regeneration of favored species after cutting and the reserving of potentially high-quality trees for future growing stock. It is also evident that extensive stand improvement work will be needed to rid the forest of excessive numbers of rough and rotten hardwoods.

The extent to which timber management will be intensified in the future depends largely upon the thousands of owners of farm and other private, nonindustrial woodlands. Altogether, these owners control more than two-thirds of the commercial forest land. Greatly intensified efforts to improve timber productivity on their holdings can open new opportunities for forest industry in Oklahoma.

# Appendix

## ACCURACY OF THE SURVEY

The data on forest acreage and timber volume in this report were secured by a systematic sampling method involving a forest-nonforest classification on aerial photographs and on-the-ground measurements of trees at sample locations. The sample locations were at the intersections of a grid of lines spaced 3 miles apart. At each location, 10 small plots were systematically distributed on an area of about 1 acre.

Accuracy of the estimates may be affected by two types of errors. The first stems from the use of a sample to estimate the whole and from variability of the items being sampled. This type is termed sampling error; it is susceptible to a mathematical evaluation of the probability of error. The second type—often referred to as reporting or estimating error—derives from mistakes in measurement, judgment, arithmetic, or recording, and from limitations of method or equipment. Its effects cannot be appraised mathematically, but the Forest Survey constantly attempts to hold it to a minimum by proper training and good supervision, and by emphasis on careful work.

Statistical analysis of the data indicates a sampling error of plus or minus 0.3 percent for the estimate of total commercial forest area, 0.6 percent for total unproductive forest area, 4.2 percent for total cubic volume, and 5.8 percent for total board-foot volume. As these totals are broken down by forest type, species, tree diameter, and other subdivisions, the possibility of error increases and is greatest for the smallest items. The order of this increase is suggested in the tabulation at bottom of page, which shows the sampling error to which the estimates are liable, two chances out of three.

Growth estimates were derived from diameter-growth measurements and mortality data taken at sample locations. No attempt was made to calculate sampling error in these estimates.

Estimates of timber removals are based on studies conducted during the period of forest inventory. The sampling error to which the estimates are liable, on a probability of two chances out of three, are:

| Cubic volume | Sampling error [1] | Board-foot volume | Sampling error [1] |
|---|---|---|---|
| *Million cu. ft.* | *Percent* | *Million bd. ft.* | *Percent* |
| ... | ... | 141.0 | 3.4 |
| ... | ... | 101.9 | 4.0 |
| 41.8 | 5.9 | 65.2 | 5.0 |
| 14.6 | 10.0 | 16.3 | 10.0 |
| 6.5 | 15.0 | 7.2 | 15.0 |
| 3.6 | 20.0 | 4.1 | 20.0 |
| 2.3 | 25.0 | 2.6 | 25.0 |

[1] By random-sampling formula.

| Commercial forest area | Sampling error [1] | Unproductive forest area | Sampling error [1] | Cubic-foot volume [2] | Sampling error [1] | Board-foot volume [3] | Sampling error [1] |
|---|---|---|---|---|---|---|---|
| *Thousand acres* | *Percent* | *Thousand acres* | *Percent* | *Million cu. ft.* | *Percent* | *Million bd. ft.* | *Percent* |
| 4,817.4 | 0.8 | ... | ... | ... | ... | ... | ... |
| 3,083.1 | 1.0 | 617.7 | 1.8 | ... | ... | ... | ... |
| 770.8 | 2.0 | 500.3 | 2.0 | ... | ... | ... | ... |
| 342.6 | 3.0 | 222.4 | 3.0 | ... | ... | ... | ... |
| 192.7 | 4.0 | 125.1 | 4.0 | 1,578.3 | 4.2 | ... | ... |
| 123.3 | 5.0 | 80.1 | 5.0 | 1,113.6 | 5.0 | 4,309.2 | 5.8 |
| 30.8 | 10.0 | 20.0 | 10.0 | 278.4 | 10.0 | 1,449.6 | 10.0 |
| 13.7 | 15.0 | 8.9 | 15.0 | 123.7 | 15.0 | 644.3 | 15.0 |
| 7.7 | 20.0 | 5.0 | 20.0 | 69.6 | 20.0 | 362.4 | 20.0 |
| 4.9 | 25.0 | 3.2 | 25.0 | 44.5 | 25.0 | 231.9 | 25.0 |

[1] By random-sampling formula.
[2] Growing-stock volume on commercial forest land.
[3] Sawtimber volume on commercial forest land.

In computing changes in timber volumes since 1956, data from the earlier survey were adjusted to make them closely comparable to those from the latest survey. This was necessary because of certain basic differences between the two sets of data. In every case, the data from the earlier survey were adjusted to conform to the standards of the latest survey before the change was computed.

## DEFINITIONS OF TERMS

*Forest Land Class*

**Forest land.**—Land at least 10 percent stocked by forest trees of any size, or formerly having such tree cover, and not currently developed for non-forest use.

**Commercial forest land.**—Forest land which is producing or is capable of producing crops of industrial wood and not withdrawn from timber utilization.

**Productive-reserved forest land.** — Productive public forest land withdrawn from timber utilization through statute or administrative regulation.

**Unproductive forest land.**—Forest land incapable of yielding crops of industrial wood because of adverse site conditions.

*Tree Species*

**Commercial species.**—Tree species presently or prospectively suitable for industrial wood products; excludes so-called weed species, such as blackjack oak and blue beech.

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

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

*Forest Type*

**Loblolly-shortleaf pine.**—Forests in which 50 percent or more of the stand is southern yellow pine, and loblolly or shortleaf pine, singly or in combination, predominates. Common associates include oak, hickory, and gum.

**Oak-pine.**—Forests in which 50 percent or more of the stand is hardwoods, usually upland oaks, but in which southern pines make up 25-49 percent of the stand. Common associates include gum, hickory, and yellow-poplar.

**Oak-hickory.**—Forests in which 50 percent or more of the stand is upland oaks or hickory, singly or in combination, except where pines comprise 25-49 percent, in which case the stand would be classified oak-pine. Common associates include yellow-poplar, elm, maple, and black walnut.

**Oak-gum-cypress.**—Bottom-land forests in which 50 percent or more of the stand is tupelo, blackgum, sweetgum, oaks, or southern cypress, singly or in combination, except where pines comprise 25-49 percent, in which case the stand would be classified oak-pine. Common associates include cottonwood, willow, ash, elm, hackberry, and maple.

**Elm-ash-cottonwood.**—Forests in which 50 percent or more of the stand is elm, ash, or cottonwood, singly or in combination. Common associates include willow, sycamore, beech, and maple.

*Class of Timber*

**Growing-stock trees.**—Sawtimber trees, poletimber trees, saplings, and seedlings; that is, all live trees except rough and rotten trees.

**Desirable trees.**—Growing-stock trees that have no serious defects to limit present or prospective use, are of relatively high vigor, and contain no pathogens that may result in death or serious deterioration before rotation age. They comprise the type of trees that forest managers aim to grow; that is, the trees left in silvicultural cutting or favored in cultural operations.

**Acceptable trees.**—Trees meeting the specifications for growing stock but not qualifying as desirable trees.

**Sawtimber trees.**—Live trees of commercial species, 9.0 inches and larger in diameter at breast height for softwoods and 11.0 inches and larger for hardwoods, and containing at least one saw log.

**Poletimber trees.**—Live trees of commercial species, 5.0 to 9.0 inches in d.b.h. for softwoods and 5.0 to 11.0 inches for hardwoods, and of good form and vigor.

**Saplings.**—Live trees of commercial species, 1.0 inch to 5.0 inches in d.b.h. and of good form and vigor.

**Rough and rotten trees.**—Live trees that are unmerchantable for saw logs now or prospectively because of defect, rot, or species.

**Salvable dead trees.**—Standing or down dead trees that are considered currently or potentially merchantable.

*Stand-Size Class*

**Sawtimber stands.**—Stands at least 10 percent stocked with growing-stock trees, with half or more of this stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

**Poletimber stands.**—Stands at least 10 percent stocked with growing-stock trees, with half or more of this stocking in sawtimber or poletimber trees, and with poletimber stocking exceeding that of sawtimber stocking.

**Sapling-seedling stands.**—Stands at least 10 percent stocked with growing-stock trees, with more than half of this stocking in saplings or seedlings.

**Nonstocked areas.**—Commercial forest lands less than 10 percent stocked with growing-stock trees.

*Stocking*

A measure of area occupancy by trees of specified classes. Three categories of stocking are considered in the Survey: (1) all live trees, (2) growing-stock trees, and (3) desirable trees. Stocking in terms of all trees is used in the delineation of forest land and forest types. Stocking in terms of growing-stock trees is used in stand-size and age classifications. Stocking in terms of desirable trees is used in delineating area-condition classes.

*Volume*

**Volume of sawtimber.**—Net volume of the sawlog portion of live sawtimber trees, in board feet of the International rule, ¼-inch kerf.

**Volume of growing stock.**—Volume of sound wood in the bole of sawtimber and poletimber trees from stump to a minimum 4.0-inch top outside bark or to the point where the central stem breaks into limbs.

**Volume of timber.**—The volume of sound wood in the bole of growing stock, rough, rotten, and salvable dead trees 5.0 inches and larger in d.b.h. from stump to a minimum 4.0-inch top outside bark or to the point where the central stem breaks into limbs.

*Log Grades*

Log grades are based on the standards presented by the USDA Forest Service in "Interim Log Grades for Southern Pines," issued by the Southern Forest Experiment Station in 1953, and "Hardwood Log Grades for Standard Lumber," issued by the Forest Products Laboratory under the designation D1737 in 1949.

Hardwood log grades include, in addition to the hardwood log grades for standard lumber, a grade-4 tie and timber log. Specifications for tie and timber logs are based chiefly on knot size and log soundness; clear cuttings are not required.

*Area-Condition Class*

**Class 1.**—Areas 70% or more stocked with desirable trees.

**Class 2.**—Areas 40 to 70% stocked with desirable trees, and with 30% or less of the area controlled by acceptable growing-stock trees, rough and rotten trees, inhibiting vegetation, slash, or nonstockable conditions.

**Class 3.**—Areas 40 to 70% stocked with desirable trees and with more than 30% of the area controlled by other trees or conditions that ordinarily prevent occupancy by desirable trees.

**Class 4.**—Areas less than 40% stocked with desirable trees, but with 70% or more stocking with growing-stock trees.

**Class 5.**—Areas less than 40% stocked with desirable trees, but with 40 to 70% stocking with growing-stock trees.

**Class 6.**—Areas less than 40% stocked with desirable trees and with less than 40% stocking with growing-stock trees.

*Miscellaneous Definitions*

**D.b.h. (Diameter breast high).**—Tree diameter in inches, outside bark, measured at 4½ feet above ground.

**Diameter classes.**—The 2-inch diameter classes extend from 1.0 inch below to 0.9 inch above the stated midpoint. Thus, the 12-inch class includes trees 11.0 inches to and including 12.9 inches d.b.h.

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

**Net annual growth of sawtimber.**—The annual change, resulting from natural causes, in net board-foot volume of live sawtimber trees.

**Net annual growth of growing stock.**—The annual change, resulting from natural causes, in volume of sound wood in live sawtimber and poletimber trees.

**Mortality of sawtimber.**—The net board-foot volume of sawtimber trees dying annually from natural causes.

**Mortality of growing stock.**—The volume of sound wood in live sawtimber and poletimber trees dying annually from natural causes.

**Timber removals from sawtimber.**—The net board-foot volume of live sawtimber trees removed from the inventory by harvesting; cultural operations, such as timber-stand improvement; land clearing; or changes in land use.

**Timber removals from growing stock.**—The volume of sound wood in live sawtimber and poletimber trees removed from the inventory by harvesting; cultural operations, such as timber-stand improvement; land clearing; or changes in land use.

**Timber products.**—Roundwood products and by-products of wood manufacturing plants.

# STANDARD TABLES

Table 1. *Area by land classes, east Oklahoma, 1966*

| Land class | Area |
|---|---|
| | *Thousand acres* |
| Forest: | |
| Commercial | 4,817.4 |
| Productive-reserved | 34.4 |
| Unproductive | 617.7 |
| Total | 5,469.5 |
| Nonforest: | |
| Cropland [1] | 1,257.7 |
| Pasture and range [1] | 2,436.1 |
| Other [2] | 492.3 |
| Total | 4,186.1 |
| All land [3] | 9,655.6 |

[1] Source: 1964 Census of Agriculture.
[2] Includes swampland, industrial and urban areas, other nonforest land, and 22,285 acres, classed as water by Forest Survey standards, but defined by the Bureau of the Census as land.
[3] Source: United States Bureau of the Census, Land and Water Area of the United States, 1960.

Table 2. *Area of commercial forest land by ownership classes, east Oklahoma, 1966*

| Ownership class | Area |
|---|---|
| | *Thousand acres* |
| Public: | |
| National forest | 221.9 |
| Miscellaneous federal | 248.2 |
| State | 86.4 |
| County and municipal | 9.3 |
| Total public | 565.8 |
| Private: | |
| Forest industry | 868.7 |
| Farmer | 1,410.8 |
| Miscellaneous private | 1,972.1 |
| Total private | 4,251.6 |
| All ownerships | 4,817.4 |

Table 3. *Area of commercial forest land by stand-size and ownership classes, east Oklahoma, 1966*

| Stand-size class | All ownerships | National forest | Other public | Forest industry | Farmer and misc. private |
|---|---|---|---|---|---|
| | *Thousand acres* | | | | |
| Sawtimber | 1,261.9 | 106.4 | 72.9 | 408.6 | 674.0 |
| Poletimber | 943.4 | 43.6 | 75.0 | 193.3 | 631.5 |
| Sapling and seedling | 2,497.7 | 71.9 | 191.3 | 261.4 | 1,973.1 |
| Nonstocked areas | 114.4 | ... | 4.7 | 5.4 | 104.3 |
| All classes | 4,817.4 | 221.9 | 343.9 | 868.7 | 3,382.9 |

Table 4. *Area of commercial forest land by stand-volume and ownership classes, east Oklahoma, 1966*

| Stand volume per acre | All ownerships | National forest | Other public | Forest industry | Farmer and misc. private |
|---|---|---|---|---|---|
| | *Thousand acres* | | | | |
| Less than 1,500 board feet | 3,900.5 | 137.3 | 295.9 | 427.8 | 3,039.5 |
| 1,500 to 5,000 board feet | 755.9 | 71.3 | 32.3 | 350.3 | 302.0 |
| More than 5,000 board feet | 161.0 | 13.3 | 15.7 | 90.6 | 41.4 |
| All classes | 4,817.4 | 221.9 | 343.9 | 868.7 | 3,382.9 |

Table 5. *Area of commercial forest land by stocking classes based on selected stand components, east Oklahoma, 1966*

| Stocking percentage | Stocking classified in terms of | | | | | |
|---|---|---|---|---|---|---|
| | All trees | Growing-stock trees | | | Rough and rotten trees | Inhibiting vegetation |
| | | Total | Desirable | Acceptable | | |
| | *Thousand acres* | | | | | |
| 90 to 100 | 2,197.3 | 213.9 | 11.0 | 5.8 | 30.2 | ... |
| 80 to 90 | 1,362.7 | 332.8 | 54.9 | 11.7 | 64.4 | ... |
| 70 to 80 | 764.4 | 611.1 | 99.1 | 71.5 | 193.6 | ... |
| 60 to 70 | 263.9 | 612.3 | 216.1 | 241.6 | 370.0 | ... |
| 50 to 60 | 170.1 | 775.9 | 260.1 | 359.2 | 612.9 | ... |
| 40 to 50 | 35.0 | 821.1 | 259.7 | 699.4 | 678.0 | ... |
| 30 to 40 | 24.0 | 620.8 | 436.5 | 1,134.1 | 839.2 | ... |
| 20 to 30 | ... | 442.3 | 653.2 | 1,160.3 | 969.6 | 10.6 |
| 10 to 20 | ... | 272.8 | 985.4 | 768.3 | 694.4 | 69.6 |
| Less than 10 | ... | 114.4 | 1,841.4 | 365.5 | 365.1 | 4,737.2 |
| All areas | 4,817.4 | 4,817.4 | 4,817.4 | 4,817.4 | 4,817.4 | 4,817.4 |

Table 6. *Area of commercial forest land by stocking classes of growing stock trees and by stand-size classes, east Oklahoma, 1966*

| Stocking class | All stands | Saw-timber | Pole-timber | Sapling and seedling | Non-stocked |
|---|---|---|---|---|---|
| | *Thousand acres* | | | | |
| 70 percent or more | 1,157.8 | 488.8 | 168.7 | 500.3 | ... |
| 40 to 70 percent | 2,209.3 | 515.1 | 510.3 | 1,183.9 | ... |
| 10 to 40 percent | 1,335.9 | 258.0 | 264.4 | 813.5 | ... |
| Less than 10 percent | 114.4 | ... | ... | ... | 114.4 |
| All classes | 4,817.4 | 1,261.9 | 943.4 | 2,497.7 | 114.4 |

Table 7. *Area of commercial forest land by area-condition and ownership classes, east Oklahoma, 1966*

| Area-condition class | All ownerships | National forest | Other public | Forest industry | Farmer and misc. private |
|---|---|---|---|---|---|
| | *Thousand acres* | | | | |
| 1 | 165.0 | 6.6 | 4.7 | 101.9 | 51.8 |
| 2 | 175.5 | 21.2 | 5.4 | 107.3 | 41.6 |
| 3 | 560.4 | 63.4 | 37.8 | 266.1 | 193.1 |
| 4 | 445.6 | 7.3 | 25.3 | 80.1 | 332.9 |
| 5 | 2,020.6 | 94.3 | 116.0 | 270.8 | 1,539.5 |
| 6 | 1,450.3 | 29.1 | 154.7 | 42.5 | 1,224.0 |
| All classes | 4,817.4 | 221.9 | 343.9 | 868.7 | 3,382.9 |

Table 8. *Area of commercial forest land by area-condition and stocking classes, east Oklahoma, 1966*

| Area-condition class | All classes | | Stocking class | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Growing stock | | | | Rough and rotten trees | | Shrubs | | Other | |
| | | | Desirable | | Acceptable | | | | | | | |
| | *Thousand acres* | *Percent* | *Thousand acres* | *Percent* | *Thousand acres* | *Percent* | *Thousand acres* | *Percent* | *Thousand acres* | *Percent* | *Thousand acres* | *Percent* |
| 1 | 165.0 | 100.0 | 126.9 | 77.0 | 14.6 | 8.8 | 10.1 | 6.1 | ... | ... | 13.4 | 8.1 |
| 2 | 175.5 | 100.0 | 103.5 | 58.9 | 26.3 | 15.0 | 19.6 | 11.2 | ... | ... | 26.1 | 14.9 |
| 3 | 560.4 | 100.0 | 277.8 | 49.6 | 143.6 | 25.6 | 96.9 | 17.3 | 0.8 | 0.1 | 41.3 | 7.4 |
| 4 | 445.6 | 100.0 | 79.9 | 17.9 | 255.8 | 57.4 | 77.9 | 17.5 | 2.8 | .6 | 29.2 | 6.6 |
| 5 | 2,020.6 | 100.0 | 297.8 | 14.7 | 727.5 | 36.1 | 656.8 | 32.5 | 8.5 | .4 | 330.0 | 16.3 |
| 6 | 1,450.3 | 100.0 | 70.7 | 4.9 | 269.1 | 18.6 | 789.4 | 54.4 | 4.5 | .3 | 316.6 | 21.8 |
| All classes | 4,817.4 | 100.0 | 956.6 | 19.9 | 1,436.9 | 29.8 | 1,650.7 | 34.3 | 16.6 | .3 | 756.6 | 15.7 |

Table 9. *Area of commercial forest land by site and ownership classes, east Oklahoma, 1966*

| Site class | All ownerships | National forest | Other public | Forest industry | Farmer and misc. private |
|---|---|---|---|---|---|
| | *Thousand acres* | | | | |
| 120 cu. ft. or more | 17.4 | ... | 4.7 | ... | 12.7 |
| 85 to 120 cu. ft. | 319.0 | 13.3 | 40.7 | 68.6 | 196.4 |
| 50 to 85 cu. ft. | 1,330.7 | 78.0 | 73.5 | 386.8 | 792.4 |
| Less than 50 cu. ft. | 3,150.3 | 130.6 | 225.0 | 413.3 | 2,381.4 |
| All classes | 4,817.4 | 221.9 | 343.9 | 868.7 | 3,382.9 |

Table 10. *Area of commercial forest land by forest types and ownership classes, east Oklahoma, 1966*

| Type | All ownerships | Public | Private |
|---|---|---|---|
| | *Thousand acres* | | |
| Loblolly-shortleaf pine | 795.3 | 119.7 | 675.6 |
| Oak-pine | 664.3 | 96.1 | 568.2 |
| Oak-hickory | 2,891.3 | 301.1 | 2,590.2 |
| Oak-gum-cypress | 349.6 | 38.3 | 311.3 |
| Elm-ash-cottonwood | 116.9 | 10.6 | 106.3 |
| All types | 4,817.4 | 565.8 | 4,251.6 |

Table 11. *Area of noncommercial forest land by forest types, east Oklahoma, 1966*

| Type | All areas | Productive-reserved areas | Unproductive areas |
|---|---|---|---|
| | *Thousand acres* | | |
| Loblolly-shortleaf pine | 13.6 | 13.6 | ... |
| Oak-pine | 5.2 | 5.2 | ... |
| Oak-hickory | 633.3 | 15.6 | 617.7 |
| All types | 652.1 | 34.4 | 617.7 |

Table 12. *Number of growing-stock trees on commercial forest land by species and diameter classes, east Oklahoma, 1966*

| Species | Diameter class (inches at breast height) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | All classes | 5.0-6.9 | 7.0-8.9 | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0 and larger |
| | *Thousand trees* | | | | | | | | |
| Softwood: | | | | | | | | | |
| Loblolly pine | 4,090 | 1,642 | 746 | 377 | 352 | 276 | 253 | 242 | 202 |
| Shortleaf pine | 102,293 | 44,375 | 25,817 | 15,841 | 9,103 | 4,863 | 1,504 | 668 | 122 |
| Cypress | 22 | ... | ... | ... | ... | 18 | ... | ... | 4 |
| Redcedar | 1,522 | 1,204 | 166 | 72 | 47 | 18 | 15 | ... | ... |
| Total | 107,927 | 47,221 | 26,729 | 16,290 | 9,502 | 5,175 | 1,772 | 910 | 328 |
| Hardwood: | | | | | | | | | |
| Select white oaks [1] | 14,014 | 7,679 | 2,877 | 2,086 | 520 | 476 | 177 | 115 | 84 |
| Select red oaks [2] | 5,129 | 2,656 | 1,373 | 412 | 275 | 120 | 108 | 78 | 107 |
| Other white oaks | 45,716 | 24,905 | 10,821 | 4,975 | 2,532 | 1,310 | 582 | 344 | 247 |
| Other red oaks | 28,156 | 11,700 | 7,780 | 4,016 | 2,366 | 1,208 | 590 | 258 | 238 |
| Hickory | 23,200 | 11,861 | 5,271 | 3,240 | 1,393 | 726 | 367 | 179 | 163 |
| Hard maple | 362 | 90 | 128 | 79 | 26 | 18 | 13 | ... | 8 |
| Soft maple | 890 | 324 | 322 | 171 | 54 | 19 | ... | ... | ... |
| Sweetgum | 6,482 | 2,659 | 1,681 | 1,174 | 453 | 295 | 142 | 24 | 54 |
| Tupelo and blackgum | 2,600 | 1,357 | 275 | 232 | 258 | 271 | 117 | 64 | 26 |
| Ash | 6,675 | 3,170 | 1,893 | 858 | 331 | 170 | 154 | 48 | 51 |
| Cottonwood | 1,067 | 184 | 213 | 290 | 288 | 60 | ... | 26 | 6 |
| Basswood | 166 | 89 | 62 | ... | ... | ... | 15 | ... | ... |
| Black walnut | 438 | 130 | 85 | 129 | ... | 47 | 34 | 13 | ... |
| Other hardwoods | 17,564 | 7,664 | 4,596 | 2,329 | 1,228 | 731 | 473 | 207 | 336 |
| Total | 152,459 | 74,468 | 37,377 | 19,991 | 9,724 | 5,451 | 2,772 | 1,356 | 1,320 |
| All species | 260,386 | 121,689 | 64,106 | 36,281 | 19,226 | 10,626 | 4,544 | 2,266 | 1,648 |

[1] Includes white, swamp chestnut, chinkapin, and bur oaks.
[2] Includes cherrybark, Shumard, and northern red oaks.

Table 13. *Number of rough, rotten, and salvable dead trees on commercial forest land by diameter groups and by softwoods and hardwoods, east Oklahoma, 1966*

| D.b.h. class (inches) | Rough and rotten trees | Salvable dead trees |
|---|---|---|
| | *– – – Thousand trees – – –* | |
| Softwood: | | |
| 5.0- 8.9 | 1,628 | . . . |
| 9.0-18.9 | 1,012 | . . . |
| 19.0 and larger | 19 | . . . |
| Total | 2,659 | . . . |
| Hardwood: | | |
| 5.0-10.9 | 156,052 | 388 |
| 11.0-18.9 | 38,811 | 267 |
| 19.0 and larger | 3,140 | . . . |
| Total | 198,003 | 655 |
| All species | 200,662 | 655 |

Table 14. *Volume of timber on commercial forest land by class of timber and by softwoods and hardwoods, east Oklahoma, 1966*

| Class of timber | All species | Softwood | Hardwood |
|---|---|---|---|
| | | *– – – Million cubic feet – – –* | |
| Sawtimber trees: | | | |
| Saw-log portion | 759.6 | 452.6 | 307.0 |
| Upper-stem portion | 146.1 | 72.4 | 73.7 |
| Total | 905.7 | 525.0 | 380.7 |
| Poletimber trees | 672.6 | 229.5 | 443.1 |
| All growing stock | 1,578.3 | 754.5 | 823.8 |
| Rough trees: | | | |
| Sawtimber-size | 337.8 | 4.5 | 333.3 |
| Poletimber-size | 276.3 | 2.4 | 273.9 |
| Total | 614.1 | 6.9 | 607.2 |
| Rotten trees: | | | |
| Sawtimber-size | 118.5 | 2.4 | 116.1 |
| Poletimber-size | 53.9 | .4 | 53.5 |
| Total | 172.4 | 2.8 | 169.6 |
| Salvable dead trees: | | | |
| Sawtimber-size | 2.9 | . . . | 2.9 |
| Poletimber-size | .9 | . . . | .9 |
| Total | 3.8 | . . . | 3.8 |
| All timber | 2,368.6 | 764.2 | 1,604.4 |

Table 15. *Volume of growing stock and sawtimber on commercial forest land by ownership classes and by softwoods and hardwoods, east Oklahoma, 1966*

| Ownership class | Growing stock | | | Sawtimber | | |
|---|---|---|---|---|---|---|
| | All species | Softwood | Hardwood | All species | Softwood | Hardwood |
| | *– – Million cubic feet – –* | | | *– – Million board feet – –* | | |
| Public: | | | | | | |
| National forest | 111.8 | 90.6 | 21.2 | 378.8 | 345.3 | 33.5 |
| Other public | 96.1 | 23.3 | 72.8 | 242.8 | 91.3 | 151.5 |
| Total | 207.9 | 113.9 | 94.0 | 621.6 | 436.6 | 185.0 |
| Private: | | | | | | |
| Forest industry | 585.1 | 444.8 | 140.3 | 1,825.5 | 1,543.2 | 282.3 |
| Farmer and misc. private | 785.3 | 195.8 | 589.5 | 1,862.1 | 528.8 | 1,333.3 |
| Total | 1,370.4 | 640.6 | 729.8 | 3,687.6 | 2,072.0 | 1,615.6 |
| All ownerships | 1,578.3 | 754.5 | 823.8 | 4,309.2 | 2,508.6 | 1,800.6 |

Table 16. *Volume of growing stock and sawtimber on commercial forest land by stand-size classes and by softwoods and hardwoods, east Oklahoma, 1966*

| Stand-size class | Growing stock | | | Sawtimber | | |
|---|---|---|---|---|---|---|
| | All species | Softwood | Hardwood | All species | Softwood | Hardwood |
| | *– – Million cubic feet – –* | | | *– – Million board feet – –* | | |
| Sawtimber | 914.6 | 525.3 | 389.3 | 3,194.0 | 1,991.8 | 1,202.2 |
| Poletimber | 370.1 | 113.4 | 256.7 | 470.5 | 194.4 | 276.1 |
| Sapling and seedling | 292.3 | 115.3 | 177.0 | 642.5 | 321.2 | 321.3 |
| Nonstocked areas | 1.3 | .5 | .8 | 2.2 | 1.2 | 1.0 |
| All classes | 1,578.3 | 754.5 | 823.8 | 4,309.2 | 2,508.6 | 1,800.6 |

Table 17. *Volume of growing stock on commercial forest land by species and diameter classes, east Oklahoma, 1966*

| Species | Diameter class (inches at breast height) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | All classes | 5.0-6.9 | 7.0-8.9 | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0 and larger |
| | *Million cubic feet* | | | | | | | | |
| Softwood: | | | | | | | | | |
| Loblolly pine | 58.7 | 3.7 | 3.8 | 3.7 | 4.8 | 7.6 | 10.0 | 11.5 | 13.6 |
| Shortleaf pine | 690.9 | 92.7 | 127.1 | 139.2 | 136.8 | 109.8 | 49.6 | 28.1 | 7.6 |
| Cypress | .9 | ... | ... | ... | ... | .3 | ... | ... | .6 |
| Redcedar | 4.0 | 1.7 | .5 | .5 | .5 | .3 | .5 | ... | ... |
| Total | 754.5 | 98.1 | 131.4 | 143.4 | 142.1 | 118.0 | 60.1 | 39.6 | 21.8 |
| Hardwood: | | | | | | | | | |
| Select white oaks [1] | 68.2 | 15.2 | 12.6 | 15.1 | 6.7 | 8.4 | 4.0 | 2.7 | 3.5 |
| Select red oaks [2] | 30.4 | 4.7 | 6.5 | 2.9 | 3.4 | 2.2 | 2.7 | 2.1 | 5.9 |
| Other white oaks | 192.8 | 45.8 | 41.2 | 32.2 | 27.3 | 20.1 | 10.4 | 7.9 | 7.9 |
| Other red oaks | 171.3 | 24.5 | 33.6 | 31.1 | 31.3 | 21.3 | 13.8 | 6.4 | 9.3 |
| Hickory | 116.9 | 21.3 | 21.3 | 21.6 | 16.3 | 12.5 | 8.7 | 5.6 | 9.6 |
| Hard maple | 3.1 | .3 | .6 | .5 | .4 | .4 | .5 | ... | .4 |
| Soft maple | 5.3 | .6 | 1.8 | 1.7 | .7 | .5 | ... | ... | ... |
| Sweetgum | 46.2 | 5.8 | 8.2 | 10.3 | 7.0 | 6.7 | 4.3 | 1.0 | 2.9 |
| Tupelo and blackgum | 19.9 | 2.6 | 1.0 | 1.9 | 3.3 | 4.6 | 3.3 | 1.9 | 1.3 |
| Ash | 34.9 | 6.1 | 7.7 | 6.5 | 3.8 | 3.5 | 3.6 | 1.1 | 2.6 |
| Cottonwood | 16.9 | .6 | 1.5 | 4.3 | 6.9 | 2.3 | ... | 1.1 | .2 |
| Basswood | .8 | .2 | .3 | ... | ... | ... | .3 | ... | ... |
| Black walnut | 3.4 | .2 | .4 | .7 | ... | .5 | .9 | .7 | ... |
| Other hardwoods | 113.7 | 14.7 | 19.1 | 15.9 | 16.1 | 12.7 | 11.8 | 6.9 | 16.5 |
| Total | 823.8 | 142.6 | 155.8 | 144.7 | 123.2 | 95.7 | 64.3 | 37.4 | 60.1 |
| All species | 1,578.3 | 240.7 | 287.2 | 288.1 | 265.3 | 213.7 | 124.4 | 77.0 | 81.9 |

[1] Includes white, swamp chestnut, chinkapin, and bur oaks.
[2] Includes cherrybark, Shumard, and northern red oaks.

Table 18. *Volume of sawtimber on commercial forest land by species and diameter classes, east Oklahoma, 1966*

| Species | Diameter class (inches at breast height) | | | | | | |
|---|---|---|---|---|---|---|---|
| | All classes | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0 and larger |
| | *Million board feet* | | | | | | |
| Softwood: | | | | | | | |
| Loblolly pine | 274.1 | 13.2 | 19.8 | 40.7 | 56.1 | 65.7 | 78.6 |
| Shortleaf pine | 2,224.0 | 542.1 | 654.1 | 563.9 | 267.8 | 152.9 | 43.2 |
| Cypress | 2.6 | ... | ... | 1.4 | ... | ... | 1.2 |
| Redcedar | 7.9 | 2.0 | 1.9 | 1.4 | 2.6 | ... | ... |
| Total | 2,508.6 | 557.3 | 675.8 | 607.4 | 326.5 | 218.6 | 123.0 |
| Hardwood: | | | | | | | |
| Select white oaks [1] | 123.1 | ... | 27.8 | 40.1 | 20.0 | 15.7 | 19.5 |
| Select red oaks [2] | 84.7 | ... | 13.5 | 11.6 | 13.9 | 10.9 | 34.8 |
| Other white oaks | 350.1 | ... | 117.3 | 97.2 | 52.2 | 39.1 | 44.3 |
| Other red oaks | 375.7 | ... | 123.7 | 98.5 | 67.7 | 31.5 | 54.3 |
| Hickory | 254.7 | ... | 70.8 | 59.0 | 46.5 | 23.8 | 54.6 |
| Hard maple | 7.5 | ... | 1.5 | 2.1 | 2.2 | ... | 1.7 |
| Soft maple | 5.2 | ... | 2.7 | 2.5 | ... | ... | ... |
| Sweetgum | 99.0 | ... | 28.1 | 30.8 | 21.7 | 4.8 | 13.6 |
| Tupelo and blackgum | 63.0 | ... | 10.9 | 19.2 | 15.6 | 9.8 | 7.5 |
| Ash | 69.9 | ... | 16.2 | 16.1 | 19.0 | 5.8 | 12.8 |
| Cottonwood | 39.8 | ... | 22.6 | 10.5 | ... | 5.2 | 1.5 |
| Basswood | 1.9 | ... | ... | ... | 1.9 | ... | ... |
| Black walnut | 10.7 | ... | ... | 2.3 | 4.9 | 3.5 | ... |
| Other hardwoods | 315.3 | ... | 68.3 | 62.8 | 58.7 | 34.3 | 91.2 |
| Total | 1,800.6 | ... | 503.4 | 452.7 | 324.3 | 184.4 | 335.8 |
| All species | 4,309.2 | 557.3 | 1,179.2 | 1,060.1 | 650.8 | 403.0 | 458.8 |

[1] Includes white, swamp chestnut, chinkapin, and bur oaks.
[2] Includes cherrybark, Shumard, and northern red oaks.

Table 19. *Volume of sawtimber on commercial forest land by species and log grade, east Oklahoma, 1966*

| Species | All grades | Grade 1 | Grade 2 | Grade 3 | Lower grades |
|---|---|---|---|---|---|
| | | | *Million board feet* | | |
| Softwood: | | | | | |
| Yellow pines | 2,498.1 | 20.0 | 361.4 | 1,312.6 | 804.1 |
| Cypress | 2.6 | ... | 1.2 | 1.4 | ... |
| Other softwoods | 7.9 | 7.9 | ... | ... | ... |
| Total | 2,508.6 | 27.9 | 362.6 | 1,314.0 | 804.1 |
| Hardwood: | | | | | |
| Select white and red oaks | 207.8 | 34.0 | 41.0 | 94.0 | 38.8 |
| Other white and red oaks | 725.8 | 29.9 | 105.8 | 413.4 | 176.7 |
| Hickory | 254.7 | 32.0 | 46.1 | 125.0 | 51.6 |
| Hard maple | 7.5 | ... | ... | 3.6 | 3.9 |
| Sweetgum | 99.0 | 7.1 | 18.7 | 45.9 | 27.3 |
| Ash and black walnut | 80.6 | 21.3 | 27.1 | 29.3 | 2.9 |
| Other hardwoods | 425.2 | 49.3 | 88.1 | 200.9 | 86.9 |
| Total | 1,800.6 | 173.6 | 326.8 | 912.1 | 388.1 |
| All species | 4,309.2 | 201.5 | 689.4 | 2,226.1 | 1,192.2 |

Table 20. *Volume of salvable dead sawtimber-size trees on commercial forest land by softwoods and hardwoods, east Oklahoma, 1966*

| Species group | Volume |
|---|---|
| | *Million board feet* |
| Softwood | ... |
| Hardwood | 16.2 |
| All species | 16.2 |

Table 21. *Net annual growth and removals of growing stock on commercial forest land by species, east Oklahoma, 1965*

| Species | Net annual growth | Annual removals |
|---|---|---|
| | *Million cubic feet* | |
| Softwood: | | |
| Yellow pines | 40.5 | 19.0 |
| Other softwoods | .2 | .1 |
| Total | 40.7 | 19.1 |
| Hardwood: | | |
| Select white and red oaks | 2.6 | 2.3 |
| Other white and red oaks | 9.4 | 10.3 |
| Hickory | 3.0 | 3.2 |
| Sweetgum | 1.2 | .6 |
| Ash and black walnut | 1.0 | .9 |
| Other hardwoods | 4.2 | 5.4 |
| Total | 21.4 | 22.7 |
| All species | 62.1 | 41.8 |

Table 22. *Net annual growth and removals of growing stock on commercial forest land by ownership classes and by softwoods and hardwoods, east Oklahoma, 1965*

| Ownership class | Net annual growth | | | Annual removals | | |
|---|---|---|---|---|---|---|
| | All species | Softwood | Hardwood | All species | Softwood | Hardwood |
| | | | *Million cubic feet* | | | |
| Public | 8.5 | 6.1 | 2.4 | 3.9 | 2.4 | 1.5 |
| Forest industry | 27.6 | 24.0 | 3.6 | 14.5 | 11.4 | 3.1 |
| Farmer and misc. private | 26.0 | 10.6 | 15.4 | 23.4 | 5.3 | 18.1 |
| All ownerships | 62.1 | 40.7 | 21.4 | 41.8 | 19.1 | 22.7 |

Table 23. *Net annual growth and removals of sawtimber on commercial forest land by species, east Oklahoma, 1965*

| Species | Net annual growth | Annual removal |
|---|---|---|
| | – *Million board feet* – | |
| Softwood: | | |
| Yellow pines | 133.5 | 88.0 |
| Other softwoods | .5 | ... |
| Total | 134.0 | 88.0 |
| Hardwood: | | |
| Select white and red oaks | 4.4 | 6.5 |
| Other white and red oaks | 15.3 | 22.2 |
| Hickory | 5.4 | 7.3 |
| Sweetgum | 2.1 | 1.1 |
| Ash and black walnut | 1.7 | 2.4 |
| Other hardwoods | 9.1 | 13.5 |
| Total | 38.0 | 53.0 |
| All species | 172.0 | 141.0 |

Table 24. *Net annual growth and removals of sawtimber on commercial forest land by ownership classes and by softwoods and hardwoods, east Oklahoma, 1965*

| Ownership class | Net annual growth | | | Annual removals | | |
|---|---|---|---|---|---|---|
| | All species | Softwood | Hardwood | All species | Softwood | Hardwood |
| | – – – – – – – – *Million board feet* – – – – – – – – | | | | | |
| Public | 27.2 | 23.3 | 3.9 | 16.9 | 13.7 | 3.2 |
| Forest industry | 88.4 | 82.4 | 6.0 | 63.9 | 55.4 | 8.5 |
| Farmer and misc. private | 56.4 | 28.3 | 28.1 | 60.2 | 18.9 | 41.3 |
| All ownerships | 172.0 | 134.0 | 38.0 | 141.0 | 88.0 | 53.0 |

Table 25. *Annual mortality of growing stock and sawtimber on commercial forest land by species, east Oklahoma, 1965*

| Species | Growing stock | Sawtimber |
|---|---|---|
| | *Million cubic feet* | *Million board feet* |
| Softwood: | | |
| Yellow pines | 2.3 | 7.5 |
| Other softwoods | (1) | (1) |
| Total | 2.3 | 7.5 |
| Hardwood: | | |
| Select white and red oaks | 1.4 | 3.7 |
| Other white and red oaks | 5.1 | 12.9 |
| Hickory | 1.6 | 4.5 |
| Sweetgum | .6 | 1.8 |
| Ash and black walnut | .6 | 1.4 |
| Other hardwoods | 2.2 | 7.7 |
| Total | 11.5 | 32.0 |
| All species | 13.8 | 39.5 |

[1] Negligible.

Table 26. *Annual mortality of growing stock and sawtimber on commercial forest land by ownership classes and by softwoods and hardwoods, east Oklahoma, 1965*

| Ownership class | Growing stock | | | Sawtimber | | |
|---|---|---|---|---|---|---|
| | All species | Softwood | Hardwood | All species | Softwood | Hardwood |
| | – *Million cubic feet* – | | | – *Million board feet* – | | |
| Public | 1.7 | 0.3 | 1.3 | 4.6 | 1.3 | 3.3 |
| Forest industry | 3.3 | 1.4 | 2.0 | 9.6 | 4.6 | 5.0 |
| Farmer and misc. private | 8.8 | .6 | 8.2 | 25.3 | 1.6 | 23.7 |
| All ownerships | 13.8 | 2.3 | 11.5 | 39.5 | 7.5 | 32.0 |

Table 27. *Annual mortality of growing stock and sawtimber on commercial forest land by causes and by softwoods and hardwoods, east Oklahoma, 1965*

| Cause of death | Growing stock | | | Sawtimber | | |
|---|---|---|---|---|---|---|
| | All species | Softwood | Hardwood | All species | Softwood | Hardwood |
| | – *Million cubic feet* – | | | – *Million board feet* – | | |
| Fire | 1.3 | 0.4 | 0.9 | 2.4 | 1.4 | 1.0 |
| Insects | .3 | .2 | .1 | .9 | .9 | ... |
| Disease | .5 | ... | .5 | 1.4 | ... | 1.4 |
| Other | 1.2 | .2 | 1.0 | 4.1 | .7 | 3.4 |
| Unknown | 10.5 | 1.5 | 9.0 | 30.7 | 4.5 | 26.2 |
| All causes | 13.8 | 2.3 | 11.5 | 39.5 | 7.5 | 32.0 |

Table 28. *Total output of timber products by product, by type of material used, and by softwoods and hardwoods, east Oklahoma, 1965*

| Product and species group | Total output in standard units | | Output from roundwood | | Output from plant by-products (standard units) |
|---|---|---|---|---|---|
| | Unit | Number | Standard units | M cubic feet | |
| Saw logs: | | | | | |
| Softwood | M bd. ft. [1] | 81,417 | 81,417 | 13,393 | ... |
| Hardwood | M bd. ft. [1] | 22,520 | 22,520 | 3,754 | ... |
| Total | M bd. ft. [1] | 103,937 | 103,937 | 17,147 | ... |
| Veneer logs and bolts: | | | | | |
| Softwood | M bd. ft. | ... | ... | ... | ... |
| Hardwood | M bd. ft. | 420 | 420 | 70 | ... |
| Total | M bd. ft. | 420 | 420 | 70 | ... |
| Pulpwood: | | | | | |
| Softwood | Std. cords [2] | 61,178 | 8,019 | 605 | 53,159 |
| Hardwood | Std. cords [2] | 12,106 | 12,106 | 942 | ... |
| Total | Std. cords [2] | 73,284 | 20,125 | 1,547 | 53,159 |
| Piling: | | | | | |
| Softwood | M linear ft. | 144 | 144 | 71 | ... |
| Hardwood | M linear ft. | ... | ... | ... | ... |
| Total | M linear ft. | 144 | 144 | 71 | ... |
| Poles: | | | | | |
| Softwood | M pieces | 114 | 114 | 443 | ... |
| Hardwood | M pieces | ... | ... | ... | ... |
| Total | M pieces | 114 | 114 | 443 | ... |
| Misc. industrial wood: [3] | | | | | |
| Softwood | M cu. ft. | 580 | ... | ... | 580 |
| Hardwood | M cu. ft. | 2,429 | 2,292 | 2,292 | 137 |
| Total | M cu. ft. | 3,009 | 2,292 | 2,292 | 717 |
| Posts (round and split): | | | | | |
| Softwood | M pieces | 3,411 | 3,411 | 2,108 | ... |
| Hardwood | M pieces | 780 | 780 | 499 | ... |
| Total | M pieces | 4,191 | 4,191 | 2,607 | ... |
| Fuelwood: | | | | | |
| Softwood | Std. cords | 18,050 | ... | ... | [4] 18,050 |
| Hardwood | Std. cords | 85,794 | 81,630 | 6,122 | [4] 4,164 |
| Total | Std. cords | 103,844 | 81,630 | 6,122 | [4] 22,214 |
| All products: | | | | | |
| Softwood | M cu. ft. | ... | ... | 16,620 | ... |
| Hardwood | M cu. ft. | ... | ... | 13,679 | ... |
| Total | M cu. ft. | ... | ... | 30,299 | ... |

[1] International ¼-inch rule.

[2] Rough wood basis (for example, chips converted to equivalent standard cords).

[3] Includes chemical wood, furniture stock, handle stock, miscellaneous dimension, cooperage (logs and bolts), and other minor industrial products. Additionally, byproducts include material used for livestock bedding, mulch, etc.

[4] Includes plant byproducts used for industrial and domestic fuel.

Table 29. *Output of roundwood products by source, and softwoods and hardwoods, east Oklahoma, 1965*

| Product and species group | All sources | Growing-stock trees [1] | | | Rough and rotten trees [1] | Salvable dead trees [1] | Other sources [2] |
|---|---|---|---|---|---|---|---|
| | | Total | Sawtimber | Poletimber | | | |
| | *Thousand cubic feet* | | | | | | |
| Saw logs: | | | | | | | |
| Softwood | 13,393 | 13,304 | 13,255 | 49 | 16 | ... | 73 |
| Hardwood | 3,754 | 3,614 | 3,610 | 4 | 50 | 88 | 2 |
| Total | 17,147 | 16,918 | 16,865 | 53 | 66 | 88 | 75 |
| Veneer logs and bolts: | | | | | | | |
| Softwood | ... | ... | ... | ... | ... | ... | ... |
| Hardwood | 70 | 69 | 69 | ... | 1 | ... | ... |
| Total | 70 | 69 | 69 | ... | 1 | ... | ... |
| Pulpwood: | | | | | | | |
| Softwood | 605 | 576 | 397 | 179 | 4 | ... | 25 |
| Hardwood | 942 | 757 | 425 | 332 | 143 | 2 | 40 |
| Total | 1,547 | 1,333 | 822 | 511 | 147 | 2 | 65 |
| Piling: | | | | | | | |
| Softwood | 71 | 71 | 71 | ... | ... | ... | ... |
| Hardwood | ... | ... | ... | ... | ... | ... | ... |
| Total | 71 | 71 | 71 | ... | ... | ... | ... |
| Poles: | | | | | | | |
| Softwood | 443 | 440 | 389 | 51 | ... | ... | 3 |
| Hardwood | ... | ... | ... | ... | ... | ... | ... |
| Total | 443 | 440 | 389 | 51 | ... | ... | 3 |
| Misc. industrial wood: | | | | | | | |
| Softwood | ... | ... | ... | ... | ... | ... | ... |
| Hardwood | 2,292 | 1,668 | 761 | 907 | 250 | 124 | 250 |
| Total | 2,292 | 1,668 | 761 | 907 | 250 | 124 | 250 |
| Posts (round and split): | | | | | | | |
| Softwood | 2,108 | 1,921 | 4 | 1,917 | ... | ... | 187 |
| Hardwood | 499 | 450 | 131 | 319 | 22 | ... | 27 |
| Total | 2,607 | 2,371 | 135 | 2,236 | 22 | ... | 214 |
| Fuelwood: | | | | | | | |
| Softwood | ... | ... | ... | ... | ... | ... | ... |
| Hardwood | 6,122 | 4,082 | 735 | 3,347 | 326 | 482 | 1,232 |
| Total | 6,122 | 4,082 | 735 | 3,347 | 326 | 482 | 1,232 |
| All products: | | | | | | | |
| Softwood | 16,620 | 16,312 | 14,116 | 2,196 | 20 | ... | 288 |
| Hardwood | 13,679 | 10,640 | 5,731 | 4,909 | 792 | 696 | 1,551 |
| Total | 30,299 | 26,952 | 19,847 | 7,105 | 812 | 696 | 1,839 |

[1] On commercial forest land.

[2] Includes noncommercial forest land, nonforest land such as fence rows, trees less than 5.0 inches in diameter, and treetops and limbs.

Table 30. *Timber removals from growing stock on commercial forest land, by items, and by softwoods and hardwoods, east Oklahoma, 1965*

| Item | All species | Softwood | Hardwood |
|---|---|---|---|
| | – – *Thousand cubic feet* – – | | |
| Roundwood products: | | | |
| Saw logs | 16,918 | 13,304 | 3,614 |
| Veneer logs and bolts | 69 | . . . | 69 |
| Pulpwood | 1,333 | 576 | 757 |
| Piling | 71 | 71 | . . . |
| Poles | 440 | 440 | . . . |
| Miscellaneous industrial wood | 1,668 | . . . | 1,668 |
| Posts | 2,371 | 1,921 | 450 |
| Fuelwood | 4,082 | . . . | 4,082 |
| All products | 26,952 | 16,312 | 10,640 |
| Logging residues | 4,980 | 2,051 | 2,929 |
| Other removals | 9,868 | 737 | 9,131 |
| Total removals | 41,800 | 19,100 | 22,700 |

Table 31. *Timber removals from live sawtimber on commercial forest land, by items, and by softwoods and hardwoods, east Oklahoma, 1965*

| Item | All species | Softwood | Hardwood |
|---|---|---|---|
| | – – *Thousand board feet* – – | | |
| Roundwood products: | | | |
| Saw logs | 101,583 | 80,431 | 21,152 |
| Veneer logs and bolts | 408 | . . . | 408 |
| Pulpwood | 3,225 | 1,578 | 1,647 |
| Piling | 418 | 418 | . . . |
| Poles | 2,247 | 2,247 | . . . |
| Miscellaneous industrial wood | 4,012 | . . . | 4,012 |
| Posts | 523 | 16 | 507 |
| Fuelwood | 3,592 | . . . | 3,592 |
| All products | 116,008 | 84,690 | 31,318 |
| Logging residues | 9,774 | 3,310 | 6,464 |
| Other removals | 15,218 | . . . | 15,218 |
| Total removals | 141,000 | 88,000 | 53,000 |

Table 32. *Volume of plant residues by industrial source and type of residue, and by softwoods and hardwoods, east Oklahoma, 1965*

| Industrial source | All species | | | Softwood | | | Hardwood | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | Coarse [1] | Fine [2] | Total | Coarse [1] | Fine [2] | Total | Coarse [1] | Fine [2] |
| | – – – – – – – – – – – – – *Thousand cubic feet* – – – – – – – – – – – – – | | | | | | | | |
| Lumber industry | 2,544 | 1,365 | 1,179 | 1,386 | 840 | 546 | 1,158 | 525 | 633 |
| Other primary industries | 876 | 623 | 253 | 518 | 392 | 126 | 358 | 231 | 127 |
| All industries | 3,420 | 1,988 | 1,432 | 1,904 | 1,232 | 672 | 1,516 | 756 | 760 |

[1] Unused material suitable for chipping, such as slabs and edgings.

[2] Unused material not suitable for chipping, such as sawdust and shavings.

Table 33. *Projections of net annual growth, available cut, and inventory of growing stock and sawtimber on commercial forest land, east Oklahoma, 1965 to 1995* [1]

| Species group | Growing stock | | | | Sawtimber | | | |
|---|---|---|---|---|---|---|---|---|
| | 1965 | 1975 | 1985 | 1995 | 1965 | 1975 | 1985 | 1995 |
| | – – – – – *Thousand cubic feet* – – – – – | | | | – – – – – *Thousand board feet* – – – – – | | | |
| Softwood: | | | | | | | | |
| Cut | 19,100 | 43,000 | 64,900 | 81,100 | 88,000 | 161,000 | 205,000 | 215,000 |
| Growth | 40,700 | 57,300 | 72,100 | 81,100 | 134,000 | 163,000 | 180,000 | 183,000 |
| Inventory [2] | 754,500 | 930,700 | 1,035,000 | 1,067,200 | 2,508,600 | 2,757,000 | 2,606,000 | 2,310,000 |
| Hardwood: | | | | | | | | |
| Cut | 22,700 | 29,300 | 37,200 | 45,000 | 53,000 | 70,000 | 71,000 | 62,000 |
| Growth | 21,400 | 29,000 | 37,400 | 45,000 | 38,000 | 36,000 | 34,000 | 31,000 |
| Inventory [2] | 823,800 | 815,600 | 816,600 | 819,000 | 1,800,600 | 1,508,000 | 1,144,000 | 800,000 |
| Total: | | | | | | | | |
| Cut | 41,800 | 72,300 | 102,100 | 126,100 | 141,000 | 231,000 | 276,000 | 277,000 |
| Growth | 62,100 | 86,300 | 109,500 | 126,100 | 172,000 | 199,000 | 214,000 | 214,000 |
| Inventory [2] | 1,578,300 | 1,746,300 | 1,851,600 | 1,886,200 | 4,309,200 | 4,265,000 | 3,750,000 | 3,110,000 |

[1] Based on the assumption that the cut of growing stock will be in balance with growth by the year 1995, and that forestry progress will continue at the rate indicated by recent trends.

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

## COUNTY TABLES

The tables that follow are intended for use in compiling forest resource estimates for groups of counties. Because the sampling procedure used by the Forest Survey in east Oklahoma was intended primarily to furnish inventory data for the region as a whole, estimates for individual counties have limited and variable accuracy. As county totals are broken down by various subdivisions, the possibility of error increases and is greatest for the smallest items. The order of this increase is suggested in the tabulations on page 17.

Table 34. *Land area and commercial forest by county, east Oklahoma, 1966*

| County | All land | Commercial forest | | County | All land | Commercial forest | |
|---|---|---|---|---|---|---|---|
| | *Thousand acres* | *Thousand acres* | *Percent* | | *Thousand acres* | *Thousand acres* | *Percent* |
| Adair | 364.8 | 237.9 | 65.2 | McCurtain | 1,183.5 | 874.5 | 73.9 |
| Atoka | 629.0 | 328.3 | 52.2 | McIntosh | 406.1 | 102.6 | 25.3 |
| Cherokee | 483.5 | 256.2 | 53.0 | Mayes | 424.3 | 118.0 | 27.8 |
| Choctaw | 499.5 | 261.0 | 52.3 | Muskogee | 523.6 | 77.9 | 14.9 |
| Coal | 336.6 | 108.0 | 32.1 | Ottawa | 297.1 | 78.4 | 26.4 |
| Delaware | 452.7 | 254.2 | 56.2 | Pittsburg | 834.4 | 217.6 | 26.1 |
| Haskell | 388.9 | 127.6 | 32.8 | Pushmataha | 910.7 | 693.0 | 76.1 |
| Latimer | 471.3 | 305.0 | 64.7 | Sequoyah | 445.6 | 116.0 | 26.0 |
| Le Flore | 1,004.0 | 661.2 | 65.9 | All counties | 9,655.6 | 4,817.4 | 49.9 |

Table 35. *Growing-stock volume by species groups and county, east Oklahoma, 1966*

| County | All species | Softwood | | | Soft hardwood | | | Hard hardwood | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | Pine | Other | Total | Gum | Other | Total | Oak | Other |
| | *Thousand cords* | | | | | | | | | |
| Adair | 736 | 76 | 76 | ... | 48 | 38 | 10 | 612 | 461 | 151 |
| Atoka | 814 | 179 | 179 | ... | 57 | ... | 57 | 578 | 273 | 305 |
| Cherokee | 882 | 44 | 44 | ... | 78 | 17 | 61 | 760 | 415 | 345 |
| Choctaw | 1,103 | 29 | 29 | ... | 296 | 218 | 78 | 778 | 453 | 325 |
| Coal | 383 | ... | ... | ... | 25 | ... | 25 | 358 | 133 | 225 |
| Delaware | 617 | 11 | 11 | ... | 10 | 10 | ... | 596 | 512 | 84 |
| Haskell | 590 | 43 | 43 | ... | 269 | ... | 269 | 278 | 109 | 169 |
| Latimer | 721 | 394 | 394 | ... | ... | ... | ... | 327 | 246 | 81 |
| Le Flore | 2,967 | 1,628 | 1,605 | 23 | 161 | 140 | 21 | 1,178 | 724 | 454 |
| McCurtain | 8,309 | 5,148 | 5,133 | 15 | 551 | 464 | 87 | 2,610 | 1,851 | 759 |
| McIntosh | 153 | ... | ... | ... | 34 | ... | 34 | 119 | 74 | 45 |
| Mayes | 388 | 51 | 51 | ... | 61 | 15 | 46 | 276 | 194 | 82 |
| Muskogee | 192 | 3 | 3 | ... | 4 | ... | 4 | 185 | 91 | 94 |
| Ottawa | 334 | ... | ... | ... | ... | ... | ... | 334 | 283 | 51 |
| Pittsburg | 466 | 60 | 57 | 3 | ... | ... | ... | 406 | 212 | 194 |
| Pushmataha | 3,403 | 2,245 | 2,220 | 25 | 106 | 85 | 21 | 1,052 | 772 | 280 |
| Sequoyah | 298 | 149 | 149 | ... | 12 | ... | 12 | 137 | 103 | 34 |
| All counties | 22,356 | 10,060 | 9,994 | 66 | 1,712 | 987 | 725 | 10,584 | 6,906 | 3,678 |

Table 36. *Sawtimber volume by species groups and county, east Oklahoma, 1966*

| County | All species | Softwood | | | Soft hardwood | | | Hard hardwood | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | Pine | Other | Total | Gum | Other | Total | Oak | Other |
| | *Million board feet* | | | | | | | | | |
| Adair | 70.7 | 14.0 | 14.0 | ... | 7.7 | 7.7 | ... | 49.0 | 27.2 | 21.8 |
| Atoka | 140.1 | 33.0 | 33.0 | ... | 20.2 | ... | 20.2 | 86.9 | 45.7 | 41.2 |
| Cherokee | 144.5 | 8.7 | 8.7 | ... | 10.1 | 4.5 | 5.6 | 125.7 | 63.8 | 61.9 |
| Choctaw | 187.4 | 4.8 | 4.8 | ... | 40.5 | 25.5 | 15.0 | 142.1 | 70.7 | 71.4 |
| Coal | 96.0 | ... | ... | ... | 3.7 | ... | 3.7 | 92.3 | 30.2 | 62.1 |
| Delaware | 106.4 | 4.2 | 4.2 | ... | 3.3 | 3.3 | ... | 98.9 | 85.1 | 13.8 |
| Haskell | 96.8 | 6.6 | 6.6 | ... | 48.7 | ... | 48.7 | 41.5 | 13.6 | 27.9 |
| Latimer | 101.2 | 64.4 | 64.4 | ... | ... | ... | ... | 36.8 | 30.8 | 6.0 |
| Le Flore | 547.8 | 402.1 | 401.0 | 1.1 | 32.8 | 25.9 | 6.9 | 112.9 | 78.1 | 34.8 |
| McCurtain | 1,843.4 | 1,397.5 | 1,394.1 | 3.4 | 92.0 | 77.6 | 14.4 | 353.9 | 248.3 | 105.6 |
| McIntosh | 29.9 | ... | ... | ... | 6.9 | ... | 6.9 | 23.0 | 14.7 | 8.3 |
| Mayes | 75.8 | 13.4 | 13.4 | ... | 16.0 | 2.3 | 13.7 | 46.4 | 23.0 | 23.4 |
| Muskogee | 13.4 | 1.1 | 1.1 | ... | ... | ... | ... | 12.3 | 3.4 | 8.9 |
| Ottawa | 53.9 | ... | ... | ... | ... | ... | ... | 53.9 | 42.9 | 11.0 |
| Pittsburg | 80.8 | 8.8 | 8.8 | ... | ... | ... | ... | 72.0 | 40.7 | 31.3 |
| Pushmataha | 679.6 | 517.8 | 511.8 | 6.0 | 16.4 | 15.2 | 1.2 | 145.4 | 110.5 | 34.9 |
| Sequoyah | 41.5 | 32.2 | 32.2 | ... | ... | ... | ... | 9.3 | 4.9 | 4.4 |
| All counties | 4,309.2 | 2,508.6 | 2,498.1 | 10.5 | 298.3 | 162.0 | 136.3 | 1,502.3 | 933.6 | 568.7 |

Table 37. *Sawtimber volume by diameter classes and county, east Oklahoma, 1966*

| County | All species | Softwood | | | Soft hardwood | | | Hard hardwood | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | 9.0-14.9 inches | 15.0 inches and up | Total | 11.0-14.9 inches | 15.0 inches and up | Total | 11.0-14.9 inches | 15.0 inches and up |
| | *Million board feet* | | | | | | | | | |
| Adair | 70.7 | 14.0 | 14.0 | ... | 7.7 | 7.7 | ... | 49.0 | 39.5 | 9.5 |
| Atoka | 140.1 | 33.0 | 30.9 | 2.1 | 20.2 | 6.0 | 14.2 | 86.9 | 45.9 | 41.0 |
| Cherokee | 144.5 | 8.7 | 8.7 | ... | 10.1 | 2.5 | 7.6 | 125.7 | 55.3 | 70.4 |
| Choctaw | 187.4 | 4.8 | 3.9 | .9 | 40.5 | 25.8 | 14.7 | 142.1 | 63.5 | 78.6 |
| Coal | 96.0 | ... | ... | ... | 3.7 | 1.5 | 2.2 | 92.3 | 34.2 | 58.1 |
| Delaware | 106.4 | 4.2 | 4.2 | ... | 3.3 | 1.1 | 2.2 | 98.9 | 54.5 | 44.4 |
| Haskell | 96.8 | 6.6 | 4.5 | 2.1 | 48.7 | 33.1 | 15.6 | 41.5 | 24.5 | 17.0 |
| Latimer | 101.2 | 64.4 | 56.0 | 8.4 | ... | ... | ... | 36.8 | 25.6 | 11.2 |
| Le Flore | 547.8 | 402.1 | 323.7 | 78.4 | 32.8 | 7.8 | 25.0 | 112.9 | 66.2 | 46.7 |
| McCurtain | 1,843.4 | 1,397.5 | 949.0 | 448.5 | 92.0 | 57.0 | 35.0 | 353.9 | 218.0 | 135.9 |
| McIntosh | 29.9 | ... | ... | ... | 6.9 | 2.4 | 4.5 | 23.0 | 13.7 | 9.3 |
| Mayes | 75.8 | 13.4 | 12.3 | 1.1 | 16.0 | 3.3 | 12.7 | 46.4 | 20.8 | 25.6 |
| Muskogee | 13.4 | 1.1 | ... | 1.1 | ... | ... | ... | 12.3 | 7.8 | 4.5 |
| Ottawa | 53.9 | ... | ... | ... | ... | ... | ... | 53.9 | 32.3 | 21.6 |
| Pittsburg | 80.8 | 8.8 | 6.7 | 2.1 | ... | ... | ... | 72.0 | 19.7 | 52.3 |
| Pushmataha | 679.6 | 517.8 | 397.4 | 120.4 | 16.4 | 4.7 | 11.7 | 145.4 | 77.1 | 68.3 |
| Sequoyah | 41.5 | 32.2 | 29.2 | 3.0 | ... | ... | ... | 9.3 | 4.6 | 4.7 |
| All counties | 4,309.2 | 2,508.6 | 1,840.5 | 668.1 | 298.3 | 152.9 | 145.4 | 1,502.3 | 803.2 | 699.1 |

Table 38. *Timber removals from growing stock and sawtimber by county, east Oklahoma, 1965*

| County | Growing stock | | | Sawtimber | | |
|---|---|---|---|---|---|---|
| | All species | Soft-wood | Hard-wood | All species | Soft-wood | Hard-wood |
| | – *Million cubic feet* – | | | – *Million board feet* – | | |
| Adair | 0.5 | (1) | 0.5 | 0.7 | (1) | 0.7 |
| Atoka | 1.4 | 0.2 | 1.2 | 3.9 | 0.7 | 3.2 |
| Cherokee | 1.5 | (1) | 1.5 | 2.9 | (1) | 2.9 |
| Choctaw | 1.3 | .2 | 1.1 | 3.1 | .3 | 2.8 |
| Coal | .5 | (1) | .5 | 1.7 | ... | 1.7 |
| Delaware | 1.1 | (1) | 1.1 | 2.7 | (1) | 2.7 |
| Haskell | .4 | ... | .4 | 1.4 | ... | 1.4 |
| Latimer | .9 | (1) | .9 | 1.3 | .2 | 1.1 |
| Le Flore | 5.4 | 2.2 | 3.2 | 12.8 | 6.2 | 6.6 |
| McCurtain | 18.5 | 12.0 | 6.5 | 78.5 | 59.0 | 19.5 |
| McIntosh | .6 | ... | .6 | .4 | ... | .4 |
| Mayes | .4 | ... | .4 | 1.2 | (1) | 1.2 |
| Muskogee | .7 | ... | .7 | 1.0 | ... | 1.0 |
| Ottawa | .8 | ... | .8 | 1.8 | ... | 1.8 |
| Pittsburg | .9 | .1 | .8 | 1.2 | .4 | .8 |
| Pushmataha | 6.3 | 4.4 | 1.9 | 25.1 | 21.2 | 3.9 |
| Sequoyah | .6 | (1) | .6 | 1.3 | ... | 1.3 |
| All counties | 41.8 | 19.1 | 22.7 | 141.0 | 88.0 | 53.0 |

[1] Negligible.

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