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KANSAS WOODLANDS

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FOREWORD

This report presents forest resource information for Kansas compiled from a forest survey made in 1965. It provides new statistics on forest area, timber volume, growth and cut, and forest industry.

A previous forest survey of Kansas was made in 1936 by Kansas State College in cooperation with the U.S.D.A. Forest Service. The findings were published in a report entitled *Woodlands of Kansas,* which emphasized the management of farm woodlots. The new survey consisted of a forest inventory conducted between July 1964 and June 1965, and a canvass of forest products milling activities in 1964. Both the 1936 and 1965 surveys were part of the nationwide forest survey authorized by the McSweeney-McNary Forest Research Act of 1928. The Kansas Legislature appropriated $39,000 to supplement Federal funds for the 1965 survey, making possible data summary on a county basis in heavily forested parts of the State.

The survey was designed and carried out by the North Central (formerly Lake States) Forest Experiment Station, St. Paul, Minnesota, with the assistance of Kansas State University. The Kansas Office of the Agricultural Stabilization and Conservation Service provided the necessary aerial photos. Photographs for the text were supplied by the Extension Forester, Kansas State University.

Paul S. DeBald,[1] North Central Forest Experiment Station, directed the survey with assistance from John K. Strickler, Associate State Forester of Kansas, and Arnold J. Ostrom, Field Supervisor from North Central. The timber industry of Kansas was surveyed by Leonard K. Gould, Kansas State University. Burton L. Essex, Arthur G. Horn, (now retired) and Mr. Ostrom, all of the North Central Station, were responsible for computing and compiling the data.

Landowners who would like guidance in obtaining trees, improving their stands, or harvesting timber are advised to contact the State Extension Forester, Kansas State University, Manhattan, Kansas 66502, or their County Extension Office.

1 *Now with the Northeastern Forest Experiment Station.*

KANSAS WOODLANDS

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and

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IN BRIEF

The natural forests of Kansas occupy about 1.3 million acres, or 2.6 percent of the State's land area. Approximately 1,192,000 of these acres are classified as commercial forest land. An additional 215,000 acres of nonforest wooded-strip land meet the national standard for commercial forest in every respect except that these strips are less than 120 feet wide. Most of the woodland is in the eastern third of the State where rainfall is most abundant. In western Kansas, forests become more and more closely confined to the river valleys as rainfall diminishes.

The forest acreage has increased in the last 30 years, mostly as a result of natural restocking of idle farmland. Windbreak and shelterbelt plantings have added substantially to the total wood volume, but most of these are not classified as commercial forest. Forest land area is expected to decrease in years to come, largely because of urban expansion and changing land use.

The Kansas forests, primarily hardwood, are composed of two major forest-type groups: oak-hickory, found mostly on the eastern uplands, and elm-ash-cottonwood, abundant in the eastern lowlands and following the stream bottoms into the western part of the State. Cottonwood and elm are the most abundant species, comprising over half the sawtimber volume. Black walnut, however, is the most valuable species; in 1963 only Indiana showed a larger cut of walnut logs.

The woodlands have been depleted over the years as a result of poor logging practices, grazing, and burning. Many stands are understocked with vigorous thrifty growing-stock trees; 7 out of 10 acres need timber harvest or silvicultural treatment to increase the number of desirable trees and reduce competing vegetation. The forest improvements in future years will depend on the attitudes of the small-private-woodland owners, mostly farmers, who control the timber resource.

Insufficient logging in the last 30 years has resulted in a surplus of large trees. In fact, over half the total wood volume in Kansas is in trees larger than 15 inches in diameter. Black walnut is the only exception because its high value has resulted in heavier cutting. Fortunately, the future of such species as hackberry, ash, and soft maple is beginning to look brighter, since the demand for high-quality logs is increasing.

Net growth of timber on commercial forest land in 1964 exceeded cut by about four times. Black walnut, bur oak, soft maple, and cottonwood made up over half the cut. Allowing for overcutting in certain species and quality classes, and changes in land use, it appears that the growing-stock cut could easily be increased 75 percent and the sawtimber cut 30 percent over the 1964 level.

The outlook for forestry in Kansas is favorable. The potential for manufacturing forest products is not yet fully developed. Primary processors in and immediately adjacent to Kansas are expanding their operations to take advantage of improved markets for the high-quality sawtimber, but there is a real need and opportunity for secondary processors to utilize the lumber being manufactured. Kansas also needs more forest products industries that can use small and low-quality material. The development of more of these industries, such as pulpmills, charcoal plants, and pallet manufacturers, would allow a more effective and complete utilization of Kansas timber resources.

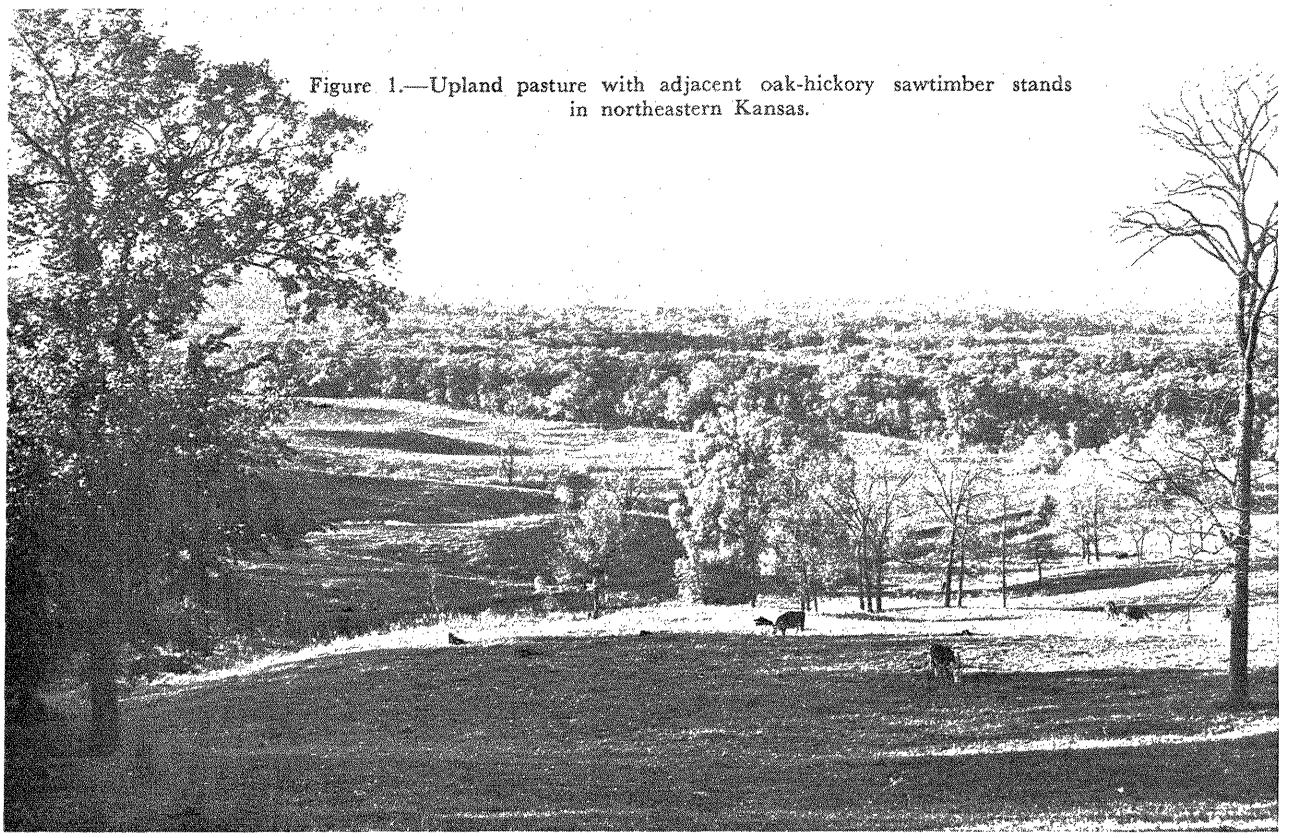


Figure 1.—Upland pasture with adjacent oak-hickory sawtimber stands in northeastern Kansas.

KANSAS

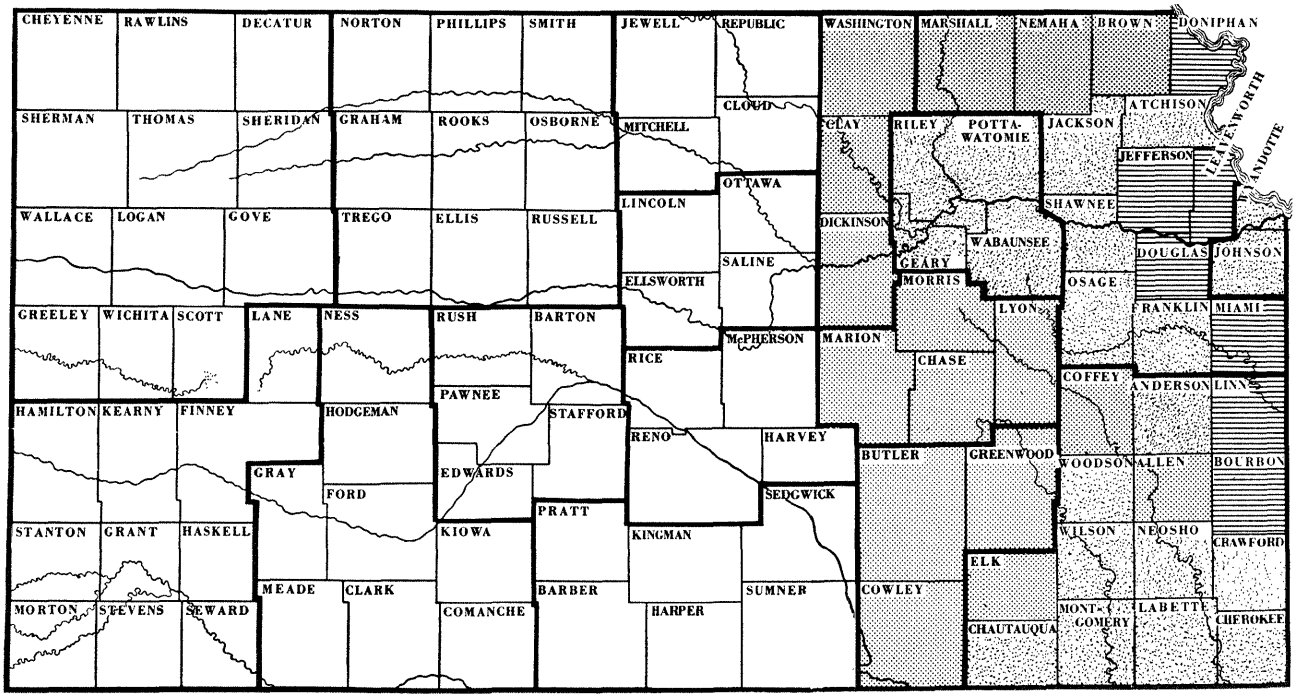


Figure 2.—Percent of land classed commercial forest, by county or county group, Kansas, 1965.

TIMBER TRENDS

FOREST AREA

Forest Land Pattern Changing

Today Kansas has roughly 1.2 million acres of commercial forest land, about 92,000 acres more than in 1936. The increase over the past 30 years has been due largely to natural regeneration of idle pasture and cropland, rather than artificial reforestation. Although nearly 2,500 acres have been planted annually in recent years, 80 percent are in nonforest windbreak and shelterbelt plantings.

Noncommercial forest land, or land incapable of yielding a merchantable timber crop, covers 157,400 acres in Kansas. Blackjack and post oak stands in the southeastern part of the State account for three-fourths of this unproductive land. These are found primarily on the poorer upland sites characterized by shallow, rocky soils.

During the next 30 years changes in land use are expected to reduce the commercial forest area by about 40,000 acres. Gains from reforestation will probably not be large enough to offset losses due to agriculture, urban expansion, reservoirs, highways, and recreational developments.

"Nonforest" Land Important

To be classified as "forest" by national survey standards, land must support timber stands at least 120 feet wide. Yet, about 215,000 acres of naturally wooded land in Kansas are in narrow strips less than 120 feet wide. Classified as "wooded strip," these areas meet all the requirements for commercial forest land except width. It should be noted that windbreaks, shelterbelts, and fence rows are not included in the wooded strip classification. Because accessibility of the wooded strips for logging makes their use for commercial timber production feasible, they must be considered as part of the timber resource. With 80 percent of the wooded-strip area in the bottomland types, most sites have the capacity to produce high-quality hardwood timber, but tree quality tends to be poor due to open growing conditions. Stands are also younger on the wooded-strip land; only 14 percent of the area supports sawtimber, compared to 57 percent for commercial forest land.

In addition to wooded strips, nonforest land includes about 370,000 acres of wooded pasture (fig. 1). This is grazed land 10 percent or more stocked with trees, but less than 25 percent stocked with growing-stock trees. The primary use and impact on this land is grazing. It is mostly pasture or native grassland that has been invaded by such species as osage orange, blackjack oak, post oak, elm, and honeylocust. Due to a combination of grazing, adverse site conditions, noncommercial species, and poor tree quality, these wooded pastures have little or no potential for commercial timber production.

Hardwoods Dominate Timber Picture

The natural woodlands of Kansas are found principally in narrow belts along the river valleys, side drainages, and adjacent slopes; they become scarcer and more closely confined to the river banks in the western part of the State. Over 80 percent of the commercial forest land is in the eastern third of the State, where rainfall is most abundant (fig. 2). The woodlands are composed of two broad forest-type groups, which occupy about equal land areas: oak-hickory, found chiefly on the uplands in the eastern third of the State; and elm-ash-cottonwood, found mostly in the stream bottoms of the eastern half (fig. 3). The oak-hickory group includes the following distinct local types, in order of decreasing abundance: elm-ash-locust, oak-hickory, upland plains

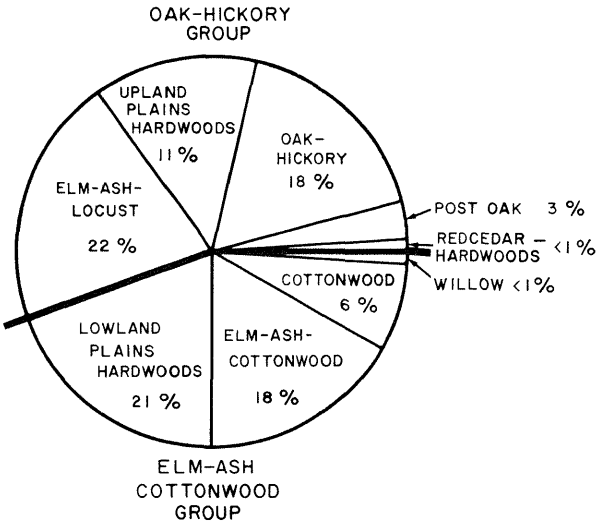


Figure 3.—Forest types by percent of commercial forest land, Kansas, 1965.

hardwoods, post oak, and redcedar-hardwoods. In the elm-ash-cottonwood group, lowland plains hardwoods are most abundant, followed by the elm-ash-cottonwood, cottonwood, and willow types (fig. 4). Bottomland, streambank, and cove sites, which are excellent for growing hardwoods, make up about two-thirds of the commercial forest land. Trees will grow over 60 feet tall in 50 years on nearly all this land.

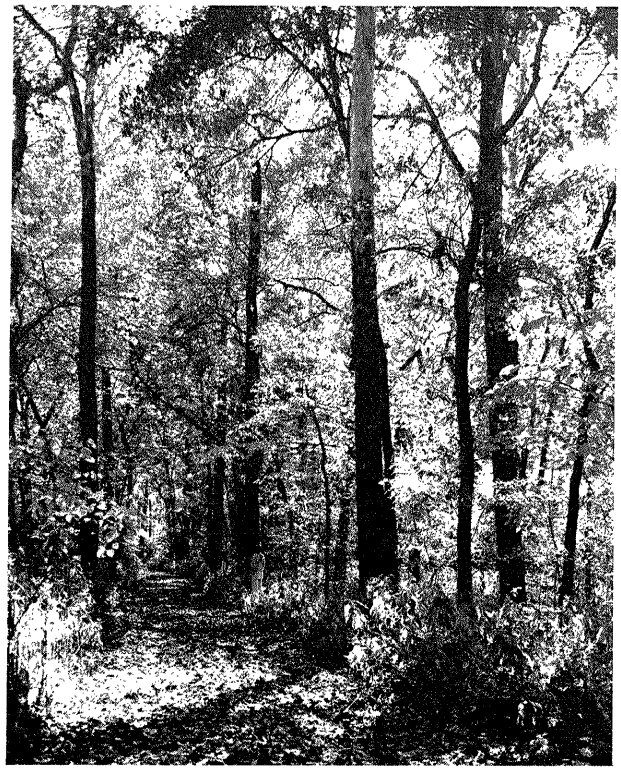


Figure 4.—An excellent bottomland sawtimber stand of elm-ash-cottonwood in eastern Kansas.

Stand Improvement Possibilities

The timber harvest in Kansas has been well below growth in the last three decades, as evidenced by the increase in sawtimber. Today sawtimber stands make up 57 percent of the commercial forest area, compared to only 46 percent in 1936 (fig. 5). Poletimber stands occupy 19 percent, sapling and seedling stands 12 percent, and nonstocked areas 12 percent. The woodlands contain a larger amount of sawtimber than would normally be carried in a long-term management program, but increased cutting in recent years, if continued, will eventually balance the stand-size distribution.

Despite the large area in sawtimber and poletimber, the woodlands of Kansas are relatively young. Half the commercial forest area supports stands less than 40 years old. Almost four-fifths of the forests are less than 60 years old, and less than a tenth exceed 80 years. Stands in the oak-hickory group are on the average younger than stands in the elm-ash-cottonwood group (fig. 6).

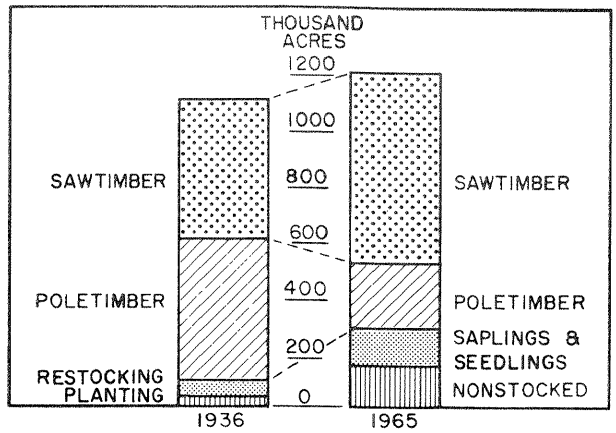


Figure 5.—Commercial forest land by stand-size class, Kansas, 1936 and 1965.

The number of good growing-stock trees has declined over the years as a result of "high grading," grazing, and repeated burning. High-quality trees harvested or lost have been too frequently replaced by less desirable trees. When all live trees are considered, 92 percent of the commercial forest area is 50 percent or more stocked; but when only growing-stock trees are considered, less than one-fourth is 50 percent or more stocked. The main deficiency in Kansas woodlands at the present, then, is not simply quantity of trees, but quantity of *good* trees. While only 4 percent of the commercial forest land requires complete reforestation, 1 acre in every 3 would benefit from partial or spot underplanting to fill in openings and improve species composition. About 50 percent of the forest land would benefit from stand improvement treatments (half of which could be commercial operations), and 18 percent from harvest cutting.

Farmers own two-thirds of the commercial forest land in Kansas, and there are no large blocks of private or public ownership. Thus, upgrading the woodlands will depend largely on the attitudes of small owners. While forestry is doubtless of secondary importance to most Kansas farmers, they will improve their woodlands as opportunities to make profits emerge. The present emphasis on quality hardwoods, such as black walnut, and the increase in milling activities hold much promise for the future.

TIMBER VOLUME

Sawtimber Abundant

The present timber volume on commercial forest land in Kansas approaches 825 million cubic feet.

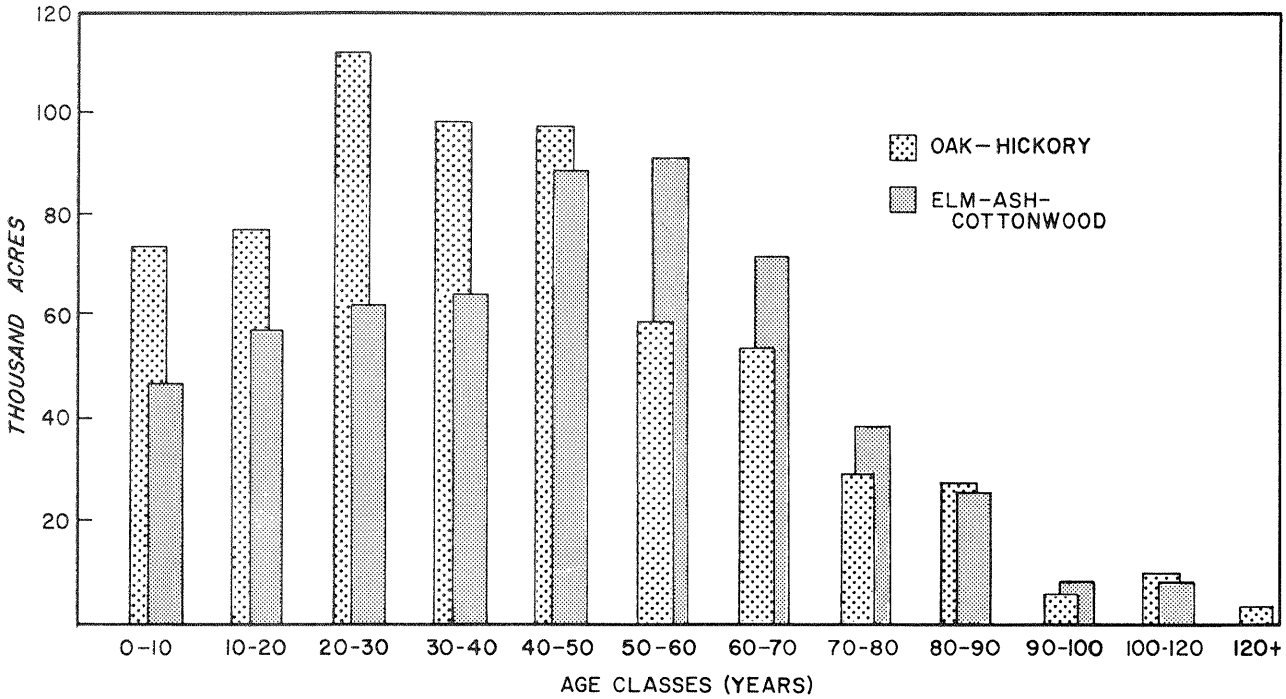


Figure 6.—Distribution of oak-hickory and elm-ash-cottonwood type groups by age classes, Kansas, 1965.

Fifty-nine percent is in growing stock trees, 40 percent in rough (including short-log) and rotten trees, and 1 percent in salvageable dead trees. The growing-stock volume is about 490 million cubic feet.

The sawtimber volume on commercial forest land is approximately 1.8 billion board feet by the International ¼-inch rule; short-log trees contain an additional 260 million board feet. Short-log trees, which are commonly merchantable in the central states, contain one or more 8-to-11-foot logs, but do not have the 12-foot log required by national survey standards for a growing-stock tree.

The volume breakdown by species shows that cottonwood and elm comprise almost half the total sawtimber (fig. 7). Cottonwood is relatively more abundant in western Kansas, but gives way to elm in the eastern third of the State, where 80 percent of the total sawtimber volume is found.

Poletimber stands have a slightly different species composition than sawtimber stands. For instance, cottonwood makes up 24 percent of the sawtimber, but only 11 percent of the poletimber volume (fig. 7). It appears that cottonwood, elm, and select white oaks will be partially replaced by such species as black walnut, hackberry, and ash in the future.

In addition to the timber on commercial forest land, Kansas has nearly 184 million cubic feet on wooded strips. This includes 98 million cubic feet in sound timber, roughly one-fifth the amount found on commercial forest land. The total sawtimber volume in growing stock and short-log trees on wooded strips is 443 million board feet.

Sawtimber Quality High

Insufficient markets and light cutting (until recently) have caused timber to accumulate in the larger diameter classes (fig. 8). Over half the sawtimber volume is in trees 19 inches or larger in diameter; in fact, three-fourths of the cottonwood and sycamore, and about two-thirds of the elm volume is in these large trees. Since log grade is directly related to tree size, Kansas sawtimber is relatively high in quality. Grade 1 logs make up a fourth of the sawtimber volume, and grades 1 and 2 combined make up nearly half. Sycamore, black walnut, hackberry, and cottonwood are exceptionally high in quality (fig. 9).

Black Walnut A Key Species

The natural range of black walnut extends over most of the eastern half of Kansas. The species grows best on rich, well drained soils, and is most abundant in the upland plains hardwoods type. The trees are usually scattered in hardwood stands or in narrow strips along streams or fence rows (fig. 10). This species seldom grows in pure stands, although plantations have been found feasible (fig. 11). If current research results in improved management

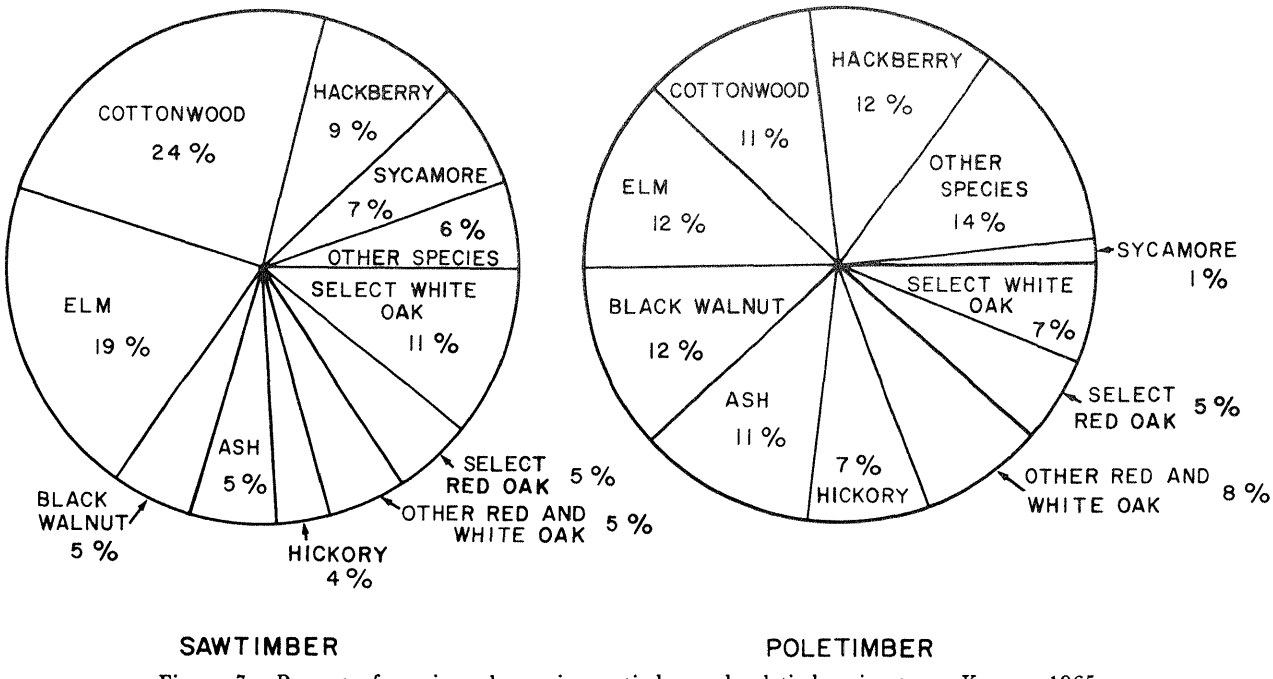


Figure 7.—Percent of species volumes in sawtimber-and-poletimber-size trees, Kansas, 1965.

techniques and shorter rotations, there will undoubtedly be a sharp increase in walnut planting.

The total volume of black walnut in Kansas amounts to over 60 million cubic feet; about 51 million cubic feet are found on commercial forest land, 5 million on wooded strips, and 4 million on other nonforest land. Sawtimber volume approaches 120 million board feet, 62 percent of which is in grade 1 and 2 logs.

The tree size distribution reflects much heavier cutting of black walnut than other Kansas species. Poletimber trees make up 40 percent of the walnut volume on commercial forest land, compared to only 25 percent for all species combined. On the

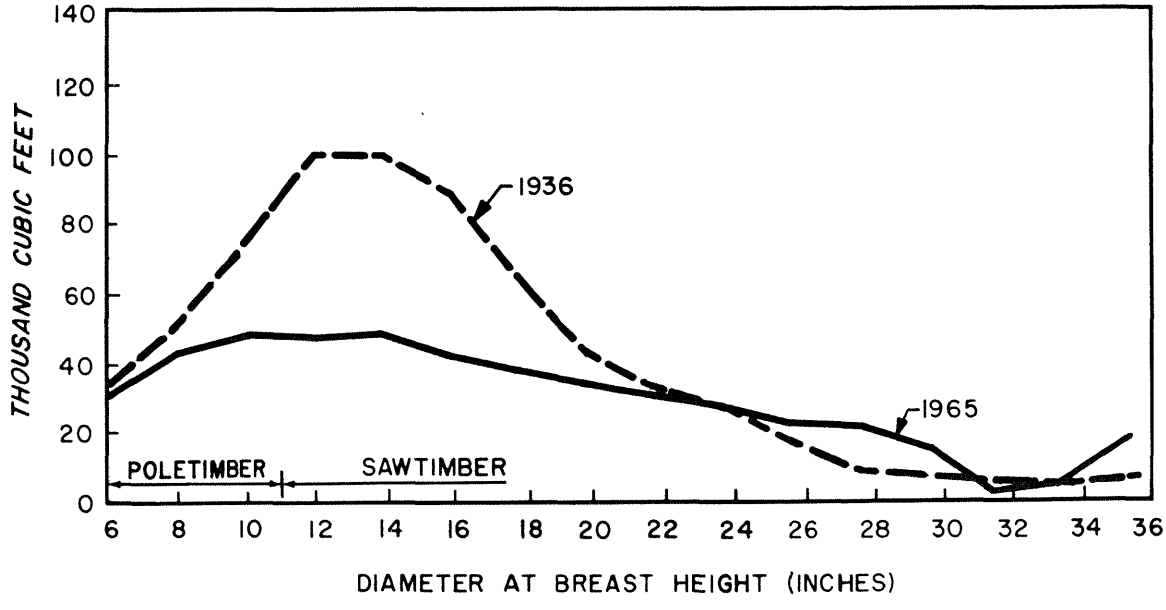


Figure 8.—Distribution of growing-stock volumes by tree diameter class, Kansas, 1936 and 1965.

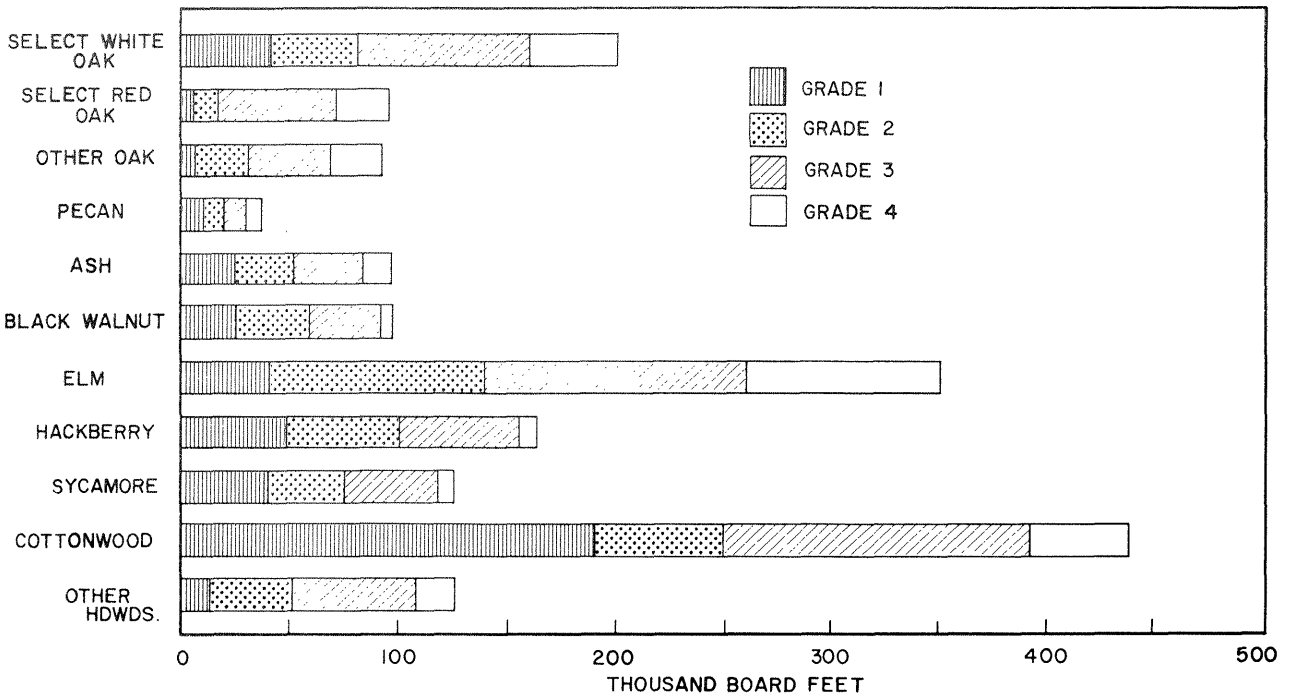


Figure 9.—Sawtimber volume by species groups and log grades, Kansas, 1965.

other hand, only 15 percent of the walnut sawtimber is in trees larger than 19 inches in diameter compared to 54 percent for all species.

Black walnut, then, provides an excellent opportunity for forest management in Kansas. The majority of the walnut growing stock is in young, vigorous trees that respond best to good management practices. High-quality timber can be grown on relatively short rotations, thus offering the timber grower a good return on woodland property.

TIMBER GROWTH AND CUT

Timber Growth Good

The net growth of growing stock on commercial forest land in 1964 was 24.5 million cubic feet, or about 20.5 cubic feet per acre. However, net growth in 1964 may be somewhat higher than normal for Kansas because of adequate rainfall and low mortality in that year. The 1964 mortality estimate was based on the average for the years 1962-64, which were all years of low mortality. Adjusting the net growth for average mortality over a longer period of time gives a more reliable growth estimate — called "net *trend* growth" — for making long-range plans and projections. The net trend growth of growing stock in 1964 was 14 million cubic feet, somewhat less than the actual.

Sawtimber net annual growth was in excess of 85 million board feet, or about 71 board feet per acre; again, adjustment for long-term mortality gives a trend annual growth figure of slightly more than half this amount. Cottonwood made up a fourth of

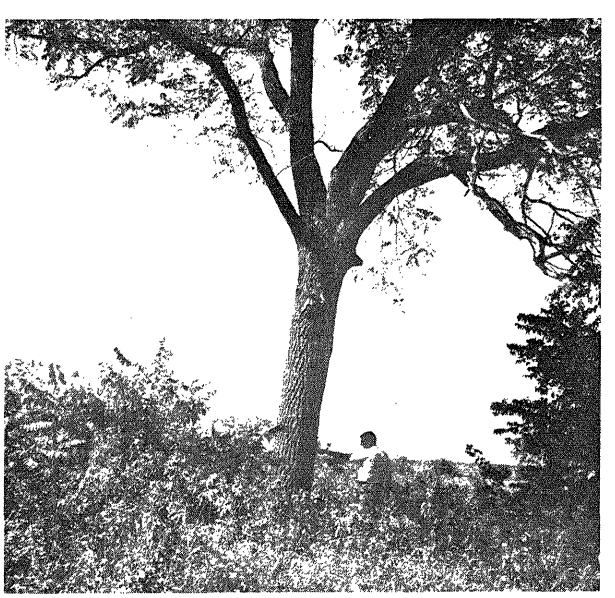


Figure 10.—Isolated high value veneer quality black walnut trees along fence rows or in pastures are merchantable in eastern Kansas.

Figure 11.—High quality black walnut sawtimber in a 50-year old plantation.

the total sawtimber growth in 1964; hackberry and black walnut added nearly another fourth. Cottonwood provides the most sawtimber growth in northeastern Kansas, but gives way to hackberry in the southeastern portion of the State; in western Kansas, cottonwood far exceeds all other species, providing over 60 percent of the sawtimber growth.

The average sawtimber growth rate in 1964 was 4.7 percent, but ranged from as low as 1.6 percent for elm to as high as 9.6 percent for black walnut. Although walnut is a fast-growing tree, this abnormally high rate, due to ingrowth and an abundance of small, fast-growing sawtimber trees, will probably taper off in the future.

As indicated earlier, tree mortality varies widely in the Great Plains. It was high in the 1930's and mid-1950's in Kansas, but has been low in recent years. The average annual mortality for the years 1962-64 was only 7 million board feet, or 0.4 percent of the sawtimber volume. Elm was the hardest hit species in 1964, losing 5.4 million board feet. Disease, the major cause of mortality, was responsible for 94 percent of the sawtimber mortality and 84 percent of the growing stock mortality. Dutch elm and other elm diseases were the primary causes.

Timber Cut Low

The cut of growing stock on commercial forest land in 1964 was approximately 5.8 million cubic feet — only one-fourth the net growth for that year. Black walnut made up 20 percent of the total cut, followed by bur oak and soft maple with 13 and 11 percent. Despite the fact that cottonwood has the greatest growing-stock volume, it provided only 10 percent of the cut.

Timber harvesting in 1964 reduced the total growing-stock volume by about 1.2 percent; soft maple volume, however, was reduced by 7.0 percent and black walnut by 3.3 percent. More than 90 percent of the timber harvest came from the eastern third of the State.

The sawtimber cut on commercial forest land amounted to 29 million board feet, or 1.6 percent of the State's total. Black walnut accounted for one-fourth of the sawtimber cut, and cottonwood and bur oak each one-eighth. The walnut sawtimber volume was reduced by 7.6 percent, most of the cut coming from the northeastern part of the State.

Total timber removal is somewhat greater than timber cut since it includes trees that are destroyed as forest land is cleared, flooded, or converted to other uses. Removals in addition to cut in 1964 were estimated at 2.3 million cubic feet.

Growth and Removal Not in Balance

Ideally, under a long period of sound management, timber stands should be in balance with growth equal to cut. This situation does not exist in Kansas because inadequate harvesting has resulted in a surplus of large-diameter trees. Although heavy cutting may be justified for a time in order to harvest overmature trees, care should be taken to distribute the cut evenly until young growth is ready for harvest. Measures should be taken to increase the use of less desirable species and log grades, and at the same time restrict the overcutting of desirable species and high-quality material.

Comparing the 1964 growth and cut may be misleading because net growth was probably higher and cut lower than the average for recent years. Trend growth and timber removal provide a better comparison, but even these figures are not precise. However, it is evident that soft maple is being overcut, while cottonwood, ash, hackberry, select red oaks, and "other hardwoods" are building up surpluses. Trend growth-cut comparisons indicate that growing-stock removal can be increased 75 percent and sawtimber 30 percent above present levels.

TIMBER PRODUCTS AND FOREST INDUSTRIES

SAW LOGS MOST IMPORTANT

Almost 9 million cubic feet of timber products came from Kansas woodlands in 1964. Although the cut of fuelwood and fence posts has declined sharply since 1935, more wood is still used for fuel than for any other product. Yet veneer and lumber logs must be considered the most important forest products because they have higher values and account for the largest drain on the growing stock.

Over 60 percent of the total harvest in 1964 came from growing-stock trees, while the remainder came from limbwood, dead, cull, and short-log trees, plant by-products, and trees from noncommercial or nonforest land. About 80 percent of the growing-stock trees harvested were sawtimber size.

Forty-five percent of the growing stock harvested was used for saw logs, 35 percent for fuelwood, 13 percent for veneer and cooperage logs, and 7 percent for all other products. Very little logging residue is utilized in Kansas.

NINETY-FIVE COMPANIES PROCESSING TIMBER

Ninety-five primary wood-using plants were operating in Kansas in 1964 (fig. 12). In addition to 79 sawmills, there were 10 cooperage mills, a charcoal plant, and five fence post yards or treating plants. Eighty-seven of the 95 mills are located in the eastern third of Kansas.

While the output of lumber has decreased only 20 percent since 1935, the number of sawmills has decreased from 252 to 79. In 1935 only two mills sawed more than 1 million board feet of lumber annually, compared to six today. The reduction in output has resulted almost entirely from the closing of many small sawmills.

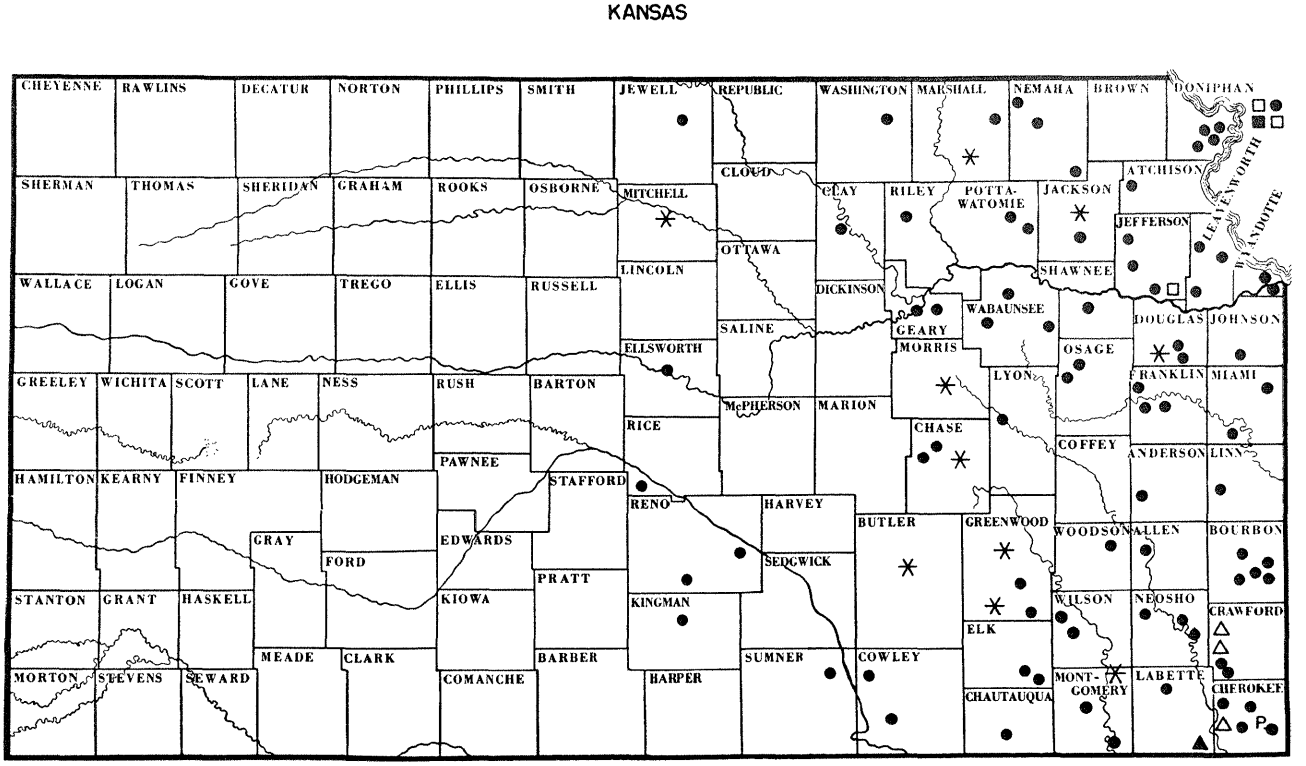


Figure 12.—Primary wood-using industries in Kansas, 1964.

LOOKING AHEAD[2]

FOREST AREA EXPECTED TO DECLINE

The area of commercial forest land is expected to decrease 40,000 acres in the next three decades. Urban expansion, reservoirs and channel improvements, recreational developments, highway construction, and land clearing for agriculture will all contribute to the decline. These changes will be only partially offset by forest invasion of upland pastures and other open areas. It is expected that the greatest losses of forest land will be in the bottomlands, while the greatest gains will be in the uplands.

With the exception of black walnut, few trees are being planted today for commercial timber production. Walnut planting should increase throughout eastern Kansas in years to come. Increased planting of such species as cottonwood, ash, and maple is anticipated but not expected to reach large proportions.

LARGE INCREASE IN TIMBER REMOVAL FORESEEN

The gap between timber growth and removal will tend to close in the next 30 years as demand for high-quality saw logs results in larger harvests. Growing-stock removal will increase from 8 million cubic feet in 1965 to an estimated 13 million cubic feet in 1995, while annual growth will rise from 14 million cubic feet to 18 million cubic feet during the same period (fig. 13). The greatest increase in cut will be in sawtimber trees, where projected removal will amount to 96 percent of growth by 1995.

The timber harvest will be dominated by large-diameter, high-quality sawtimber trees for some years to come. However, as this supply begins to diminish, size and quality standards will be lowered to allow cutting of smaller and less valuable trees. For instance, walnut logs that 4 years ago would have been graded as number 2 and processed as gunstocks are now being processed as veneer logs. Also, the growing hardwood pulp market may provide an additional outlet for Kansas hardwoods. Many Kansas species are preferred for hardwood pulp production.

OPPORTUNITIES FOR FORESTRY

Although most of the commercial forests in Kansas are on good hardwood-growing land, only about 1 acre out of 3 is adequately stocked with growing-stock trees. And eastern Kansas woodlands, capable

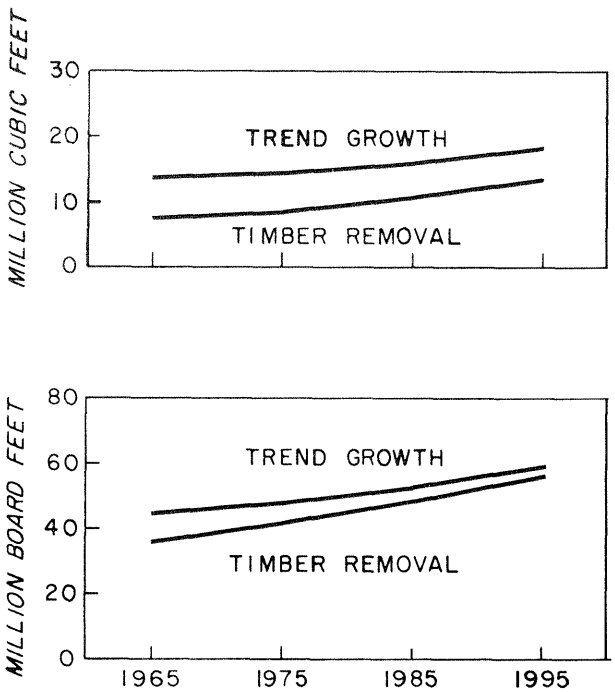


Figure 13.—Projections of growth and cut of growing stock (top) and sawtimber (bottom), Kansas.

of producing some of the finest hardwoods in the nation, are too often occupied by trees of poor quality and undesirable species. Land that is estimated to be capable of growing more than 100 board feet of sawtimber per acre is currently producing only 38 board feet, and is expected to yield only 52 board feet in 1995 unless management is improved.

What are some of the opportunities for rebuilding this resource? A basic need is a market for small and low-quality trees so that the costs of stand improvement may be at least partially met. A number of well-distributed fiber-using plants, charcoal plants, and post and fuel yards would help fill this need. Another distinct need is for more secondary wood manufacturing industries to complete the utilization and thus extract the greatest value from the timber resource. At present, nearly all the timber industries in Kansas are primary producers, such as sawmills.

The stability of any timber industry depends on an adequate, continuous supply of high-quality wood from the woodlands. If this is to be achieved in Kansas, small landowners must recognize timber production as a sound and profitable land use. Probably the greatest progress in rebuilding the timber resource, then, can be made by increasing the stocking of high-value trees such as black walnut, which offer the landowner a realistic opportunity for profit.

[2] *The projections presented here are based on assumptions footnoted in table 33.*

PRINCIPAL COMMERCIAL TREE SPECIES IN KANSAS[1]

SOFTWOOD SPECIES

Redcedar (eastern) ..... *Juniperus virginiana* L.

HARDWOOD SPECIES

Ash (green) ..... *Fraxinus pennsylvanica* Marsh.
Basswood (American) ..... *Tilia americana* L.
Birch (river) ..... *Betula nigra* L.
Cherry (black) ..... *Prunus serotina* Ehrh.
Catalpa (northern) ..... *Catalpa speciosa* Warder
Cottonwood (eastern) ..... *Populus deltoides* Bartr.
Elm includes:
- American elm ..... *Ulmus americana* L.
- Rock elm ..... *Ulmus thomasii* Sarg.
- Siberian elm ..... *Ulmus pumila* L.
- Slippery elm ..... *Ulmus rubra* Muhl.

Hackberry ..... *Celtis occidentalis* L.
Hickory includes:
- Bitternut hickory ..... *Carya cordiformis* (Wangenh.) K. Koch
- Mockernut hickory ..... *Carya tomentosa* Nutt.
- Pecan ..... *Carya illinoensis* (Wangenh.) K. Koch
- Pignut hickory ..... *Carya glabra* (Mill.) Sweet
- Shagbark hickory ..... *Carya ovata* (Mill.) K. Koch
- Shellbark hickory ..... *Carya laciniosa* (Michx. f.) Loud.

Honeylocust ..... *Gleditsia triacanthos* L.
Kentucky coffeetree ..... *Gymnocladus dioicus* (L.) K. Koch
Locust (black) ..... *Robinia pseudoacacia* L.
Maple includes:
- Hard maple—
  - Black maple ..... *Acer nigrum* Michx. f.
  - Sugar maple ..... *Acer saccharum* Marsh.
- Soft maple—
  - Boxelder ..... *Acer negundo* L.
  - Red maple ..... *Acer rubrum* var. *rubrum* L.
  - Silver maple ..... *Acer saccharinum* L.

Mulberry includes:
- Red mulberry ..... *Morus rubra* L.
- White mulberry ..... *Morus alba* L.

Oak includes:
- Select red oaks—
  - Northern red oak ..... *Quercus rubra* L.
  - Shumard oak ..... *Quercus shumardii* Buckl.
- Other red oaks—
  - Black oak ..... *Quercus velutina* Lam.
  - Pin oak ..... *Quercus palustris* Muenchh.
  - Shingle oak ..... *Quercus imbricaria* Michx.
- Select white oaks—
  - Bur oak ..... *Quercus macrocarpa* Michx.
  - Chinkapin oak ..... *Quercus muehlenbergii* Engelm.
  - White oak ..... *Quercus alba* L.
- Other white oaks—
  - Post oak ..... *Quercus stellata* var. *stellata* Wangenh.

Persimmon (common) ..... *Diospyros virginiana* L.
Sycamore (American) ..... *Platanus occidentalis* L.
Walnut (black) ..... *Juglans nigra* L.
Willow (black) ..... *Salix nigra* Marsh.

[1] *The common and scientific names are based on "Check List of Native and Naturalized Trees of the United States (Including Alaska)" by Elbert L. Little, Jr., U.S. Dep. Agr., Agr. Handb. 41, 472 p. 1953.*

APPENDIX

FOREST SURVEY METHODS

The Inventory

Kansas was divided into three Forest Survey Units, Northeastern, Southeastern, and Western (fig. 14). Data were compiled for individual counties in the more heavily wooded eastern quarter of the State. In the rest of the State counties were combined into groups, which were larger in the west where woodlands are less abundant. Each county group was named for a prominent city within the area.

The inventory of forest area, timber volume, and growth was designed to provide specified statistical accuracies at minimum cost. Estimates of forest area were made by classifying points systematically located on aerial photos of all land and water in the State. Approximately 411,000 photo points were classified to determine forest and nonforest acreages. Eleven thousand forest points were further examined stereoscopically and classified as to forest type, stand size, stocking, and site. Field measurements were made at 1,200 of these forest points to provide information regarding the forest cover. Of these, 775 sample locations were established on commercial forest land.

At each of these 775 sample locations, 10 variable radius plots were established in accordance with National Forest Survey instructions. All plot trees were measured and each location was classified as to forest type, size, and condition class. Radial growth measurements and a tally of dead trees were made to provide estimates of growth and mortality. One-third of the forest locations were designated "permanent plots" and marked for remeasurement. These should provide improved growth and mortality information for the next survey.

Wooded Strip Sample

Aerial photo and field sampling procedures similar to those for commercial forest were used in the wooded strip study. The design and size of the wooded strip field plots were adjusted to allow for the narrowness of the strips. Although fewer trees were sampled per plot, the same individual tree measurements were taken on these plots as on the commercial forest plots.

Timber Cut

The 1964 timber production in Kansas was determined by contacting all resident sawmills, all primary wood-using establishments that obtained logs and bolts from Kansas in 1964, and other wood users within the State. The cut of fuelwood and fence posts was estimated using 1964 U.S. Bureau of Census data.

Timber product output figures were converted to standing timber volumes by kind of material and tree size with utilization factors adapted from the Missouri conversion factor and logging residue study.

ACCURACY OF STATISTICS

Forest resource statistics are subject to both sampling errors and human errors (mistakes in judgment, recording, calculation, and compilation). Human errors are minimized through close supervision and adequate training of employees and by rechecking all phases of the work. Sampling errors can be estimated by statistical methods. These errors are held to specified levels by survey design and sample size. A substantial financial contribution from Kansas State University helped make possible the low sampling errors of only ± 2.1 percent for commercial forest land area, ± 4.5 percent for total growing stock volume, and ± 5.2 percent for sawtimber volume (see Guide). The sampling errors of growing stock growth and cut are ± 5.5 percent and ± 11.2 percent respectively. These sampling errors are lower than required to meet National survey standards.

As area, volume, growth, and cut figures are broken down by forest type, species, ownership, and diameter classes, sampling errors increase — the smaller the unit the higher the sampling error. Thus, while estimates for small areas or volumes may sometimes be needed, the reader should use them with caution.

Projections in this report are based on a number of assumptions and on trends which may not continue. We believe them to be reasonably accurate projections (at least for the next decade) of the changes that will take place in the timber resource of Kansas.

DEFINITION OF TERMS

Land and Forest Area

Gross area. — The entire area of land and water as determined by the Bureau of Census, 1960.

Land area. — The area of dry land and land tem-

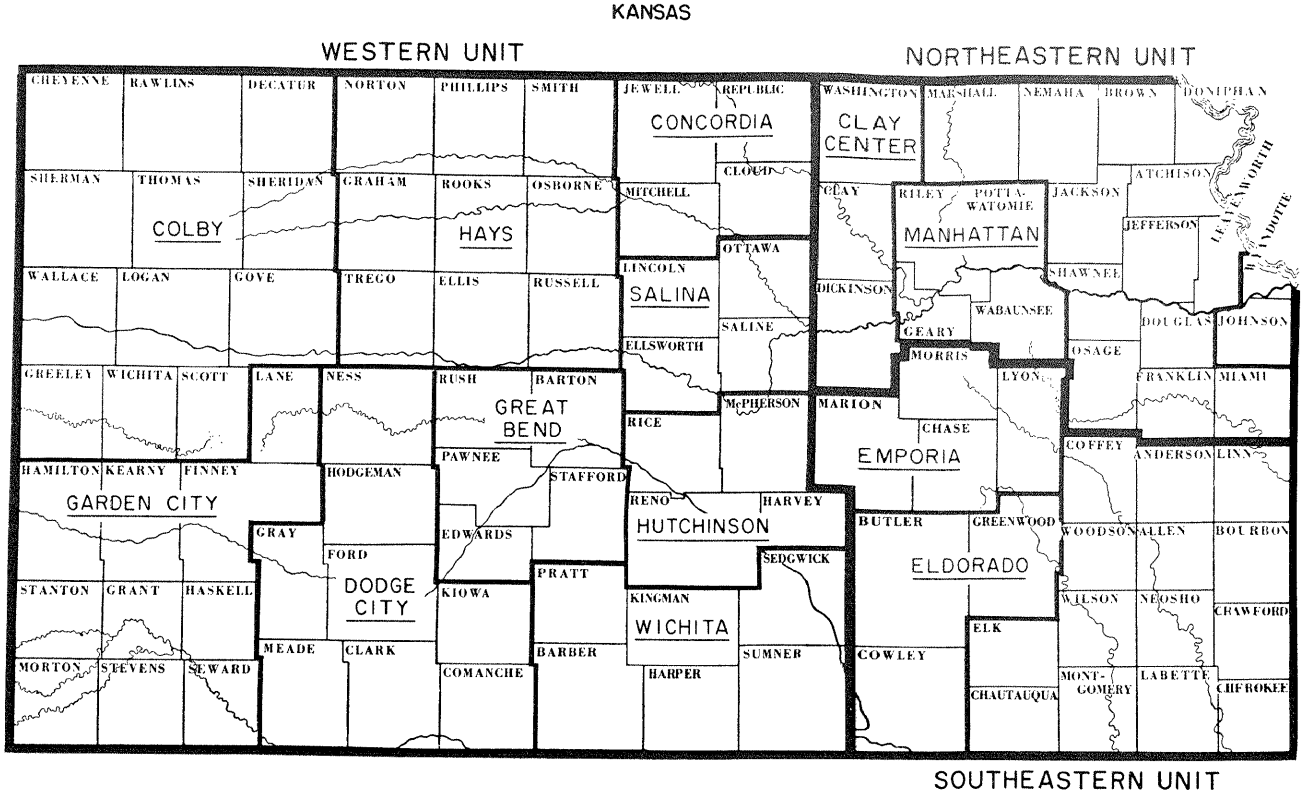


Figure 14.—Forest Survey Units and county groups, Kansas, 1965.

Guide for judging accuracy of area, volume, growth and cut, Kansas, 1965

Sampling error	Commercial forest area	Cubic foot volume	Cubic foot growth	Cubic foot timber cut
(Percent)	(Thousand acres)	(Million cu. ft.)	(Million cu. ft.)	(Million cu. ft.)
3	569	...	...	...
4	320	...	...	...
5	205	401	...	...
10	51	100	7	...
15	23	44	3	4
20	13	25	2	2
25	8	16	1	1
50	2	4	1/	1/
100	2/	1	1/	1/

1/ *Less than one million cubic feet.*
2/ *Less than one thousand acres.*

porarily or partially covered by water such as marshes, swamps, and flood plains; streams, sloughs, estuaries, and canals less than one-eighth mile wide; lakes, reservoirs, and ponds smaller than 40 acres. These figures are from the Bureau of the Census, 1960.

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 nonforest use. Includes afforested areas. The minimum forest area classified was 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, and clearings in forest areas were classed as forest if less than 120 feet in width.

Commercial forest land. — Forest land producing or capable of producing crops of industrial wood and not withdrawn from timber utilization by statute or administrative regulation.

Noncommercial forest land. — (a) Unproductive forest land incapable of yielding crops of industrial wood because of adverse site conditions. (b) Productive-reserved — productive public forest land withdrawn from commercial timber use through statute or administrative regulation.

Nonforest land. — Land that has never supported forests, and lands formerly forested where forest use is now precluded by development for nonforest-uses, such as cropland, improved pasture, residential areas, and city parks. Also includes improved roads and

adjoining rights-of-way, powerline clearings, and certain areas of water classified by the Bureau of Census as land. Unimproved roads, streams, canals, and nonforest strips in forest areas must be more than 120 feet wide, and clearings in forest areas must be more than 1 acre in size, to qualify as nonforest land.

Two subclasses of nonforest were recognized in this survey:

1. *Wooded pasture.* — Heavily grazed, nonforest land, more than 10 percent stocked with forest trees but less than 25 percent stocked with growing stock trees.

2. *Wooded strips.* — Nonforest land which would have been classed commercial forest except that the strips were less than 120 feet wide.

Ownership Classes

Miscellaneous Federal. — Lands owned or administrated by the Federal government.

State, county, and municipal. — Lands owned by states, counties, or municipalities, or lands leased by them for more than 50 years.

Farmer-owned. — Lands owned by operators of farms. A farm must include 10 or more acres from which the sale of agricultural products totals $50 or more annually or, if less than 10 acres, the yield must be at least $250 annually.

Miscellaneous private. — Privately owned lands other than forest-industry or farmer-owned.

Stand-size Classes

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, and with half or more of this stocking in sawtimber and/or poletimber trees and with poletimber stocking exceeding that of sawtimber.

Sapling-seedling stands. — Stands at least 10 percent stocked with growing stock trees and with sapling and/or seedlings comprising more than half of the stocking.

Nonstocked land. — Commercial forest land less than 10 percent stocked with growing stock trees.

Stocking Classes

Well-stocked. — Stands that are 70 percent (of area) or more stocked with growing stock trees.

Medium stocked. — Stands that are 40 to 69 percent stocked with growing stock trees.

Poorly stocked. — Stands that are from 10 to 39 percent stocked with growing stock trees.

Forest Types

Oak-hickory. — Forests in which upland oaks or hickory, singly or in combination, comprise a plurality of the stocking except where pines comprise 25-50 percent, in which case the stand would be classified oak-pine. Common associates include elm, maple, and black walnut. These forests may be subtyped *redcedar-hardwood, post* (or post-blackjack) *oak, oak-hickory, elm-ash-locust,* or *upland plains-hardwoods,* depending on which species is most common. Eastern redcedar must comprise at least 25 percent of the stocking of a redcedar hardwood stand. Post or blackjack oak, singly or in combination, must comprise a majority of the stocking of a post oak stand. Upland oaks or hickory, singly or in combination, must comprise a plurality of the stocking of "local" oak-hickory stands. Upland growing elm, ash, or honeylocust, singly or in combination, must comprise a majority of the elm-ash-locust subtype. Black walnut, hackberry, or bur oak, singly or in combination, growing on upland sites must comprise a plurality of the stocking of upland plains hardwood stands.

Elm-ash-cottonwood. — Forests in which elm, ash, or cottonwood, singly or in combination, comprise a plurality of the stocking. Common associates include willow, sycamore, and maple. These forests may be subtyped *cottonwood, willow, lowland plains hardwoods,* or *elm-ash-cottonwood,* depending on which species is most common. Cottonwood must comprise the majority of the stocking of the cottonwood subtype. Willow must comprise the majority of the stocking of the willow subtype. Black walnut, hackberry, bur oak, soft maple, and boxelder, singly or in combination and growing in coves or bottomlands, must comprise a plurality of the stocking of the lowland plains hardwoods subtype. Elm, ash, cottonwood or willow, singly or in combination and growing on lowland sites must comprise a plurality of the stocking (except for those areas largely occupied by willow or cottonwood) to be classed by the subtype elm-ash-cottonwood.

Tree Classifications

All trees. — All live trees.

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 having no serious defects in quality limiting present or prospective use, and of relatively high vigor and containing no pathogens that may result in death or serious deterioration before rotation age. These are trees that would be favored by forest management in silvicultural operations.

Sawtimber trees. — Live trees of commercial species containing at least a 12-foot saw log. Softwoods must be at least 9.0 inches in diameter at breast height and hardwoods at least 11.0 inches.

Poletimber trees. — Live trees with good vigor and form of commercial species 5.0 to 8.9 inches in diameter at breast height for softwoods and 5.0 to 10.9 inches in diameter at breast height for hardwoods.

Saplings. — Live trees of commercial species 1.0 inch to 5.0 inches and of good form and vigor.

Seedlings. — Live trees of commercial species less than 1.0 inch in diameter at breast height that are expected to survive according to regional standards.

Rotten trees. — Live trees of commercial species that do not contain a merchantable 12-foot saw log, now or prospectively, because of rot.

Rough trees. — Live trees that do not contain at least one merchantable 12-foot saw log, now or prospectively, because of roughness, poor form, or noncommercial species.

Short-log trees (rough trees). — Trees that contain one or more 8- to 11-foot saw logs and would qualify as growing stock except for the 12-foot log requirement. Although these trees are merchantable, the net volume is shown separately from growing stock.

Area Condition Class

Excellent. — Areas 70 percent or more stocked with desirable trees.

Good. — Areas 40 to 70 percent stocked with desirable trees and with less than 30 percent of the area having undesirable growing stock trees, cull trees, inhibiting vegetation, or nonstockable conditions.

Favorable. — Areas 40 to 70 percent stocked with desirable trees and with 30 percent or more of the area having other trees or conditions that prevent occupancy by desirable trees.

Moderately favorable. — Areas less than 40 percent stocked with desirable trees, but with 70 percent or more of the area occupied by growing stock trees.

Fair. — Areas less than 40 percent stocked with desirable trees, but with 40 to 70 percent of the area occupied by growing stock trees.

Unfavorable. — Areas less than 40 percent stocked with desirable trees, and with less than 40 percent of the area occupied by growing stock trees.

Other Land Classifications

Site index. — An expression of forest site quality based upon the height of a free-growing dominant tree at age 50.

Stand-age. — Age of the main stand in both even- and uneven-aged stands.

Stocking. — An expression of how well the available growing space is being utilized by trees, measured by basal area and/or number of trees.

Timber Volumes

Volume of growing stock. — The volume of sound wood in the bole of sawtimber and poletimber trees from stump to a minimum 4.0-inch top diameter outside bark, or to the point where the central stem breaks into limbs. Growing stock volumes are shown in cubic feet but may be converted into solid-wood cords by dividing by 79.

Volume of sawtimber. — Net volume of the saw log portion of live sawtimber trees in board feet, International ¼-inch rule, from stump to a minimum 7 inches top diameter outside bark for softwoods and 9 inches for hardwoods. Note that the volume of sawtimber is a part of the volume of growing stock.

Volume of short-log trees. — Net volume of the saw log portion of short-log trees, International ¼-inch rule, from stump to a minimum 7 inches top

diameter outside bark for softwoods and 9 inches for hardwoods. Note that the volume of short-log trees is shown separately from the volume of growing stock.

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

Log Grades

Log grades. — The grades assigned to sawtimber trees were based on external characteristics of all logs in the tree in accordance with "Hardwood Log Grade for Standard Lumber" issued by the Forest Products Laboratory under the designation D1737 in 1953, and standards for hardwood tie and timber logs.

Growth

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 on commercial forest land.

Net annual growth of sawtimber. — The annual change in volume of live sawtimber trees and the total volume of trees reaching sawtimber size, less volume losses resulting from natural causes (measured in board feet, International ¼-inch rule).

Mortality of growing stock. — The volume of sound wood in live sawtimber and poletimber trees dying annually from natural causes (averaged for a 3-year period). Natural causes include fire, insects, disease, animal damage, weather, and suppression.

Mortality of sawtimber. — The net board foot volume of sawtimber trees dying annually from natural causes (averaged for a 3-year period).

Trend growth. — Annual growth as defined above except that mortality estimates are averaged from a longer period of time.

Timber Cut

Timber cut from growing stock. — The volume of sound wood in live sawtimber and poletimber trees cut for forest products during a specified period including both roundwood products and logging residues. Roundwood products are logs, bolts, and other round sections cut from trees. Logging residues are the unused portions of growing stock trees plus unused growing stock trees killed by logging.

Timber cut from sawtimber. — The net board foot volume of live sawtimber trees cut for forest products during a specified period including both roundwood products and logging residues.

Timber products output. — All timber products produced from roundwood, and by-products of wood-manufacturing plants. Roundwood products include logs, bolts, or other round sections cut from growing stock trees, cull trees, salvable dead trees, trees on nonforest land, trees of noncommercial species, sapling-size trees, and limbwood. By-products from primary manufacturing plants include slabs, edgings, trimmings, miscuts, sawdust, shavings, veneer cores, and clippings. The annual timber cut include roundwood products and logging residues but does not include output from nongrowing stock or plant by-products.

TABLES

Timber Products

45. Total output of timber products, by type of material used and species classes
46. Total output of roundwood products, by source and species classes
47. Annual timber removal from growing stock on commercial forest land, by products and logging residues, and species classes
48. Annual timber removals from live sawtimber on commercial forest land, by products and logging residues, and species classes
49. Volume of unused plant residues, by industrial sources and type of residue
50. Number of primary wood-using plants, by survey units

Projections

51. Projections of timber volumes on commercial forest land, 1965 to 1995

Table 1.—*Land area by classes and Forest Survey Units, Kansas, 1965*
(In acres)

Land Class	All units	Northeastern	Southeastern	Western
Forest land:				
Commercial forest	1,192,400	540,600	491,200	160,600
Unproductive forest	157,400	23,400	119,400	14,600
Productive-reserved forest	-	-	-	-
Total forest land	1,349,800	564,000	610,600	175,200
Nonforest land:				
Cropland	29,476,900	4,341,900	3,839,500	21,295,500
Pasture and range	18,403,100	2,832,300	4,725,000	10,845,800
Wooded strips	214,600	99,100	61,800	53,700
Other 1/	3,066,300	651,700	651,100	1,763,500
Total nonforest land	51,160,900	7,925,000	9,277,400	33,958,500
All land 2/	52,510,700	8,489,000	9,888,000	34,133,700

1/ Includes 66,900 acres of water according to Survey standards, but defined by the Bureau of the Census as land.

2/ From the U.S. Bureau of the Census, Land and Water Area of the United States, 1960.

Table 2.—*Area of commercial forest land, by ownership classes and Forest Survey Units, Kansas, 1965*
(In acres)

Ownership Class	All units	Northeastern	Southeastern	Western
Miscellaneous Federal	26,600	21,200	5,400	-
State	8,400	6,100	2,300	-
County and municipal	1,500	1,500	-	-
Farmer-owned	803,900	367,100	315,000	121,800
Miscellaneous private	352,000	144,700	168,500	38,800
All ownerships	1,192,400	540,600	491,200	160,600

Table 3.—*Area of commercial forest land, by stand-size and ownership classes, Kansas, 1965*
(In acres)

Stand-size class	All ownerships	Public	Private
ALL UNITS			
Sawtimber	678,200	20,300	657,900
Poletimber	227,500	9,800	217,700
Sapling and seedling	139,500	1,900	137,600
Nonstocked	147,200	4,500	142,700
All classes	1,192,400	36,500	1,155,900
NORTHEASTERN UNIT			
Sawtimber	302,600	16,500	286,100
Poletimber	120,300	7,500	112,800
Sapling and seedling	60,200	1,900	58,300
Nonstocked	57,500	2,900	54,600
All classes	540,600	28,800	511,800
SOUTHEASTERN UNIT			
Sawtimber	276,800	3,800	273,000
Poletimber	78,400	2,300	76,100
Sapling and seedling	66,200	-	66,200
Nonstocked	69,800	1,600	68,200
All classes	491,200	7,700	483,500
WESTERN UNIT			
Sawtimber	98,800	-	98,800
Poletimber	28,800	-	28,800
Sapling and seedling	13,100	-	13,100
Nonstocked	19,900	-	19,900
All classes	160,600	-	160,600

Table 4.—*Area of commercial forest land by sawtimber volume and stand-size classes, Kansas, 1965*
(In acres)

Volume per acre (board feet) 1/	All stands	Sawtimber stands	Other stands
Less than 1,500	759,400	259,200	500,200
1,500 to 5,000	370,600	356,600	14,000
More than 5,000	62,400	62,400	-
Total	1,192,400	678,200	514,200

1/ Net volume, International 1/4-inch rule.

Table 5.—*Area of commercial forest land, by stocking classes based on alternative stand components, Kansas, 1965*
(In acres)

Stocking class (percent)	Stocking classified in terms of--		
	All trees	Growing stock trees	Desirable trees
100+	236,400	5,500	-
90-100	203,600	7,900	-
80-90	207,900	22,700	-
70-80	200,800	35,600	-
60-70	165,100	89,800	3,400
50-60	85,700	96,900	1,400
40-50	41,000	143,100	8,100
30-40	28,500	203,700	8,300
20-30	12,700	222,700	36,300
10-20	6,100	217,300	127,900
Less than 10	4,600	147,200	1,007,000
Total	1,192,400	1,192,400	1,192,400

Table 6.—*Area of commercial forest land, by stocking classes of growing stock trees and by stand-size classes, Kansas, 1965*
(In acres)

Stocking class (percent)	All stands	Sawtimber stands	Poletimber stands	Sapling and seedling stands	Nonstocked stands
70 or more	71,700	60,400	9,300	2,000	-
40-70	329,800	221,700	79,000	29,100	-
10-40	643,700	396,100	139,200	108,400	-
Less than 10	147,200	-	-	-	147,200
All classes	1,192,400	678,200	227,500	139,500	147,200

Table 7.—*Area of commercial forest land, by area-condition and ownership classes, Kansas, 1965*
(In acres)

Area condition class	All ownerships	Public	Private
Favorable	12,900	-	12,900
Moderately favorable	58,800	-	58,800
Fair	329,800	8,200	321,600
Unfavorable	790,900	28,300	762,600
All classes	1,192,400	36,500	1,155,900

Table 8.—*Area of commercial forest land, by area-condition and stand-treatment classes, Kansas, 1965*
(In acres)

Area-condition class	All areas	No treatment	Commercial cut	Commercial stand improvement	Noncommercial stand improvement	Re-forestation
Favorable	12,900	200	4,600	4,400	3,700	-
Moderately favorable	58,800	4,800	27,500	23,500	3,000	-
Fair	329,800	91,900	90,800	103,300	41,800	2,000
Unfavorable	790,900	252,400	97,400	151,700	238,100	51,300
All classes	1,192,400	349,300	220,300	282,900	286,600	53,300

Table 9.—*Area of commercial forest land, by forest types and site index classes, Kansas, 1965*
(In acres)

Forest type	All sites	35-40	40-50	50-60	60-70	70-80	80-90	90-100
Oak-hickory:								
Redcedar-hdwds	4,100	-	4,100	-	-	-	-	-
Post oak	31,100	3,700	11,500	10,400	-	3,900	1,600	-
Oak-hickory	211,400	6,800	64,100	65,600	43,300	25,300	5,400	900
Elm-ash-locust	260,800	1,400	25,400	60,000	87,500	47,000	24,600	14,900
Upland plains hdwds	129,000	4,300	35,100	35,000	35,500	15,900	3,200	-
Elm-ash-cottonwood:								
Cottonwood	74,200	-	8,900	29,000	26,100	4,500	4,600	1,100
Willow	9,900	3,600	-	700	1,400	2,500	1,700	-
Lowland plains hdwds	251,800	-	9,200	47,600	77,000	59,100	39,900	19,000
Elm-ash-cottonwood	220,100	-	4,100	28,100	63,100	79,700	33,200	11,900
All types	1,192,400	19,800	162,400	276,400	333,900	237,900	114,200	47,800

Table 10.—*Area of commercial forest land, by forest types and ownership classes, Kansas, 1965*
(In acres)

Forest type	All ownerships	Public	Private
Oak-hickory:			
Redcedar-hardwoods	4,100	-	4,100
Post oak	31,100	-	31,100
Oak-hickory	211,400	5,200	206,200
Elm-ash-locust	260,800	8,700	252,100
Upland plains hardwoods	129,000	3,700	125,300
Total oak-hickory	636,400	17,600	618,800
Elm-ash-cottonwood:			
Cottonwood	74,200	4,800	69,400
Willow	9,900	-	9,900
Lowland plains hardwoods	251,800	6,500	245,300
Elm-ash-cottonwood	220,100	7,600	212,500
Total elm-ash-cottonwood	556,000	18,900	537,100
All types	1,192,400	36,500	1,155,900

Table 11—*Area of commercial forest land, by forest types and stand-size classes, Kansas, 1965*
(In acres)

Forest type	All stands	Sawtimber stands	Poletimber stands	Sapling and seedling stands	Non-stocked stands
Oak-hickory:					
Redcedar hdwds	4,100	1,500	-	-	2,600
Post oak	31,100	6,100	17,900	7,100	-
Oak-hickory	211,400	127,400	41,700	20,500	21,800
Elm-ash-locust	260,800	106,100	56,300	39,100	59,300
Upland plains hdwds	129,000	38,900	41,600	25,200	23,300
Elm-ash-cottonwood:					
Cottonwood	74,200	42,700	19,600	4,000	7,900
Willow	9,900	5,400	3,100	1,200	200
Lowland plains hdwds	251,800	187,800	31,300	14,400	18,300
Elm-ash-cottonwood	220,100	162,300	16,000	28,000	13,800
All types	1,192,400	678,200	227,500	139,500	147,200

Table 12.—*Area of commercial forest land, by forest types and stand-age classes, Kansas, 1965*
(In acres)

Forest type	All ages	Age class (Years)								
		0-40	40-50	50-60	60-70	70-80	80-90	90-100	100-120	120-140
ALL UNITS										
Oak-hickory:										
Redcedar-hdwds	4,100	4,100	-	-	-	-	-	-	-	-
Post oak	31,100	22,000	7,400	-	1,700	-	-	-	-	-
Oak-hickory	211,400	76,200	36,900	21,300	31,000	20,000	14,300	3,400	6,800	1,500
Elm-ash-locust	260,800	166,000	31,100	30,600	14,100	8,200	9,100	1,700	-	-
Upland plains hdwds	129,000	90,300	21,200	6,400	6,200	-	2,900	-	2,000	-
Elm-ash-cottonwood:										
Cottonwood	74,200	47,100	9,200	7,800	7,600	-	-	2,500	-	-
Willow	9,900	5,900	4,000	-	-	-	-	-	-	-
Lowland plains hdwds	251,800	90,800	40,400	50,500	35,900	16,500	12,100	3,800	1,800	-
Elm-ash-cottonwood	220,100	84,500	35,000	32,700	27,800	21,400	12,200	1,300	5,200	-
All types	1,192,400	586,900	185,200	149,300	124,300	66,100	50,600	12,700	15,800	1,500
NORTHEASTERN UNIT										
Oak-hickory:										
Redcedar-hdwds	2,900	2,900	-	-	-	-	-	-	-	-
Post oak	1,700	1,700	-	-	-	-	-	-	-	-
Oak-hickory	129,400	47,000	21,900	11,600	15,400	10,600	11,200	3,400	6,800	1,500
Elm-ash-locust	106,000	70,700	9,600	17,400	4,600	1,400	2,300	-	-	-
Upland plains hdwds	72,600	50,300	15,800	1,500	3,300	-	1,700	-	-	-
Elm-ash-cottonwood:										
Cottonwood	22,600	9,100	4,400	4,200	3,300	-	-	1,600	-	-
Willow	400	400	-	-	-	-	-	-	-	-
Lowland plains hdwds	105,100	34,500	13,700	21,700	20,300	6,000	6,300	2,600	-	-
Elm-ash-cottonwood	99,900	31,800	17,800	7,800	13,900	17,900	6,800	1,300	2,600	-
All types	540,600	248,400	83,200	64,200	60,800	35,900	28,300	8,900	9,400	1,500
SOUTHEASTERN UNIT										
Oak-hickory:										
Redcedar-hdwds	1,200	1,200	-	-	-	-	-	-	-	-
Post oak	29,400	20,300	7,400	-	1,700	-	-	-	-	-
Oak-hickory	75,400	29,200	15,000	9,700	13,200	6,600	1,700	-	-	-
Elm-ash-locust	114,300	74,300	11,400	11,100	7,500	5,200	3,100	1,700	-	-
Upland plains hdwds	50,000	35,300	4,900	3,700	2,900	-	1,200	-	2,000	-
Elm-ash-cottonwood:										
Cottonwood	18,600	16,100	900	1,600	-	-	-	-	-	-
Willow	4,000	-	4,000	-	-	-	-	-	-	-
Lowland plains hdwds	117,200	46,500	21,200	22,300	15,600	6,300	2,300	1,200	1,800	-
Elm-ash-cottonwood	81,100	34,800	12,500	20,200	8,700	3,500	-	-	1,400	-
All types	491,200	257,700	77,300	68,600	49,600	21,600	8,300	2,900	5,200	-
WESTERN UNIT										
Oak-hickory:										
Redcedar-hdwds	-	-	-	-	-	-	-	-	-	-
Post oak	-	-	-	-	-	-	-	-	-	-
Oak-hickory	6,600	-	-	-	2,400	2,800	1,400	-	-	-
Elm-ash-locust	40,500	21,000	10,100	2,100	2,000	1,600	3,700	-	-	-
Upland plains hdwds	6,400	4,700	500	1,200	-	-	-	-	-	-
Elm-ash-cottonwood:										
Cottonwood	33,000	21,900	3,900	2,000	4,300	-	-	900	-	-
Willow	5,500	5,500	-	-	-	-	-	-	-	-
Lowland plains hdwds	29,500	9,800	5,500	6,500	-	4,200	3,500	-	-	-
Elm-ash-cottonwood	39,100	17,900	4,700	4,700	5,200	-	5,400	-	1,200	-
All types	160,600	80,800	24,700	16,500	13,900	8,600	14,000	900	1,200	-

Table 13.—*Area of commercial forest land, by forest types and area condition classes, Kansas, 1965*
(In acres)

Forest type	All area conditions	Favorable	Moderately favorable	Fair	Unfavorable
ALL UNITS					
Oak-hickory:					
Redcedar-hdwds	4,100	-	-	-	4,100
Post oak	31,100	2,000	1,700	11,500	15,900
Oak-hickory	211,400	1,700	18,400	72,900	118,400
Elm-ash-locust	260,800	2,800	3,700	43,000	211,300
Upland plains hdwds	129,000	-	7,400	29,400	92,200
Elm-ash-cottonwood:					
Cottonwood	74,200	1,400	6,200	24,700	41,900
Willow	9,900	200	-	5,200	4,500
Lowland plains hdwds	251,800	3,400	11,300	92,800	144,300
Elm-ash-cottonwood	220,100	1,400	10,100	50,300	158,300
All types	1,192,400	12,900	58,800	329,800	790,900
NORTHEASTERN UNIT					
Oak-hickory:					
Redcedar-hdwds	2,900	-	-	-	2,900
Post oak	1,700	-	-	1,700	-
Oak-hickory	129,400	-	11,100	45,400	72,900
Elm-ash-locust	106,000	1,000	2,000	14,900	88,100
Upland plains hdwds	72,600	-	7,400	20,100	45,100
Elm-ash-cottonwood:					
Cottonwood	22,600	-	4,400	5,500	12,700
Willow	400	200	-	-	200
Lowland plains hdwds	105,100	-	3,500	45,600	56,000
Elm-ash-cottonwood	99,900	1,400	5,700	18,500	74,300
All types	540,600	2,600	34,100	151,700	352,200
SOUTHEASTERN UNIT					
Oak-hickory:					
Redcedar-hdwds	1,200	-	-	-	1,200
Post oak	29,400	2,000	1,700	9,800	15,900
Oak-hickory	75,400	1,700	5,900	23,900	43,900
Elm-ash-locust	114,300	1,800	1,700	24,400	86,400
Upland plains hdwds	50,000	-	-	8,100	41,900
Elm-ash-cottonwood:					
Cottonwood	18,600	-	-	3,500	15,100
Willow	4,000	-	-	2,300	1,700
Lowland plains hdwds	117,200	3,400	6,000	37,600	70,200
Elm-ash-cottonwood	81,100	-	3,200	25,400	52,500
All types	491,200	8,900	18,500	135,000	328,800
WESTERN UNIT					
Oak-hickory:					
Redcedar-hdwds	-	-	-	-	-
Post oak	-	-	-	-	-
Oak-hickory	6,600	-	1,400	3,600	1,600
Elm-ash-locust	40,500	-	-	3,700	36,800
Upland plains hdwds	6,400	-	-	1,200	5,200
Elm-ash-cottonwood:					
Cottonwood	33,000	1,400	1,800	15,700	14,100
Willow	5,500	-	-	2,900	2,600
Lowland plains hdwds	29,500	-	1,800	9,600	18,100
Elm-ash-cottonwood	39,100	-	1,200	6,400	31,500
All types	160,600	1,400	6,200	43,100	109,900

Table 14.—*Area of land and forest land, by counties, Kansas, 1965*

County [1]	Land area	Forest land			Commercial forest as a percent of land area	Other non-forest land	
		All forest	Noncommercial	Commercial		Wooded pasture	Wooded strips
	(Acres)	(Acres)	(Acres)	(Acres)	(Percent)	(Acres)	(Acres)
NORTHEASTERN UNIT							
Aitchison	269,400	26,900	800	26,100	9.7	4,400	3,300
Brown	369,900	13,600	400	13,200	3.6	6,400	3,900
Clay Center	1,538,600	34,700	1,300	33,400	2.2	27,100	11,600
Doniphan	242,600	34,700	1,000	33,700	13.9	3,700	4,000
Douglas	299,500	33,800	1,200	32,600	10.9	4,800	3,000
Franklin	369,300	34,700	1,200	33,500	9.1	6,000	3,800
Jackson	419,800	25,100	900	24,200	5.8	7,000	7,600
Jefferson	351,400	46,300	1,600	44,700	12.7	5,500	5,900
Johnson-Wyandotte	400,700	38,200	1,600	36,600	9.1	6,600	3,500
Leavenworth	297,600	47,500	2,300	45,200	15.2	4,500	5,600
Manhattan	1,705,000	92,200	5,500	86,700	5.1	28,900	16,800
Marshall	583,000	26,900	800	26,100	4.5	9,900	9,700
Miami	378,200	43,300	1,700	41,600	11.0	6,000	4,500
Nemaha	453,800	17,300	1,400	15,900	3.5	7,800	7,300
Osage	461,400	27,800	1,000	26,800	5.8	7,800	4,700
Shawnee	348,800	21,000	700	20,300	5.8	5,900	3,900
Total	8,489,000	564,000	23,400	540,600	6.4	142,300	99,100
SOUTHEASTERN UNIT							
Allen	323,200	15,200	800	14,400	4.5	6,100	1,300
Anderson	369,300	23,000	2,200	20,800	5.6	6,900	1,300
Bourbon	409,000	53,300	11,000	42,300	10.3	7,000	1,500
Chautauqua	414,100	68,900	29,300	39,600	9.6	6,800	4,800
Cherokee	375,700	36,600	5,600	31,000	8.3	6,700	700
Coffey	419,800	16,400	1,200	15,200	3.6	8,000	3,000
Crawford	382,700	33,400	5,500	27,900	7.3	6,900	400
Eldorado	2,386,500	68,200	7,000	61,200	2.6	45,700	16,900
Elk	414,100	27,000	11,500	15,500	3.7	7,600	3,500
Emporia	2,106,900	56,300	3,500	52,800	2.5	40,600	10,400
Labette	418,600	29,700	4,400	25,300	6.0	7,700	2,400
Linn	387,200	56,800	10,000	46,800	12.1	6,500	1,700
Montgomery	415,400	42,600	12,300	30,300	7.3	7,300	5,700
Neosho	375,700	26,200	3,200	23,000	6.1	6,800	2,400
Wilson	367,300	35,000	7,700	27,300	7.4	6,500	3,100
Woodson	322,500	22,000	4,200	17,800	5.5	5,900	2,700
Total	9,888,000	610,600	119,400	491,200	5.0	183,000	61,800
WESTERN UNIT							
Colby	7,235,800	9,900	1,100	8,800	0.12	9,300	3,000
Concordia	1,953,900	39,800	3,100	36,700	1.88	2,500	10,100
Dodge City	4,718,100	8,300	900	7,400	0.15	6,100	2,500
Garden City	4,981,100	10,700	4,300	6,400	0.13	6,400	1,300
Great Bend	2,397,500	8,400	600	7,800	0.33	3,100	2,900
Hays	5,154,600	25,100	1,800	23,300	0.45	6,600	10,500
Hutchinson	2,183,000	21,000	1,300	19,700	0.90	2,800	7,200
Salina	1,847,700	19,000	600	18,400	1.00	2,300	7,100
Wichita	3,662,000	33,000	900	32,100	0.88	4,700	9,100
Total	34,133,700	175,200	14,600	160,600	0.47	43,800	53,700
STATE TOTALS	52,510,700	1,349,800	157,400	1,192,400	2.27	369,100	214,600

1/ The more lightly wooded counties are grouped by county blocks which are named after prominent communities (see figure 1).

Table 15.—*Area of noncommercial forest land by forest types, Kansas, 1965*
(In acres)

Forest types	Unproductive areas 1/
Oak-hickory	138,100
Elm-ash-cottonwood	19,300
All types	157,400

1/ Little or no productive-reserved area.

Table 16.—*Area of wooded strips (nonforest land), by forest type and stand-size classes, Kansas, 1965*
(In acres)

Forest type	All stands	Saw-timber stands	Pole-timber stands	Sapling and seedling	Non-stocked areas
Oak-hickory:					
Redcedar-hdwds	4,800	-	-	4,800	-
Post oak	-	-	-	-	-
Oak-hickory	3,100	1,500	-	1,600	-
Elm-ash-locust	29,000	-	10,100	12,500	6,400
Upland plains hdwds	5,000	-	3,300	1,700	-
Elm-ash-cottonwood:					
Cottonwood	8,500	8,500	-	-	-
Willow	11,300	-	9,700	1,600	-
Lowland plains hdwds	59,500	10,600	27,300	10,700	10,900
Elm-ash-cottonwood	93,400	12,100	28,100	43,000	10,200
All types	214,600	32,700	78,500	75,900	27,500

Table 17.—*Area of wooded strips (nonforest land), by stocking and stand-size classes, Kansas, 1965*
(In acres)

Stocking class (Percent)	All stands	Sawtimber stands	Poletimber stands	Sapling and seedling stands	Nonstocked stands
70 or more	4,000	2,500	1,500	-	-
40-70	47,900	8,800	23,400	15,700	-
10-40	135,200	21,400	53,600	60,200	-
Less than 10	27,500	-	-	-	27,500
All classes	214,600	32,700	78,500	75,900	27,500

Table 18.—*Number of growing-stock trees on commercial forest land, by diameter and species classes, Kansas, 1965*
(In thousand trees)

Diameter classes	All species	Softwoods	Hardwoods
2	43,720	140	43,580
4	23,170	90	23,080
6	16,590	40	16,550
8	10,230	-	10,230
10	6,380	10	6,370
12	3,980	-	3,980
14	2,810	-	2,810
16	1,840	-	1,840
18	1,220	-	1,220
20	820	-	820
22	570	-	570
24+	1,250	-	1,250
All diameter classes	112,580	280	112,300

Table 19.—*Number of rough and rotten live and salvable dead trees on commercial forest land, by species and diameter classes, Kansas, 1965*
(In thousand trees)

Species and diameter class (inches)	Rough and rotten trees	Salvable dead trees
Softwoods:		
1.0 - 4.9	640	-
5.0 - 8.9	150	30
9.0 - 18.9	10	-
19.0 and larger	10	-
Total	810	30
Hardwoods:		
1.0 - 4.9	226,370	-
5.0 - 10.9	49,930	160
11.0 - 18.9	11,280	160
19.0 and larger	2,990	40
Total	290,570	360
All species	291,380	390

Table 20.—*Volume of timber on commercial forest land, by timber and species classes, Kansas, 1965*[1]
(In thousand cubic feet)

Class of timber	All species	Softwoods	Hardwoods
Growing stock:			
Sawtimber:			
Saw log portion	310,800	70	310,730
Upper stem portion	54,840	10	54,830
Total sawtimber	365,640	80	365,560
Poletimber	123,820	130	123,690
Total growing stock	489,460	210	489,250
Short-log tree:			
Sawtimber	112,800	-	112,800
Poletimber	35,040	60	34,980
Total short-log tree	147,840	60	147,780
Other rough tree:			
Sawtimber	112,960	320	112,640
Poletimber	48,910	150	48,760
Total other rough tree	161,870	470	161,400
Rotten tree:			
Sawtimber	19,620	-	19,620
Poletimber	260	-	260
Total rotten tree	19,880	-	19,880
Salvable dead tree:			
Sawtimber	2/ 4,010	-	4,010
Poletimber	520	-	520
Total salvable dead tree	4,530	-	4,530
All classes	823,580	740	822,840

1/ Estimates of additional volume on unproductive forest land total 1,930 thousand cubic feet in trees 5.0 inches and larger d.b.h. including 70 thousand cubic feet of softwoods and 1,860 thousand cubic feet of hardwoods.

2/ Includes 9,930 thousand board feet in sawtimber trees.

Table 21.—*Volume of growing stock and sawtimber on commercial forest land, by ownership and species classes, Kansas, 1965*

Ownership class	All species	Softwoods	Hardwoods
	GROWING STOCK (In thousand cubic feet)		
Public	20,340	-	20,340
Private	469,120	210	468,910
All ownerships	489,460	210	489,250
	SAWTIMBER (In thousand board feet) 1/		
Public	81,780	-	81,780
Private	1,726,850	240	1,726,610
All ownerships	1,808,630	240	1,808,390

1/ International 1/4-inch rule.

Table 22.—*Volume of growing stock and sawtimber on commercial forest land, by stand-size and species classes, Kansas, 1965*

Stand-size class	All species	Softwoods	Hardwoods
	GROWING STOCK (In thousand cubic feet)		
Sawtimber	393,370	210	393,160
Poletimber	77,360	-	77,360
Sapling and seedling	14,160	-	14,160
Nonstocked	4,570	-	4,570
All classes	489,460	210	489,250
	SAWTIMBER (In thousand board feet) 1/		
Sawtimber	1,659,920	240	1,659,680
Poletimber	92,780	-	92,780
Sapling and seedling	42,200	-	42,200
Nonstocked	13,730	-	13,730
All classes	1,808,630	240	1,808,390

1/ International 1/4-inch rule.

Table 23.—*Volume of growing stock trees on commercial forest land, by species and diameter classes, Kansas, 1965*
(In thousand cubic feet)

Species	All diameters	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	21.0-22.9	23.0 and larger
Softwoods:											
Redcedar	210	130	-	80	-	-	-	-	-	-	-
Total softwoods	210	130	-	80	-	-	-	-	-	-	-
Hardwoods:											
Select white oaks:											
Bur oak	35,960	660	1,100	1,540	2,530	4,070	4,200	4,600	4,480	3,400	9,380
Other select white oaks	11,200	1,280	1,700	1,770	1,730	1,610	1,340	1,040	310	110	310
Select red oaks	25,340	1,610	2,040	2,970	4,090	3,580	2,230	2,170	1,980	1,360	3,310
Other white oaks	10,210	1,990	1,740	2,040	2,320	990	920	140	-	70	-
Other red oaks	18,930	960	1,960	1,700	1,780	2,350	2,380	1,780	1,530	1,250	3,240
Hickory:											
Hickory	12,760	2,090	3,120	2,740	1,590	880	1,300	620	220	-	200
Pecan	7,830	260	130	590	770	940	1,030	620	370	1,040	2,080
Hard maple	2,200	190	530	270	260	510	340	-	-	-	100
Soft maple	8,770	130	460	1,020	790	940	710	1,250	840	640	1,990
Ash	34,780	4,020	5,190	4,830	5,310	4,600	3,320	2,170	1,570	880	2,890
Cottonwood	98,410	3,240	4,740	5,570	6,760	5,260	4,640	5,680	8,010	9,810	44,700
Basswood	3,520	50	380	350	380	590	570	400	150	240	410
Black walnut	35,790	2,970	4,860	6,870	5,020	6,520	4,260	2,530	1,280	600	880
Other eastern hardwoods:											
Elm	86,910	4,030	6,280	4,960	6,160	6,430	7,770	6,960	6,080	6,560	31,680
Hackberry	47,630	2,740	4,640	6,910	4,990	5,830	4,220	5,210	4,190	2,860	6,040
Sycamore	23,970	100	260	850	810	1,770	1,870	1,770	2,150	1,530	12,860
Willow	10,490	2,510	1,610	1,670	720	920	1,300	870	160	440	290
Black cherry	90	-	90	-	-	-	-	-	-	-	-
Other soft hardwoods	7,590	910	1,660	1,540	950	920	720	290	210	230	160
Other hard hardwoods	6,870	990	1,130	1,150	1,090	770	620	200	560	280	80
Total hardwoods	489,250	30,730	43,620	49,340	48,050	49,480	43,740	38,300	34,090	31,300	120,600
All species	489,460	30,860	43,620	49,420	48,050	49,480	43,740	38,300	34,090	31,300	120,600

Table 24.—*Volume of sawtimber on commercial forest land, by species and diameter classes, Kansas, 1965*
(In thousand board feet)[1]

Species	All diameters	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	21.0-22.9	23 and larger
Softwoods:									
Redcedar	240	240	-	-	-	-	-	-	-
Total softwoods	240	240	-	-	-	-	-	-	-
Hardwoods:									
Select white oaks:									
Bur oak	167,900	-	13,050	19,180	20,730	23,550	23,490	18,220	49,680
Other select white oaks	29,860	-	6,620	7,280	6,750	5,410	1,970	540	1,290
Select red oaks	93,090	-	17,310	16,990	12,080	11,180	10,710	7,730	17,090
Other white oaks	17,630	-	7,610	4,500	4,530	760	-	230	-
Other red oaks	73,870	-	7,770	11,460	12,800	9,930	9,260	6,940	15,710
Hickory:									
Hickory	26,420	-	8,430	4,990	6,970	3,490	1,430	-	1,110
Pecan	36,470	-	3,630	5,410	5,970	3,210	1,790	5,770	10,690
Hard maple	5,490	-	1,200	2,250	1,570	-	-	-	470
Soft maple	29,460	-	1,510	3,200	3,280	5,090	3,620	2,750	10,010
Ash	94,530	-	17,140	20,740	16,750	11,680	8,340	4,630	15,250
Cottonwood	435,840	-	22,860	22,650	22,350	28,180	43,690	53,010	243,100
Basswood	14,480	-	1,530	2,980	2,990	2,210	1,100	1,300	2,370
Black walnut	95,260	-	17,550	29,520	20,930	12,970	6,500	3,280	4,510
Other eastern hardwoods:									
Elm	349,980	-	24,810	29,850	39,870	34,780	29,630	33,550	157,490
Hackberry	162,570	-	20,140	25,360	21,810	26,340	21,370	14,980	32,570
Sycamore	125,170	-	3,550	9,210	9,730	9,400	12,400	8,750	72,130
Willow	20,620	-	2,560	3,840	5,710	3,740	780	2,080	1,910
Black cherry	-	-	-	-	-	-	-	-	-
Other soft hardwoods	14,640	-	3,070	3,640	3,290	1,580	1,110	1,020	930
Other hard hardwoods	15,110	-	3,560	3,100	3,010	950	2,460	1,540	490
Total hardwoods	1,808,390	-	183,900	226,150	221,120	194,450	179,650	166,320	636,800
All species	1,808,630	240	183,900	226,150	221,120	194,450	179,650	166,320	636,800

1/ International 1/4-inch rule.

Table 25.—*Volume of sawtimber on commercial forest land by species and log grade*
Kansas, 1965
(In thousand board feet)[1]

Species	Log Grades				
	All grades	Grade 1	Grade 2	Grade 3	Tie & timber Grade 4
Softwoods:					
Redcedar	240	-	-	240	-
Total softwoods	240	-	-	240	-
Hardwoods:					
Select white oaks:					
Bur oak	167,900	32,160	34,440	69,270	32,030
Other select white oaks	29,860	7,820	3,470	10,240	8,330
Select red oaks	93,090	4,000	11,920	53,650	23,520
Other white oaks	17,630	-	3,200	7,800	6,630
Other red oaks	73,870	6,230	20,700	29,230	17,710
Hickory:					
Hickory	26,420	1,910	8,900	11,230	4,380
Pecan	36,470	11,710	9,160	11,000	4,600
Hard maple	5,490	570	1,600	1,390	1,930
Soft maple	29,460	4,770	7,990	13,000	3,700
Ash	94,530	24,400	27,890	29,310	12,930
Cottonwood	435,840	190,300	60,090	143,170	42,280
Basswood	14,480	3,940	7,480	2,760	300
Black walnut	95,260	25,470	33,870	32,500	3,420
Other eastern hardwoods:					
Elm	349,980	41,600	99,020	121,220	88,140
Hackberry	162,570	49,010	50,230	55,550	7,780
Sycamore	125,170	40,240	35,510	42,920	6,500
Willow	20,620	3,280	4,190	9,560	3,590
Black cherry	-	-	-	-	-
Other soft hardwoods	14,640	1,010	4,550	6,830	2,250
Other hard hardwoods	15,110	240	1,400	11,930	1,540
Total hardwoods	1,808,390	448,660	425,610	662,560	271,560
All species	1,808,630	448,660	425,610	662,800	271,560

1/ International 1/4-inch rule.

Table 26.—*Volume of growing stock on commercial forest land, by species and Forest Survey Units, Kansas, 1965*
(In thousand cubic feet)

Species	All units	Northeastern	Southeastern	Western
Softwoods:				
Redcedar	210	140	70	-
Total softwoods	210	140	70	-
Hardwoods:				
Select white oaks:				
Bur oak	35,960	15,660	12,190	8,110
Other select white oaks	11,200	8,310	2,890	-
Select red oaks	25,340	12,250	13,090	-
Other white oaks	10,210	2,260	7,950	-
Other red oaks	18,930	11,280	7,650	-
Hickory:				
Hickory	12,760	8,090	4,670	-
Pecan	7,830	440	7,390	-
Hard maple	2,200	160	2,040	-
Soft maple	8,770	5,410	3,290	70
Ash	34,780	9,010	18,800	6,970
Cottonwood	98,410	45,540	11,360	41,510
Basswood	3,520	3,370	150	-
Black walnut	35,790	23,340	11,820	630
Other eastern hardwoods:				
Elm	86,910	41,820	34,280	10,810
Hackberry	47,630	20,980	21,570	5,080
Sycamore	23,970	8,300	15,670	-
Willow	10,490	4,220	3,710	2,560
Black cherry	90	90	-	-
Other soft hardwoods	7,590	2,910	2,290	2,390
Other hard hardwoods	6,870	3,360	2,570	940
Total hardwoods	489,250	226,800	183,380	79,070
All species	489,460	226,940	183,450	79,070

Table 27.—*Volume of sawtimber on commercial forest land, by species and Forest Survey Units, Kansas, 1965*
(In thousand board feet)

Species	All units	Northeastern	Southeastern	Western
Softwoods:				
Redcedar	240	240	-	-
Total softwoods	240	240	-	-
Hardwoods:				
Select white oaks:				
Bur oak	167,900	67,390	60,480	40,030
Other select white oaks	29,860	21,390	8,470	-
Select red oaks	93,090	43,890	49,200	-
Other white oaks	17,630	4,440	13,190	-
Other red oaks	73,870	49,920	23,950	-
Hickory:				
Hickory	26,420	15,060	11,360	-
Pecan	36,470	1,470	35,000	-
Hard maple	5,490	470	5,020	-
Soft maple	29,460	19,130	10,000	330
Ash	94,530	23,360	52,220	18,950
Cottonwood	435,840	211,560	49,220	175,060
Basswood	14,480	13,380	1,100	-
Black walnut	95,260	56,880	35,400	2,980
Other eastern hardwoods:				
Elm	349,980	159,330	142,120	48,530
Hackberry	162,570	64,790	79,650	18,130
Sycamore	125,170	42,190	82,980	-
Willow	20,620	6,680	11,630	2,310
Black cherry	-	-	-	-
Other soft hardwoods	14,640	5,410	6,230	3,000
Other hard hardwoods	15,110	7,000	6,570	1,540
Total hardwoods	1,808,390	813,740	683,790	310,860
All species	1,808,630	813,980	683,790	310,860

Table 28.—*Volume of growing stock and sawtimber on commercial forest land, by counties and species classes, Kansas, 1965*

County[1/]	Growing stock			Sawtimber		
	All species	Soft-woods	Hard-woods	All species	Soft-woods	Hard-woods
	Thousand cu. ft.	Thousand cu. ft.	Thousand cu. ft.	Thousand bd. ft.	Thousand bd. ft.	Thousand bd. ft.
NORTHEASTERN UNIT						
Atchison	12,130	10	12,120	44,270	30	44,240
Brown	5,230	-	5,230	19,140	-	19,140
Clay Center	14,730	10	14,720	53,780	-	53,780
Doniphan	14,500	10	14,490	50,850	-	50,850
Douglas	13,460	10	13,450	47,920	30	47,890
Franklin	13,770	10	13,760	49,860	30	49,830
Jackson	11,230	10	11,220	41,470	-	41,470
Jefferson	19,970	10	19,960	72,040	30	72,010
Johnson & Wyandotte	14,210	10	14,200	50,080	30	50,050
Leavenworth	18,890	10	18,880	68,130	30	68,100
Manhattan	33,580	10	33,570	118,830	-	118,830
Marshall	11,000	10	10,990	38,940	-	38,940
Miami	16,810	10	16,800	60,090	-	60,090
Nemaha	6,100	-	6,100	21,490	-	21,490
Osage	12,170	10	12,160	44,180	30	44,150
Shawnee	9,160	10	9,150	32,910	30	32,880
Total	226,940	140	226,800	813,980	240	813,740
SOUTHEASTERN UNIT						
Allen	5,870	-	5,870	23,210	-	23,210
Anderson	8,380	-	8,380	32,170	-	32,170
Bourbon	15,440	10	15,430	56,870	-	56,870
Chautaugua	13,030	10	13,020	45,100	-	45,100
Cherokee	11,170	-	11,170	41,750	-	41,750
Coffey	6,220	-	6,220	23,990	-	23,990
Crawford	10,120	10	10,110	38,080	-	38,080
Eldorado	24,620	10	24,610	93,380	-	93,380
Elk	4,230	-	4,230	13,880	-	13,880
Emporia	21,900	10	21,890	83,710	-	83,710
Labette	10,270	-	10,270	39,140	-	39,140
Linn	16,750	10	16,740	61,750	-	61,750
Montgomery	10,310	10	10,300	37,150	-	37,150
Neosho	8,800	-	8,800	32,960	-	32,960
Wilson	9,700	-	9,700	35,770	-	35,770
Woodson	6,640	-	6,640	24,880	-	24,880
Total	183,450	70	183,380	683,790	-	683,790
WESTERN UNIT						
Colby	3,780	-	3,780	13,870	-	13,870
Concordia	20,370	-	20,370	83,130	-	83,130
Dodge	3,600	-	3,600	13,430	-	13,430
Garden City	3,560	-	3,560	15,000	-	15,000
Great Bend	3,590	-	3,590	13,580	-	13,580
Hays	10,850	-	10,850	41,630	-	41,630
Hutchinson	9,150	-	9,150	34,860	-	34,860
Salina	8,690	-	8,690	34,350	-	34,350
Wichita	15,480	-	15,480	61,010	-	61,010
Total	79,070	-	79,070	310,860	-	310,860
State total	489,460	210	489,250	1,808,630	240	1,808,390

1/ The more lightly wooded counties are grouped by county blocks which are named after prominent communities (see figure 1).

Table 29.—*Volume of short-log trees on commercial forest land, by species and Forest Survey Units, Kansas, 1965*
(In thousand cubic feet)

Species	All units	Northeastern	Southeastern	Western
Softwoods:				
Redcedar	60	60	-	-
Total softwoods	60	60	-	-
Hardwoods:				
Select white oaks:				
Bur oak	13,720	5,930	5,310	2,480
Other select white oaks	5,720	4,160	1,560	-
Select red oaks	3,660	2,030	1,630	-
Other white oaks	3,430	710	2,720	-
Other red oaks	2,930	2,270	660	-
Hickory:				
Hickory	1,850	1,120	730	-
Pecan	1,420	80	1,340	-
Hard maple	330	-	330	-
Soft maple	3,200	2,140	1,060	-
Ash	10,090	2,380	5,120	2,590
Cottonwood	11,050	3,550	1,440	6,060
Basswood	960	890	-	70
Black walnut	8,600	5,250	2,940	410
Other eastern hardwoods:				
Elm	50,690	21,630	19,770	9,290
Hackberry	15,300	6,060	6,190	3,050
Sycamore	1,790	1,220	570	-
Willow	3,020	350	2,040	630
Black cherry	590	590	-	-
Other soft hardwoods	5,580	3,070	1,200	1,310
Other hard hardwoods	3,850	2,180	1,060	610
Total hardwoods	147,780	65,610	55,670	26,500
All species	147,840	65,670	55,670	26,500

Table 30.—*Sawtimber volume in short-log trees on commercial forest land, by species and Forest Survey Units, Kansas, 1965*
(In thousand board feet)[1]

Species	All units	Northeastern	Southeastern	Western
Hardwoods:				
Select white oaks:				
Bur oak	32,710	13,910	13,390	5,410
Other select white oaks	4,720	3,750	970	-
Select red oaks	7,090	4,360	2,730	-
Other white oaks	1,880	470	1,410	-
Other red oaks	7,000	5,530	1,470	-
Hickory:				
Hickory	2,180	1,370	810	-
Pecan	2,930	230	2,700	-
Hard maple	-	-	-	-
Soft maple	6,020	4,610	1,410	-
Ash	6,900	1,270	2,770	2,860
Cottonwood	27,160	9,520	1,660	15,980
Basswood	1,740	1,740	-	-
Black walnut	10,440	6,170	3,760	510
Other eastern hardwoods:				
Elm	110,130	45,110	42,780	22,240
Hackberry	20,980	8,990	7,610	4,380
Sycamore	5,890	4,320	1,570	-
Willow	4,900	310	3,550	1,040
Black cherry	680	680	-	-
Other soft hardwoods	3,250	870	1,100	1,280
Other hard hardwoods	3,660	2,070	1,130	460
Total hardwoods	260,260	115,280	90,820	54,160
All species	260,260	115,280	90,820	54,160

1/ International 1/4-inch rule.

Table 31.—*Volume of timber on wooded strips (nonforest land), by timber and species classes, Kansas, 1965*
(In thousand cubic feet)

Class of timber	All species	Softwoods	Hardwoods
Growing stock:			
Sawtimber			
Saw log portion	78,880	190	78,690
Upper stem portion	3,060	40	3,020
Total sawtimber	81,940	230	81,710
Poletimber	16,050	190	15,860
Total growing stock	97,990	420	97,570
Rough tree (including short log trees):			
Sawtimber	61,490	700	60,790
Poletimber	21,080	70	21,010
Total	82,570	770	81,800
Rotten tree:			
Sawtimber	2,230	-	2,230
Poletimber	960	120	840
Total	3,190	120	3,070
All classes	183,750	1,310	182,440

Table 32.—*Volume of growing stock and sawtimber on wooded strips (nonforest land), by stand-size and species classes, Kansas, 1965*

GROWING STOCK (In thousand cubic feet)			
Stand-size class	All species	Softwoods	Hardwoods
Sawtimber	42,780	-	42,780
Poletimber	34,740	-	34,740
Sapling and seedling	18,490	420	18,070
Nonstocked	1,980	-	1,980
All classes	97,990	420	97,570
SAWTIMBER (In thousand board feet) 1/			
Sawtimber	186,600	-	186,600
Poletimber	102,650	-	102,650
Sapling and seedling	80,670	-	80,670
Nonstocked	5,070	-	5,070
All classes	374,990	-	374,990

1/ International 1/4-inch rule.

Table 33.—*Volume of growing stock and short-log trees on wooded strips (nonforest land) by species and Forest Survey Units, Kansas, 1965*
(In thousand cubic feet)

Species	All units	North-eastern	South-eastern	Western
Softwoods:				
Redcedar	420	-	-	420
Total softwoods	420	-	-	420
Hardwoods:				
Select white oaks:				
Bur oak	2,040	250	1,790	-
Other select white oaks	90	90	-	-
Select red oaks	1,220	20	1,200	-
Other red oaks	2,210	1,680	530	-
Hickory	640	380	260	-
Soft maple	1,960	1,850	110	-
Ash	11,210	3,420	5,380	2,410
Cottonwood	42,870	19,120	5,290	18,460
Black walnut	4,070	2,770	1,300	-
Other eastern hardwoods:				
Elm	40,150	16,910	19,980	3,260
Hackberry	8,770	3,850	4,300	620
Sycamore	2,080	660	1,420	-
Willow	6,140	1,500	140	4,500
Other soft hardwoods	1,870	1,540	100	230
Other hard hardwoods	4,390	2,690	1,500	200
Total hardwoods	129,710	56,730	43,300	29,680
All species	130,130	56,730	43,300	30,100

Table 34.—*Volume of sawtimber material and short-log trees on wooded strips (nonforest land) by species and Forest Survey Units, Kansas, 1965*
(In thousand board feet)[1]

Species	All units	North-eastern	South-eastern	Western
Hardwoods:				
Select white oaks:				
Bur oak	9,180	990	8,190	-
Select red oaks	4,230	-	4,230	-
Other red oaks	9,740	7,710	2,030	-
Hickory	1,300	630	670	-
Soft maple	7,070	7,070	-	-
Ash	38,640	10,720	22,130	5,790
Cottonwood	191,410	81,770	20,490	89,150
Black walnut	8,200	5,380	2,820	-
Other eastern hardwoods:				
Elm	132,270	50,140	73,600	8,530
Hackberry	17,870	10,650	6,430	790
Sycamore	6,320	2,830	3,490	-
Willow	3,750	1,020	-	2,730
Other soft hardwoods	1,150	1,150	-	-
Other hard hardwoods	11,420	7,430	3,990	-
Total hardwoods	442,550	187,490	148,070	106,990
All species	442,550	187,490	148,070	106,990

1/ International 1/4-inch rule.

Table 35.—*Volume of growing stock trees on wooded strips (nonforest land), by species and diameter classes, Kansas, 1965*
(In thousand cubic feet)

Species	All diameters	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	17.0-19.9	19.0-20.9	21.0-22.9	23+
Softwoods:											
Redcedar	420	70	120	230	-	-	-	-	-	-	-
Total softwoods	420	70	120	230	-	-	-	-	-	-	-
Hardwoods:											
Select white oaks:											
Bur oak	1,760	-	40	-	-	480	-	460	-	780	-
Select red oaks	530	20	-	-	-	-	-	510	-	-	-
Other red oaks	1,780	-	20	-	-	80	-	440	-	-	1,240
Hickory	170	20	150	-	-	-	-	-	-	-	-
Soft maple	1,390	30	140	-	-	-	-	-	1,220	-	-
Ash	8,650	430	830	550	700	-	420	950	550	790	3,430
Cottonwood	39,670	540	570	1,420	2,710	3,170	5,000	1,380	750	10,260	13,870
Basswood	110	20	-	90	-	-	-	-	-	-	-
Black walnut	2,760	220	270	400	980	540	350	-	-	-	-
Other eastern hardwoods:											
Elm	26,760	870	1,380	850	1,330	1,690	3,420	1,410	770	1,370	13,670
Hackberry	4,760	620	1,000	520	1,220	490	320	-	590	-	-
Sycamore	2,080	20	-	-	-	-	-	-	640	1,420	-
Willow	4,380	1,170	1,020	1,480	710	-	-	-	-	-	-
Black cherry	300	-	100	-	-	200	-	-	-	-	-
Other soft hardwoods	620	190	310	120	-	-	-	-	-	-	-
Other hard hardwoods	1,850	110	70	270	210	840	350	-	-	-	-
Total hardwoods	97,570	4,260	5,900	5,700	7,860	7,490	9,860	5,150	4,520	14,620	32,210
All species	97,990	4,330	6,020	5,930	7,860	7,490	9,860	5,150	4,520	14,620	32,210

Table 36.—*Volume of sawtimber[1] on wooded strips (nonforest land), by species and diameter classes, Kansas, 1965*
(In thousand board feet)

Species	All diameters	Diameter class (inches at breast height)						
		11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23+
Hardwoods: [2]								
Select white oaks:								
Bur oak	8,480	-	1,920	-	2,450	-	4,110	-
Select red oaks	2,180	-	-	-	2,180	-	-	-
Other red oaks	8,030	-	320	-	1,900	-	-	5,810
Soft maple	5,370	-	-	-	-	5,370	-	-
Ash	34,400	2,550	-	1,760	4,120	2,420	3,570	19,980
Cottonwood	181,120	11,120	13,340	22,590	6,070	3,300	48,560	76,140
Black walnut	6,630	3,410	2,090	1,130	-	-	-	-
Other eastern hardwoods:								
Elm	102,640	5,320	6,830	14,190	6,040	4,060	6,150	60,050
Hackberry	10,450	4,560	1,970	1,390	-	2,530	-	-
Sycamore	6,320	-	-	-	-	2,830	3,490	-
Willow	2,850	2,850	-	-	-	-	-	-
Black cherry	840	-	840	-	-	-	-	-
Other hardwoods	5,680	820	3,400	1,460	-	-	-	-
Total hardwoods	374,990	30,630	30,710	42,520	22,760	20,510	65,880	161,980

1/ Sawtimber growing stock (not including the volume of short-log trees)
2/ Little or no softwood sawtimber.

Table 37.—*Volume of black walnut, by material and land classes, Kansas, 1965*

Class of material	Commercial forest		Nonforest			
			Wooded strip		Other nonforest	
	Thousand cu. ft.	Thousand bd. ft. [1/]	Thousand cu. ft.	Thousand bd. ft. [1/]	Thousand cu. ft.	Thousand bd. ft. [1/]
Growing stock	35,790	-	2,760	-	860	-
Sawtimber	-	95,260	-	6,630	-	2,440
Short-logs trees	8,600	10,440	1,310	1,570	990	2,700
Other rough and rotten trees	6,990	[2/]	720	[2/]	2,110	[2/]
Total	51,380	105,700	4,790	8,200	3,960	5,140

1/ International 1/4-inch rule.
2/ Not expressed in board feet.

Table 38.—*Net annual growth and annual removal of growing stock on commercial forest land, by species and Forest Survey Units, Kansas, 1964*
(In thousand cubic feet)

Species	Net annual growth				Net annual removal			
	All units	North-eastern	South-eastern	Western	All units	North-eastern	South-eastern	Western
Current growth and timber cut:								
Softwoods:								
Redcedar	40	30	10	-	20	10	10	-
Total softwoods	40	30	10	-	20	10	10	-
Hardwoods:								
Select white oaks:								
Bur oak	1,010	540	280	190	760	380	290	90
Other select white oaks	540	370	170	-	60	10	50	-
Select red oaks	1,160	550	610	-	20	10	10	-
Other white oaks	610	90	520	-	240	50	190	-
Other red oaks	980	420	560	-	390	180	210	-
Hickory:								
Hickory	1,040	710	330	-	470	220	270	-
Pecan	360	30	330	-	30	10	20	-
Hard maple	100	30	70	-	-	-	-	-
Soft maple	470	270	200	-	620	310	190	120
Ash	2,630	650	1,540	440	420	160	220	40
Cottonwood	5,630	2,300	880	2,450	590	300	270	20
Basswood	150	150	-	-	-	-	-	-
Black walnut	2,440	1,600	810	30	1,180	780	300	100
Other eastern hardwoods:								
Elm	1,120	240	850	30	380	100	280	-
Hackberry	3,150	1,430	1,380	340	370	90	240	40
Sycamore	1,010	370	640	-	130	30	100	-
Willow	1,030	510	250	270	10	10	-	-
Black cherry	30	30	-	-	-	-	-	-
Other soft hardwoods	650	160	170	320	-	-	-	-
Other hard hardwoods	360	140	90	130	170	20	50	100
Total hardwoods	24,470	10,590	9,680	4,200	5,840	2,640	2,690	510
All species	24,510	10,620	9,690	4,200	5,860	2,650	2,700	510
Catastrophic mortality or other removals (all species)	10,330	4,750	3,930	1,650	2,300	1,050	870	380
Trend growth and removal (all species) 1/	14,180	5,870	5,760	2,550	8,160	3,700	3,570	890

1/ Same as net annual growth and removal except that mortality estimates are averaged from a longer period of time.

Table 39.—*Net annual growth and annual cut of growing stock on commercial forest land, by species and ownership classes, Kansas, 1964*
(In thousand cubic feet)

Species class	All owners	Public	Private
NET ANNUAL GROWTH			
Hardwoods [1/]	[2/] 24,510	1,050	23,460
ANNUAL TIMBER CUT			
Softwoods	20	-	20
Hardwoods	[3/] 5,860	50	5,810
All species	5,880	50	5,830

1/ Little or no softwood growth.
2/ Trend growth is estimated to be 14,180 thousand cubic feet.
3/ Total removals are estimated to be 8,160 thousand cubic feet.

Table 40.—*Net annual growth and annual removal of sawtimber on commercial forest land, by species and Forest Survey Units, Kansas, 1964*
(In thousand board feet)[1]

Species	Net annual growth				Net annual removal			
	All units	North-eastern	South-eastern	Western	All units	North-eastern	South-eastern	Western
Current growth and timber cut:								
Hardwoods: [2/]								
Select white oaks:								
Bur oak	4,760	2,280	1,490	990	3,480	1,530	1,670	280
Other select white oaks	1,550	920	630	-	480	70	410	-
Select red oaks	4,600	1,820	2,780	-	100	50	50	-
Other white oaks	1,150	230	920	-	480	110	370	-
Other red oaks	3,180	1,810	1,370	-	1,400	620	780	-
Hickory:								
Hickory	1,960	1,290	670	-	1,440	550	890	-
Pecan	1,450	130	1,320	-	230	70	130	30
Hard maple	300	10	290	-	-	-	-	-
Soft maple	1,890	1,080	800	10	2,710	1,380	730	600
Ash	6,520	1,730	3,510	1,280	1,480	470	920	90
Cottonwood	22,560	10,870	3,570	8,120	3,860	1,900	1,790	170
Basswood	650	630	20	-	-	-	-	-
Black walnut	9,120	6,230	2,800	90	7,240	4,790	1,850	600
Other eastern hardwoods:								
Elm	5,470	1,250	3,550	670	2,280	620	1,640	20
Hackberry	10,840	5,680	4,330	830	2,230	550	1,440	240
Sycamore	4,390	1,520	2,870	-	810	200	610	-
Willow	1,720	1,110	280	330	-	-	-	-
Other soft hardwoods	1,550	490	310	750	-	-	-	-
Other hard hardwoods	1,460	730	570	160	510	50	190	270
Total hardwoods	85,120	39,810	32,080	13,230	28,730	12,960	13,470	2,300
Catastrophic mortality or other removals (all species)	39,580	17,810	15,040	6,730	6,400	2,880	2,440	1,080
Trend growth and removal (all species) [3/]	45,540	22,000	17,040	6,500	35,130	15,840	15,910	3,380

1/ International 1/4-inch rule.
2/ Little or no softwood growth or cut.
3/ Same as net annual growth and removal except that mortality estimates are averaged from a longer period of time.

Table 41.—*Net annual growth and annual cut of hardwood sawtimber on commercial forest land by ownership class, Kansas, 1964*
(In thousand board feet)[1]

Species class	All species	Public	Private
	NET ANNUAL GROWTH		
Hardwoods [2]	[3] 85,120	4,360	80,760
	ANNUAL TIMBER CUT		
Hardwoods [2]	[4] 28,730	290	28,440

1/ International 1/4-inch rule.
2/ Little or no softwood growth or cut.
3/ Trend growth is estimated to be 45,540 thousand board feet.
4/ Total removals are estimated to be 35,130 thousand board feet.

Table 42.—*Annual mortality of growing stock and sawtimber on commercial forest land, by species, Kansas, 1964*

Species	Growing stock	Sawtimber
	Thousand cu. ft.	Thousand bd. ft. [1]
Hardwoods:[2]		
Select white and red oaks	160	260
Other white and red oaks	20	50
Hickory	30	60
Ash, walnut, black cherry	250	270
Other hardwoods	[3] 2,820	[3] 6,420
Total hardwoods	[4] 3,280	[4] 7,060

1/ International 1/4-inch rule.
2/ Little or no softwood mortality.
3/ Elm included 2,240,000 cubic feet and 5,440,000 board feet.
4/ Trend mortality is estimated at 13,610 thousand cubic feet including 46,640 thousand board feet.

Table 43.—*Annual mortality of hardwood growing stock and sawtimber on commercial forest land, by ownership class, Kansas, 1964*

Ownership class	Hardwoods [1]
	GROWING STOCK (In thousand cubic feet)
Public	190
Private	3,090
All ownerships	[3] 3,280
	SAWTIMBER (In thousand board feet) [2]
Public	470
Private	6,590
All ownerships	[3] 7,060

1/ Little or no softwood mortality.
2/ International 1/4-inch rule.
3/ Trend mortality is estimated at 13,610 thousand cubic feet including 46,640 thousand board feet.

Table 44.—*Annual mortality of hardwood growing stock and sawtimber on commercial forest land, by causes, Kansas, 1964*

Cause of death	Hardwoods [1]
	GROWING STOCK (In thousand cubic feet)
Fire	70
Disease	2,750
Other and unknown	460
All causes	[3] 3,280
	SAWTIMBER (In thousand board feet) [2]
Fire	50
Disease	6,680
Other and unknown	330
All causes	[3] 7,060

1/ Little or no softwood mortality.
2/ International 1/4-inch rule.
3/ Trend mortality is estimated at 13,610 thousand cubic feet including 46,640 thousand board feet.

Table 45.—*Total output of timber products by type of material used and species classes, Kansas, 1964*

Product and species class	Std. units of measure [1]	Total output [2]		Output from roundwood						Output from plant by-products	
				Total		From growing stock		From nongrowing stock			
		Std. units	Thousand cu. ft.	Std. units	Thousand cu. ft.	Std. units	Thousand cu. ft.	Std. units	Thousand cu. ft.	Std. units	Thousand cu. ft.
HARDWOODS:											
Saw logs and bolts	M bd. ft.	16,497	2,505	16,497	2,505	16,082	2,442	415	63	-	-
Veneer logs and bolts	M bd. ft.	3,467	507	3,467	507	3,310	484	157	23	-	-
Cooperage logs and bolts	M bd. ft.	1,893	258	1,893	258	1,798	245	95	13	-	-
Pulpwood	M cords	0.5	37	0.5	37	0.4	31	0.1	6	-	-
Mine timbers (round)	M cu. ft.	2	2	2	2	2	2	-	-	-	-
Miscellaneous industrial wood [3]	M cu. ft.	644	644	352	352	230	230	122	122	292	292
Posts (round and split)	M pieces	530	225	530	225	228	97	302	128	-	-
Fuelwood	M cords	71	4,524	68	4,343	30	1,937	38	2,406	3	181
SOFTWOODS:											
Posts (round and split)	M pieces	30	18	30	18	20	14	10	4	-	-
ALL PRODUCTS:											
Softwoods	M cu. ft.	-	18	-	18	-	14	-	4	-	-
Hardwoods	M cu. ft.	-	8,702	-	8,229	-	5,468	-	2,761	-	473
Total	M cu. ft.	-	8,720	-	8,247	-	5,482	-	2,765	-	473

1/ M (thousand) board feet are measured by International 1/4-inch rule.

2/ Timber cut figures, shown elsewhere, include output from growing stock and logging residues but not output from nongrowing stock and plant residues.

3/ Includes charcoal wood, handle bolts, farm timber, poles, etc.

Table 46.—*Total output of roundwood products, by source and species classes, Kansas, 1964*
(In thousand cubic feet)

Source	All species	Softwoods	Hardwoods
Growing stock trees: 1/			
Sawtimber	4,360	2	4,358
Poletimber	1,122	12	1,110
Total	5,482	14	5,468
Rough and rotten trees 1/	1,058	-	1,058
Salvable dead trees 1/	89	-	89
Other sources 2/	1,618	4	1,614
All sources	8,247	18	8,229

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 limbwood.

Table 47.—*Annual timber removal from growing stock on commercial forest land, by products and logging residues, and species classes, Kansas, 1964*
(In thousand cubic feet)

Product and residues	All species	Softwoods	Hardwoods
Roundwood products:			
Saw logs and bolts	2,442	-	2,442
Veneer logs and bolts	484	-	484
Cooperage logs and bolts	245	-	245
Pulpwood	31	-	31
Mine timbers	2	-	2
Miscellaneous industrial wood 1/	230	-	230
Posts	111	14	97
Fuelwood	1,937	-	1,937
All products	5,482	14	5,468
Logging residues	378	-	378
Timber cut	5,860	14	5,846
Other removals	2,300	-	2,300
Total removals	8,160	14	8,146

1/ Includes charcoal wood, handle bolts, farm timbers, etc.

Table 48.—*Annual timber removals from live sawtimber on commercial forest land, by products and logging residues, and species classes, Kansas, 1964*
(In thousand board feet)[1]

Product and residues	All species	Softwoods	Hardwoods
Roundwood products:			
Saw logs and bolts	15,497	4	15,493
Veneer logs and bolts	3,333	-	3,333
Cooperage logs and bolts	1,784	-	1,784
Pulpwood	36	-	36
Mine timbers	2	-	2
Miscellaneous industrial wood 2/	950	-	950
Posts	33	-	33
Fuelwood	5,345	-	5,345
All products	26,980	4	26,976
Logging residues	1,750	-	1,750
Timber cut	28,730	4	28,726
Other removals	6,400	-	6,400
Total removals	35,130	-	35,130

1/ International 1/4-inch rule.
2/ Includes charcoal wood, handle bolts, farm timbers, etc.

Table 49.—*Volume of unused plant residues, by industrial sources and type of residue, Kansas, 1964*
(In thousand cubic feet)

Industrial source	Species class and character of residues		
	Hardwoods 1/		
	Total	Coarse 2/	Fine 3/
Lumber industry	963	660	303
Other primary industries	66	40	26
Total	1,029	700	329

1/ Little or no softwood
2/ Unused material suitable for chipping, such as slabs, edging, and veneer cores.
3/ Unused material not suitable for chipping, such as sawdust and shavings.

Table 50.—*Number of primary wood-using plants, by Forest Survey Units, Kansas, 1964*

Kind of mill 1/	All units	North-eastern	South-eastern	Western
Sawmills:				
Small 2/	73	35	31	7
Medium 3/	6	4	2	-
Cooperage mills	10	3	6	1
Charcoal plants	1	-	1	-
Miscellaneous plants 4/	5	1	4	-
Total	95	43	44	8

1/ Excludes idle mills.
2/ Annual lumber output less than 1 million board feet.
3/ Annual lumber output from 1 million to 5 million board feet.
4/ Includes: Fence post concentration yards, treating plant.

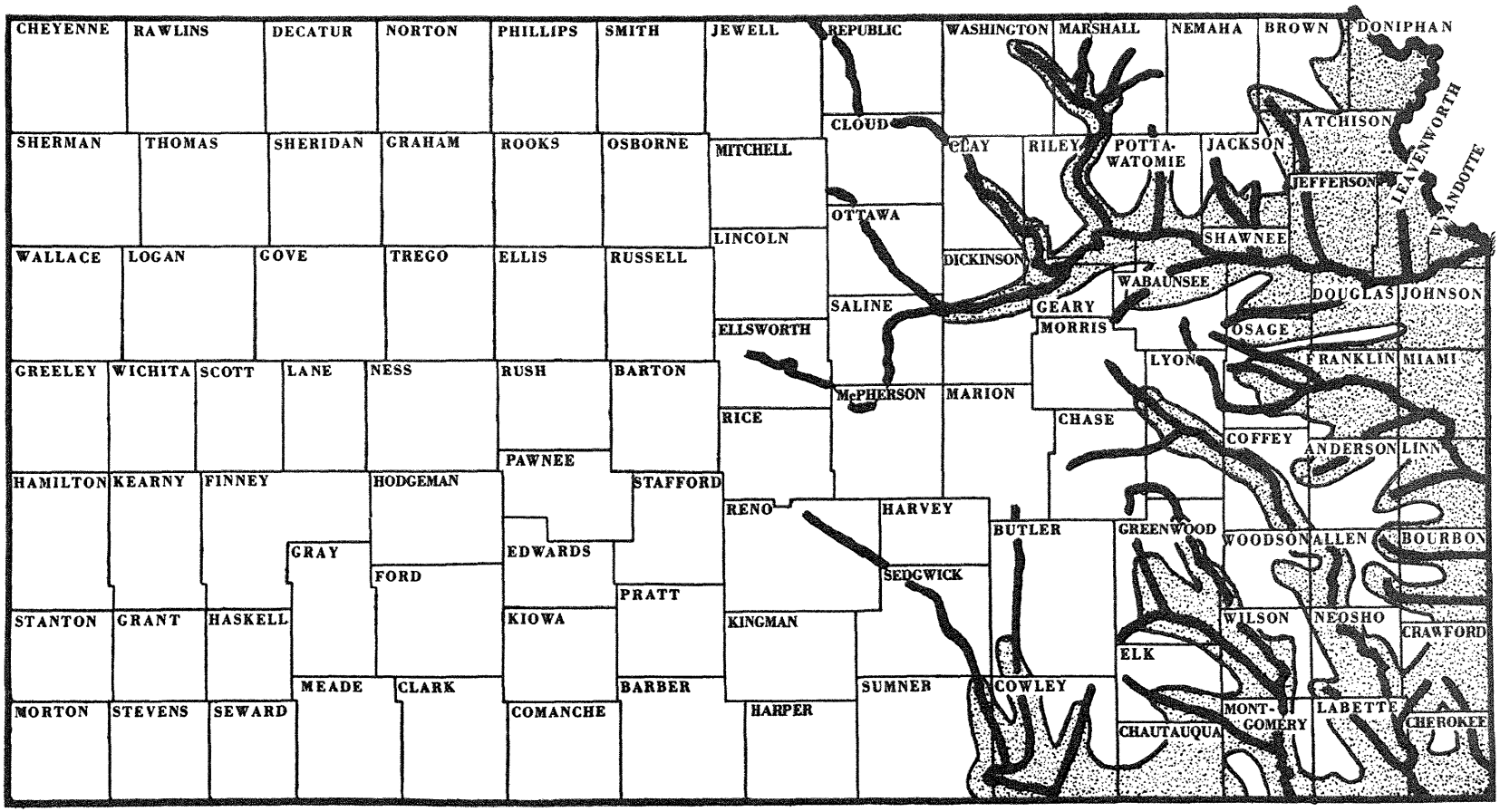
Table 51.—*Projections of timber volumes on commercial forest land, Kansas, 1965 to 1995* [1]

Year	Timber removal 2/			Trend growth 3/			Projected inventory		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
	GROWING STOCK (In thousand cubic feet)								
1965	8,160	20	8,140	14,180	40	14,140	489,460	210	489,250
1975	8,900	20	8,880	14,800	40	14,760	549,100	400	548,700
1985	11,000	20	10,980	16,000	40	15,960	603,600	600	603,000
1995	13,200	20	13,180	18,400	40	18,360	654,600	800	653,800
	SAWTIMBER (In thousand board feet) 4/								
1965	35,130	-	35,130	45,540	-	45,540	1,808,630	240	1,808,390
1975	41,000	-	41,000	48,400	-	48,400	1,897,400	300	1,897,100
1985	49,600	-	49,600	53,200	-	53,200	1,952,400	300	1,952,100
1995	57,600	-	57,600	59,700	-	59,700	1,980,900	300	1,980,600

1/ The outlook for timber volume, growth and cut to 1995 is based on assumptions that:
(A) The area of land used for producing timber will level off during the next 20 years and then begin a gradual decline.
(B) Mortality losses will continue to be substantial due to the large volume of mature timber, to recurring droughts, and to the advancing Dutch elm disease.
(C) Intensity of forest management will increase slowly but net growth rate will decline as stands fill in.
(D) Wood will maintain its relative position in the national economy but the demand for timber products from Kansas will increase.
(E) Annual production of sawtimber in Kansas will gradually increase until timber removal equals timber increment by about the year 2020. Annual production from small roundwood will also increase, but at a slower rate.

2/ Timber removal includes volume "lost" due to land clearing, flooding or reclassifying land use, in addition to cut volume.
3/ Trend growth is annual gross growth reduced for average (not current) mortality.
4/ International 1/4-inch rule.

KANSAS



NONFOREST

OAK—HICKORY

ELM—ASH—COTTONWOOD

FOREST TYPE GROUPS, KANSAS

NORTH CENTRAL FOREST EXPERIMENT STATION

1965