# FOREST STATISTICS OF KENTUCKY




CENTRAL STATES
FOREST EXPERIMENT STATION
Columbus 15, Ohio
PHILIP A. BRIEGLEB, DIRECTOR

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# FOREST STATISTICS OF KENTUCKY

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## FOREWORD

The Forest Survey is a Nation-wide activity of the Forest Service. The fivefold purpose of the Forest Survey is (1) to make a field inventory of the present supply of standing timber; (2) to find out how fast this supply is being increased through growth; (3) to find out how fast it is being diminished through industrial and domestic uses, windfall, fire, disease, and other causes; (4) to determine the present consumption and the probable future trend in requirements for forest products; and (5) to interpret and correlate these findings with existing and anticipated economic conditions, as an aid in formulating both private and public policies for use of land suitable for forest production.

The Forest Survey is conducted in the various regions by the forest experiment stations of the Forest Service. In Kentucky the project is directed by the Central States Forest Experiment Station with headquarters in Columbus, Ohio.

This Survey Release presents the more significant preliminary statistics on the forest area, timber volume, timber growth, and timber drain for the State of Kentucky. Later, an analytical report for the State will be published which will interpret statistics on forest area, timber volume, growth, and drain in the light of existing and anticipated economic conditions.

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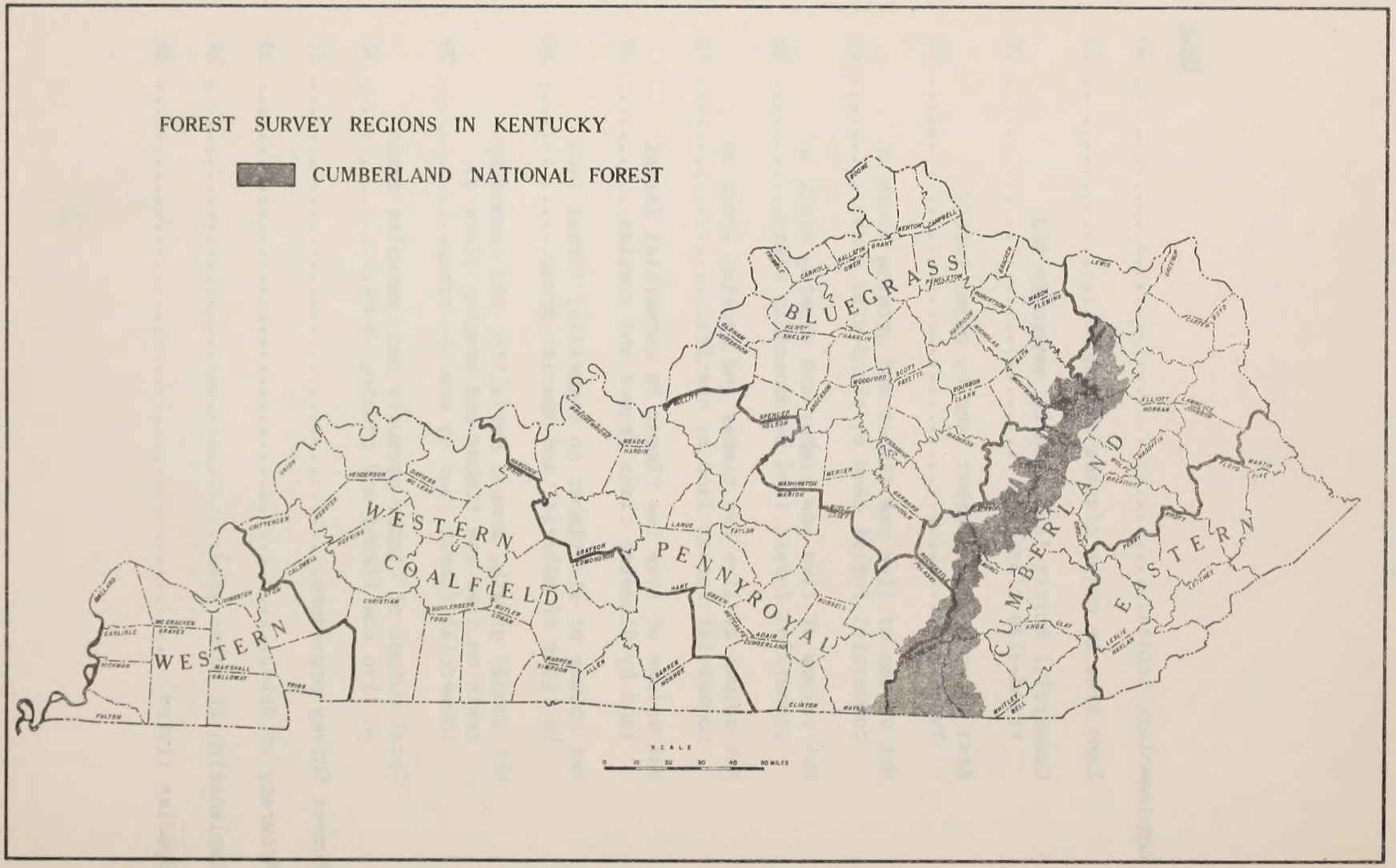
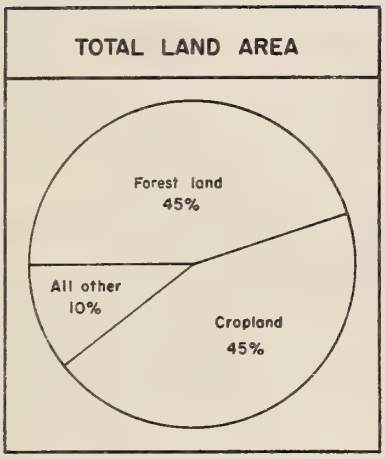
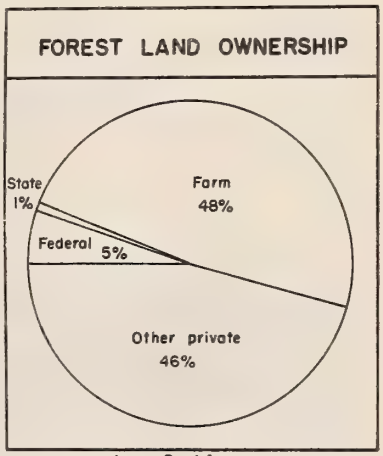

FOREST SURVEY REGIONS IN KENTUCKY
CUMBERLAND NATIONAL FOREST
BLUEGRASS
WESTERN COALFIELD
PENNYROYAL
CUMBERLAND
EASTERN
WESTERN
SCALE
0 10 20 30 40 50 MILES

# SIGNIFICANT FOREST STATISTICS FOR THE STATE OF KENTUCKY

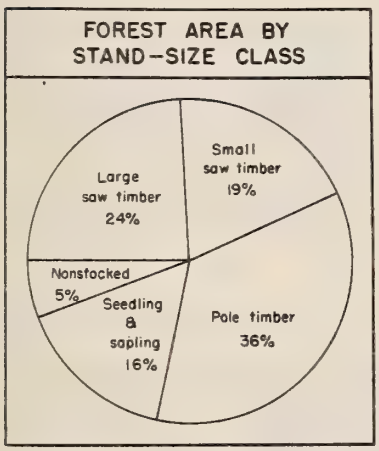
## AREA




Forty-five percent (11.5 million acres) of Kentucky's total land area is classed as forest land. All of the forest land[1] is of commercial importance though about 51,000 acres are reserved from timber use. The proportion of land in forest varies from as little as 2 percent in Bourbon County in the Bluegrass Region to over 90 percent in some counties of the Cumberland and Eastern Regions.




Ninety-four percent of the forest land is privately owned. About half of the privately owned forest area is on farms. Most of the publicly owned forest land is in the Cumberland National Forest. The State owns only about 53,000 acres of forest land.




Forty-three percent of the commercial forest area supports saw-timber stands. These are classed as large and small, depending upon the size of trees making up the volume. More than half of the saw-timber area is classed as large saw timber and averages over 5,000 board feet per acre. The small saw-timber stands average 3,000 board feet per acre. The large saw-timber area is more concentrated in the two eastern regions where 1.7 million acres of this class are found.

Pole-timber stands make up a little over one-third of the forest area. These stands average 432 cubic feet per acre. The nonstocked area is of relatively small importance in Kentucky. Stands of this class average 52 cubic feet per acre. Given adequate protection from fire and grazing, most nonstocked areas will eventually become satisfactorily stocked.

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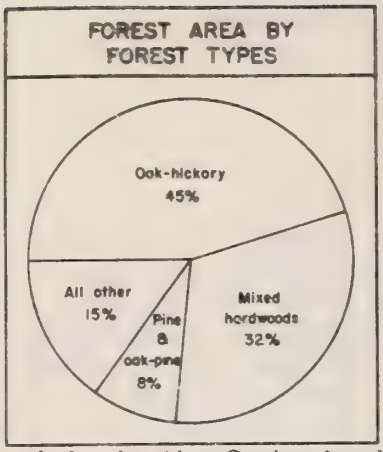
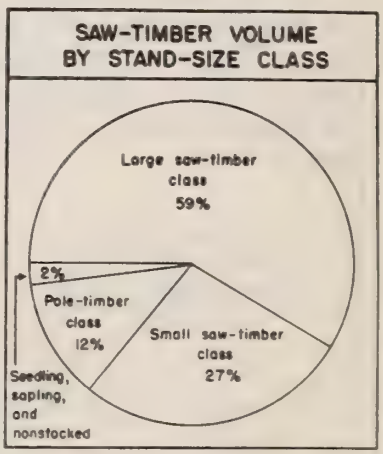
1/ For definitions of terms used see page 34.




More than 75 percent of the forest land is included in two types--oak-hickory and mixed hardwoods. Various oaks and hickories comprise 85 percent of the oak-hickory type which is found mainly on the drier upland sites. The mixed hardwoods type, which occurs mainly on the moist but well-drained sites, is usually found on cool, lower slopes and in coves. Principal species of this type include yellow-poplar, white and red oaks, hickory, beech, maple, ash, basswood, elm, walnut, and hemlock. The important pine and oak-pine types of Kentucky occur mainly in the Cumberland Region and are most concentrated on the Cumberland National Forest. The other types recognized by the Forest Survey are widely scattered throughout the State.

## SAW-TIMBER VOLUME




Of the 24.7 billion board feet[2/] (Int. 1/4-inch log scale) of saw timber, 86 percent is on areas classed as saw timber. About 59 percent is on areas classed as large saw timber. The heaviest concentration of saw-timber volume is in the Eastern Region where the forest area averages 3,349 board feet per acre. The average volume per acre for the state is 2,154 board feet.

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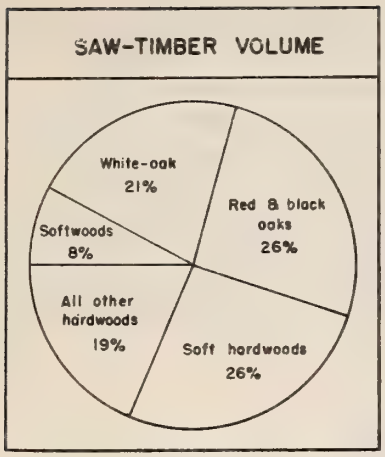
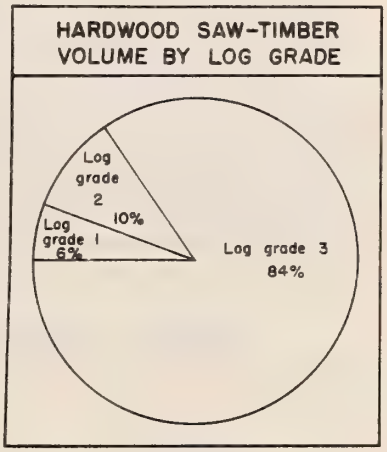
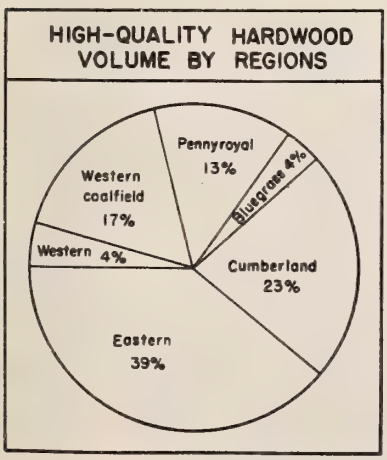
2/ The saw-timber volume is substantially increased over the figure estimated for the 1945 forest reappraisal report; the forest area is decreased slightly. Present figures differ from the 1945 estimates, partly because different definitions of forest area and commercial volume were used. but mainly because insufficient information was available in 1945 to make a more accurate estimate. The data presented here are based upon the first thorough and systematic survey of Kentucky forests.




Ninety-two percent of the board-foot volume is in hardwood species, with various species of oak comprising 47 percent of the total. Species that are often classed as soft hardwoods, such as cottonwood, yellow-poplar, basswood, and gum, make up about one-fourth of the volume. Over three-fourths of the soft-wood volume is shortleaf and Virginia pine.




Nearly 85 percent of the hard-wood saw-timber volume is in low-quality (grade 3) logs. For the most part, hardwood trees will not contain grade 1 and 2 sawlogs until they have reached the 16-inch d.b.h. class. Accordingly, 8 billion board feet of the 19 billion board feet in grade 3 sawlogs are in trees that are too small to qualify for a higher grade. Many of these trees will contain high-quality logs after they have had a chance to grow. Some of the remaining 11 billion board feet in grade 3 sawlogs is in top logs that also are too small to qualify for a higher grade. Much of the low-quality volume, however, is in logs that are too rough and defective ever to qualify as grade 1 and 2 sawlogs.



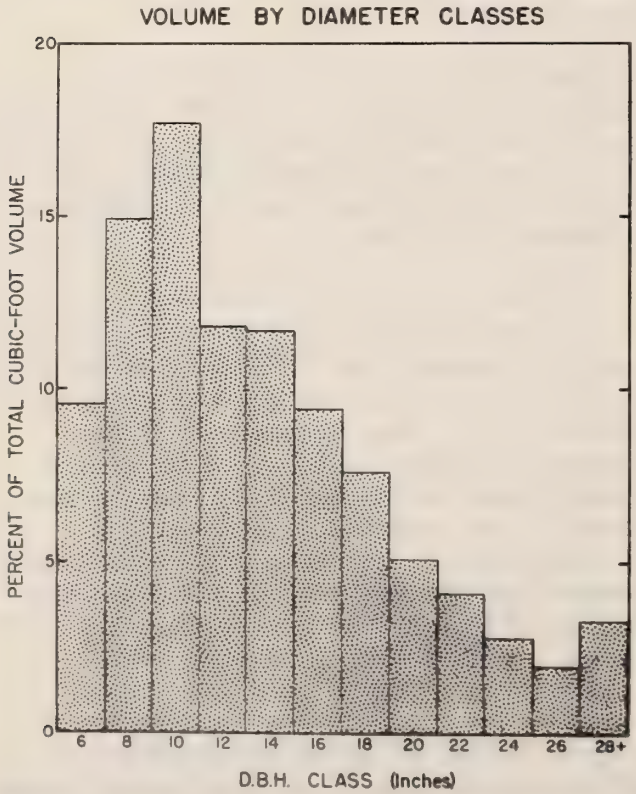

Nearly 40 percent of the high-quality (grade 1 and 2) volume is in the Eastern Region even though this region contains less than 25 percent of the board-foot timber volume. Much of the large timber in this region remains be-cause it was considered economically inaccessible at one time. Seventy-five percent of the board-foot volume in the Eastern Region is in trees 16 inches or larger in diameter.

In addition to the large volume of low-quality sawlogs, 1,686 million cubic feet of sound wood occurs in cull trees. About one of every five saw-timber-size trees is a sound or rotten cull, occupying valuable growing space in the stands.

Sawlog quality of existing stands is greatly influenced by past stand treatment, especially cutting practices, fire, and grazing. Commercial operators primarily concerned with immediate returns naturally tend to high-grade uneven-aged, mixed-hardwood stands. This practice of cutting only certain desired species and only the best trees of these species, results in a gradual stand deterioration which is most noticeable in the low quality of trees left in the stand. The quality and character of Kentucky forests will not improve until cutting practices designed to grow large, high-quality trees are accepted and until the stands are protected from fire and grazing.

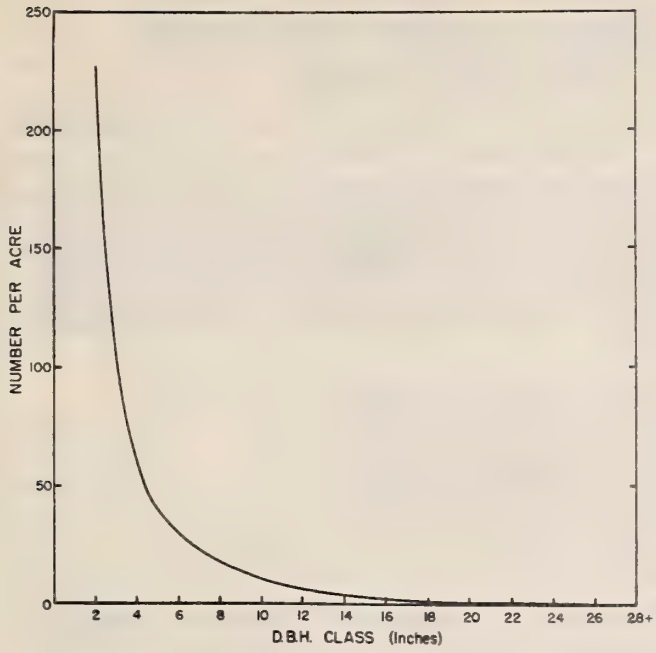
## GROWING STOCK VOLUME

The growing stock, which includes all sound trees 5.0 inches d.b.h. and larger, has a volume of 6,570 million cubic feet. This is an average of 574 cubic feet per acre of commercial forest land in the state. The best stocking, based on the average cubic-foot volume of growing stock per acre, is in the Western Region which has 666 cubic feet per acre; the Bluegrass Region, with 387 cubic feet per acre, has the poorest stocking.




About 42 percent of the growing stock volume is in trees of the 6-inch, 8-inch, and 10-inch diameter classes. Broken down into 2-inch diameter classes, the greatest proportion of the cubic-foot volume shows up in the 10-inch class. Much of the volume in pole-size trees is found on saw-timber areas; only about one-fourth of the growing-stock volume is on pole-timber areas. In general, the desirable commercial species are as well or better represented in the pole-size trees as they are in the trees of saw-timber size.

TREE STOCKING BY DIAMETER CLASS

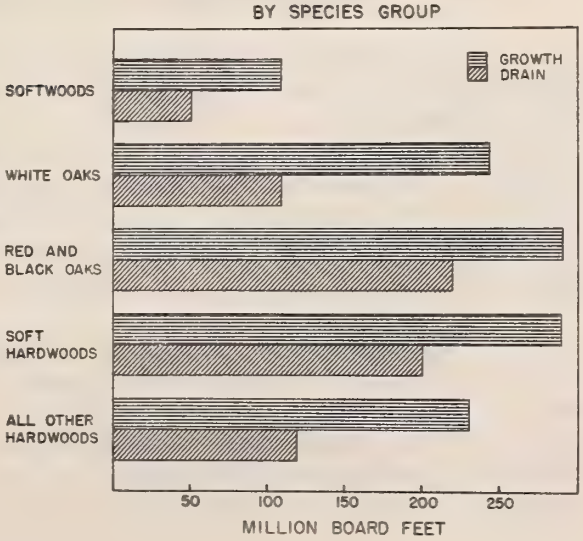


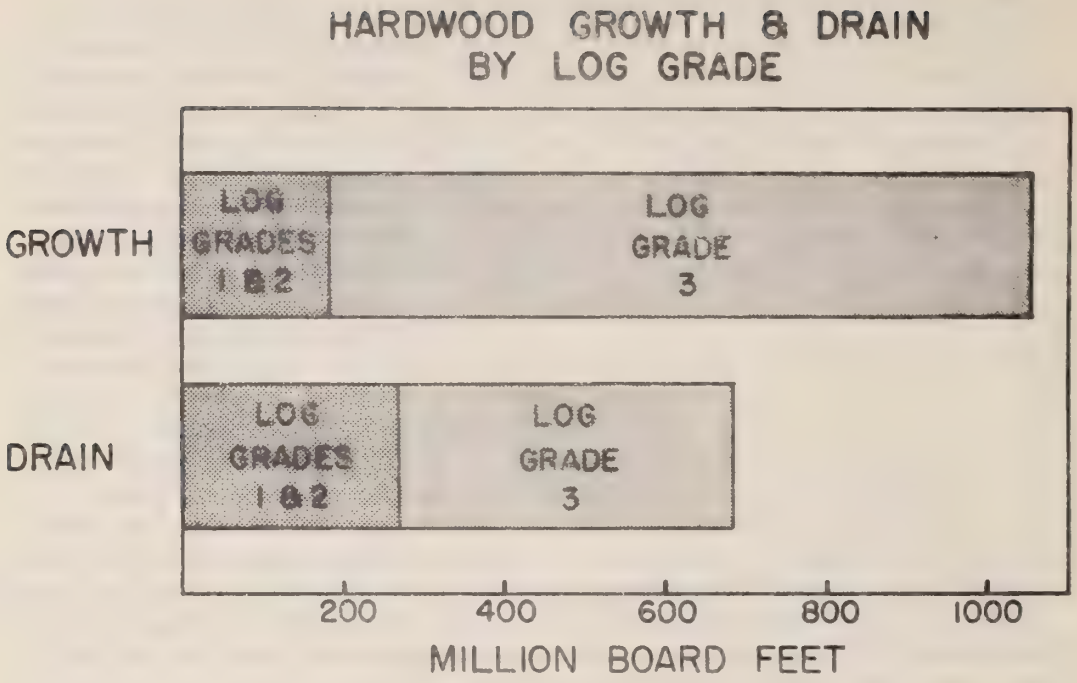

The forest area averages 364 trees per acre. About 80 percent of these are in the 2-inch and 4-inch diameter classes. The 6-inch, 8-inch, and 10-inch diameter classes have more than three times as many trees as the 12-inch and larger diameter classes. While the growing-stock volume indicates a generally understocked condition of the forest areas, the species of trees in the stands and the number of trees in the small diameter classes indicate that for the most part, the volume of Kentucky forests could be built up rapidly by applying sound management practices.

## GROWTH-DRAIN BALANCE

The total annual net growth of Kentucky's forest in 1949 was 1,189 million board feet and the drain in 1948 was only 734 million board feet. (For purposes of comparison, the 1948 drain figure can be considered representative of the total drain in 1949.) Furthermore, each of the principal species groups shows an excess of growth over drain. However, the over-all picture is not as favorable as these statistics would make it appear.

SAW TIMBER GROWTH & DRAIN
BY SPECIES GROUP






A breakdown of the 682 million board feet of hardwood drain into sawlog grades shows that about 264 million board feet were in high-quality (grade 1 and 2) sawlogs. Study of hardwood growth shows that the annual increase in grade 1 and 2 sawlog volume is only about 180 million board feet. Thus we have a sizeable deficit in the growth of high-quality hardwood timber. Softwoods are growing annually more than twice as much saw timber as is being cut.

## SIGNIFICANCE OF THE FOREST STATISTICS

The forests of Kentucky are of sufficient importance in area and character to materially affect the welfare of the State and also to contribute considerably to the national welfare. While the State is vitally interested in the wise use and development of its forests, the eventual outcome is in the hands of the farmers and other private owners who control 94 percent of the forest area. Any program designed to improve the forests of Kentucky must arouse the interest and enlist the cooperation of the private owners.

The forests of Kentucky are understocked. This is indicated by the number of trees per acre and by the average of 2,154 board feet of saw timber and 574 cubic feet of growing stock per forest acre. It is reasonable to expect that Kentucky forests could eventually support 2 to 3 times as much saw timber and growing stock if properly managed and protected from fire and grazing.

Timber is not being cut too rapidly--rather, the forests aren't growing enough, and too much of the amount being grown is on low-quality trees. The present growth, averaging 104 board feet per acre, is only one-half to one-third as much as the stands could be growing. Increasing the growth to 200 to 300 board feet per acre would more than compensate for the present drain of high-quality timber, even if the present relationship between high-grade and low-grade volume remained unchanged. However, substantial increase in volume growth is unlikely without also improving the composition and quality of the stands by removing the cull trees and merchantable trees of relatively low quality.

Besides being understocked in both board-foot and cubic-foot volume, the stands contain a high proportion of low-quality and cull timber. About one of every five saw-timber-size trees is an unmerchantable cull. Woodland grazing, repeated burning, and "high-grading" cutting practices have all contributed to the present condition of the stands. Woodland owners and woods operators must be convinced that these practices are detrimental to their interests. Economical ways must be developed to enable the woodland owners to remove the cull and low-quality trees from competition in the stands. Forests of Kentucky are not likely to improve appreciably in quality until most of the forest land is protected from fire and grazing and until most of the forest landowners and woods operators accept improved cutting practices.

# STATE SUMMARY TABLES

Table 1.--Forest and nonforest area by regions, 1949

| Regions | Total land area[1] | Forest area | | Nonforest area | |
|---|---|---|---|---|---|
| | Thousand acres | Thousand acres | Percent | Thousand acres | Percent |
| Western | 2,196 | 725 | 33 | 1,471 | 67 |
| Western Coalfield | 5,492 | 1,792 | 33 | 3,700 | 67 |
| Pennyroyal | 4,772 | 2,119 | 44 | 2,653 | 56 |
| Bluegrass | 5,649 | 1,221 | 22 | 4,428 | 78 |
| Cumberland | 5,268 | 3,838 | 73 | 1,430 | 27 |
| Eastern | 2,136 | 1,802 | 84 | 334 | 16 |
| All regions | 25,513 | 11,497 | 45 | 14,016 | 55 |

1/ Source: Area of the United States 1950, U. S. Bureau of the Census. Does not include 339,840 acres listed by Bureau of the Census as inland waters.

Table 2.--Commercial forest area by ownership class, 1949

| Ownership class | Commercial forest area[1] | |
|---|---|---|
| | Thousand acres | Percent |
| Federal: | | |
| National forest | 406 | 3.5 |
| Other | 217 | 1.9 |
| Total | 623 | 5.4 |
| State | 53 | .5 |
| County and Municipal | (2) | (2) |
| Private | 10,770 | 94.1 |
| All ownerships | 11,446 | 100.0 |

1/ Does not include 45,000 acres of forest land in Mammoth Cave National Park and 6,000 acres in state and municipal ownerships that are reserved from commercial timber use.

2/ Totals 590 acres for the state, which is included in the 10,770 thousand acres in private ownership.

Table 3.--Commercial forest area by forest type and stand-size class, 1949

| Forest type | Total | | Large saw-timber stands | Small saw-timber stands | Pole-timber stands | Seedling and sapling stands | Non-stocked stands |
|---|---|---|---|---|---|---|---|
| | Thousand acres | Percent | Thousand acres | | | | |
| Pine | 234 | 2.1 | 4 | 116 | 80 | 34 | -- |
| Redcedar-hardwoods | 490 | 4.3 | 6 | 19 | 275 | 125 | 65 |
| Oak-pine | 726 | 6.3 | 50 | 256 | 220 | 166 | 34 |
| Oak-hickory | 5,186 | 45.3 | 1,321 | 1,109 | 1,868 | 687 | 201 |
| White oak | 311 | 2.7 | 27 | 117 | 167 | -- | -- |
| Beech-maple | 393 | 3.4 | 202 | 81 | 80 | 20 | 10 |
| Mixed hardwoods | 3,603 | 31.5 | 906 | 388 | 1,235 | 786 | 288 |
| Bottomland | 503 | 4.4 | 237 | 125 | 115 | 12 | 14 |
| All types | 11,446 | | 2,753 | 2,211 | 4,040 | 1,830 | 612 |
| Percent | | 100.0 | 24.1 | 19.3 | 35.3 | 16.0 | 5.3 |

Table 4.--Saw-timber volume on commercial forest area by species and stand-size class, 1949

| Species | Total | Large saw-timber stands | Small saw-timber stands | Pole-timber stands | Seedling and sapling stands | Non-stocked stands |
|---|---|---|---|---|---|---|
| | Million bd. ft. | Percent | Million board feet | | | |
| Shortleaf pine [1] | 1,039 | 4.2 | 198 | 697 | 124 | 19 | 1 |
| Virginia pine | 523 | 2.1 | 13 | 380 | 114 | 10 | 6 |
| Other softwoods [2] | 392 | 1.6 | 276 | 51 | 64 | 1 | -- |
| Post-oak group | 611 | 2.5 | 312 | 151 | 129 | 12 | 7 |
| Chestnut oak | 2,256 | 9.2 | 1,632 | 400 | 193 | 31 | -- |
| White oak | 2,315 | 9.4 | 1,129 | 817 | 326 | 31 | 12 |
| Black oak | 4,121 | 16.7 | 2,319 | 1,221 | 514 | 62 | 5 |
| Northern red oak | 1,526 | 6.2 | 969 | 386 | 167 | 3 | 1 |
| Other red oaks | 810 | 3.3 | 512 | 209 | 89 | -- | -- |
| Hickory | 2,631 | 10.7 | 1,562 | 713 | 308 | 46 | 2 |
| Ash | 418 | 1.7 | 246 | 125 | 46 | -- | 1 |
| Elm | 357 | 1.4 | 187 | 97 | 63 | 9 | 1 |
| Cottonwood | 124 | .5 | 105 | 4 | 13 | 1 | 1 |
| Yellow-poplar | 1,830 | 7.4 | 1,164 | 413 | 213 | 35 | 5 |
| Basswood | 509 | 2.1 | 434 | 53 | 22 | -- | -- |
| Sweetgum | 462 | 1.9 | 271 | 122 | 65 | 1 | 3 |
| Blackgum | 584 | 2.4 | 391 | 125 | 59 | 9 | -- |
| Sugar maple | 526 | 2.1 | 388 | 91 | 26 | 21 | -- |
| Soft maple | 326 | 1.3 | 187 | 75 | 62 | 2 | -- |
| Sycamore | 347 | 1.4 | 202 | 84 | 58 | 2 | 1 |
| Beech | 1,959 | 7.9 | 1,545 | 286 | 96 | 25 | 7 |
| Black walnut | 266 | 1.1 | 127 | 71 | 51 | 14 | 3 |
| Other hardwoods | 723 | 2.9 | 390 | 178 | 130 | 18 | 7 |
| All species | 24,655 | | 14,559 | 6,749 | 2,932 | 352 | 63 |
| Percent | | 100.0 | 59.0 | 27.4 | 11.9 | 1.4 | 0.3 |

1/ About 6 percent white pine.
2/ Approximately 74 percent hemlock, 16 percent redcedar, and 10 percent baldcypress.

Table 5.--Saw-timber volume on commercial forest area by species and tree-diameter class, 1949

| Species | Total | 10 inches | 12-14 inches | 16-18 inches | 20-22 inches | 24-26 inches | 28 inches and larger |
|---|---|---|---|---|---|---|---|
| | | | Million board feet | | | | |
| Shortleaf pine | 1,039 | 171 | 527 | 220 | 92 | -- | 29 |
| Virginia pine | 523 | 184 | 292 | 47 | -- | -- | -- |
| Other softwoods | 392 | 51 | 100 | 104 | 73 | 49 | 15 |
| Post-oak group | 611 | -- | 307 | 188 | 87 | 22 | 7 |
| Chestnut oak | 2,256 | -- | 566 | 513 | 412 | 336 | 429 |
| White oak | 2,315 | -- | 1,171 | 604 | 255 | 148 | 137 |
| Black oak | 4,121 | -- | 1,628 | 1,512 | 654 | 286 | 41 |
| Northern red oak | 1,526 | -- | 413 | 516 | 273 | 181 | 143 |
| Other red oaks | 810 | -- | 267 | 264 | 150 | 85 | 44 |
| Hickory | 2,631 | -- | 1,219 | 720 | 379 | 197 | 116 |
| Ash | 418 | -- | 155 | 129 | 77 | 27 | 30 |
| Elm | 357 | -- | 170 | 75 | 60 | 25 | 27 |
| Cottonwood | 124 | -- | 28 | 43 | 31 | 19 | 3 |
| Yellow-poplar | 1,830 | -- | 636 | 681 | 315 | 174 | 24 |
| Basswood | 509 | -- | 122 | 228 | 129 | 30 | -- |
| Sweetgum | 462 | -- | 186 | 167 | 66 | 30 | 13 |
| Blackgum | 584 | -- | 227 | 176 | 107 | 61 | 13 |
| Sugar maple | 526 | -- | 163 | 118 | 122 | 59 | 64 |
| Soft maple | 326 | -- | 145 | 117 | 49 | 5 | 10 |
| Sycamore | 347 | -- | 89 | 77 | 77 | 54 | 50 |
| Beech | 1,959 | -- | 411 | 503 | 470 | 342 | 233 |
| Black walnut | 266 | -- | 144 | 78 | 44 | -- | -- |
| Other hardwoods | 723 | -- | 314 | 171 | 140 | 38 | 60 |
| All species | 24,655 | 406 | 9,280 | 7,251 | 4,062 | 2,168 | 1,488 |
| Percent | 100.0 | 1.7 | 37.6 | 29.4 | 16.5 | 8.8 | 6.0 |

Table 6.--Hardwood saw-timber volume by species group and log grade, 1949

| Species group | Volume | Log grade 1 | | Log grade 2 | | Log grade 3 | |
|---|---|---|---|---|---|---|---|
| | Million bd. ft. | Million bd. ft. | Percent | Million bd. ft. | Percent | Million bd. ft. | Percent |
| White oaks[1/] | 5,182 | 347 | 6.7 | 547 | 10.6 | 4,288 | 82.7 |
| Red oaks[2/] | 6,457 | 267 | 4.2 | 551 | 8.5 | 5,639 | 87.3 |
| Other hardwoods | 11,062 | 694 | 6.3 | 1,132 | 10.2 | 9,236 | 83.5 |
| All hardwoods | 22,701 | 1,308 | 5.8 | 2,230 | 9.8 | 19,163 | 84.4 |

1/ Includes white oak, chestnut oak, and post-oak group.
2/ Includes black oak, northern red oak, and other red oaks.

Table 7.--Total cubic volume of sound wood on commercial forest area by species and class of material, 1949

| Species | Total | Growing stock | | | Tops and limbs[1] | Cull trees[2] |
|---|---|---|---|---|---|---|
| | | Total | Saw-timber trees | Pole-timber trees | | |
| | Million cubic feet | | | | | |
| Shortleaf pine | 222.8 | 222.1 | 175.2 | 46.9 | -- | 0.7 |
| Virginia pine | 177.0 | 174.8 | 96.6 | 78.2 | -- | 2.2 |
| Other softwoods | 120.9 | 117.7 | 77.8 | 39.9 | -- | 3.2 |
| Post-oak group | 311.8 | 214.2 | 98.3 | 115.9 | 55.1 | 42.5 |
| Chestnut oak | 881.0 | 511.1 | 344.1 | 167.0 | 192.8 | 177.1 |
| White oak | 1,018.2 | 744.8 | 360.5 | 384.3 | 202.0 | 71.4 |
| Black oak | 1,513.6 | 993.4 | 652.1 | 341.3 | 365.3 | 154.9 |
| Northern red oak | 479.4 | 311.8 | 237.0 | 74.8 | 132.6 | 35.0 |
| Other red oaks | 275.2 | 185.9 | 127.5 | 58.4 | 71.5 | 17.8 |
| Hickory | 1,133.9 | 809.7 | 411.4 | 398.3 | 230.4 | 93.8 |
| Ash | 228.3 | 157.9 | 67.4 | 90.5 | 37.7 | 32.7 |
| Elm | 241.5 | 160.8 | 56.7 | 104.1 | 31.7 | 49.0 |
| Cottonwood | 34.9 | 22.2 | 19.5 | 2.7 | 10.9 | 1.8 |
| Yellow-poplar | 606.1 | 406.8 | 283.2 | 123.6 | 158.7 | 40.6 |
| Basswood | 172.3 | 101.6 | 77.5 | 24.1 | 43.4 | 27.3 |
| Sweetgum | 184.8 | 131.9 | 73.1 | 58.8 | 40.8 | 12.1 |
| Blackgum | 263.3 | 146.2 | 94.4 | 51.8 | 52.8 | 64.3 |
| Sugar maple | 274.1 | 161.0 | 80.0 | 81.0 | 44.9 | 68.2 |
| Soft maple | 248.2 | 126.9 | 51.5 | 75.4 | 28.8 | 92.5 |
| Sycamore | 117.6 | 79.1 | 53.2 | 25.9 | 29.8 | 8.7 |
| Beech | 1,008.5 | 353.9 | 290.0 | 63.9 | 162.4 | 492.2 |
| Black walnut | 128.3 | 91.0 | 43.0 | 48.0 | 23.9 | 13.4 |
| Other hardwoods | 531.1 | 345.0 | 114.4 | 230.6 | 64.1 | 122.0 |
| Noncommercial species | 62.6 | -- | -- | -- | -- | 62.6 |
| All species[3] | 10,235.4 | 6,569.8 | 3,884.4 | 2,685.4 | 1,979.6 | 1,686.0 |
| Percent | 100.0 | 64.2 | 38.0 | 26.2 | 19.3 | 16.5 |

1/ Merchantable hardwood saw timber only.
2/ Includes sound portion of tops and limbs of cull trees.
3/ Does not include volume of standing dead chestnut estimated to be 134.0 million cubic feet.

Table 8.--Cubic volume of growing stock on commercial forest area by species and stand-size class, 1949

| Species | Total | | Large saw-timber stands | Small saw-timber stands | Pole-timber stands | Seedling and sapling stands | Non-stocked stands |
|---|---|---|---|---|---|---|---|
| | Million cu. ft. | Percent | Million cubic feet | | | | |
| Shortleaf pine | 222.1 | 3.3 | 33.3 | 141.7 | 41.4 | 5.4 | 0.3 |
| Virginia pine | 174.8 | 2.7 | 3.6 | 101.4 | 62.8 | 5.9 | 1.1 |
| Other softwoods | 117.7 | 1.8 | 53.9 | 15.1 | 45.6 | 2.0 | 1.1 |
| Post-oak group | 214.2 | 3.3 | 58.2 | 60.2 | 89.5 | 4.4 | 1.9 |
| Chestnut oak | 511.1 | 7.8 | 285.5 | 103.0 | 116.2 | 6.4 | -- |
| White oak | 744.8 | 11.3 | 232.6 | 263.7 | 233.2 | 11.3 | 4.0 |
| Black oak | 993.4 | 15.1 | 416.8 | 293.4 | 264.3 | 18.0 | .9 |
| Northern red oak | 311.8 | 4.7 | 170.8 | 88.0 | 52.2 | .6 | .2 |
| Other red oaks | 185.9 | 2.8 | 92.2 | 50.0 | 42.0 | 1.7 | -- |
| Hickory | 809.7 | 12.3 | 339.6 | 231.0 | 222.4 | 14.7 | 2.0 |
| Ash | 157.9 | 2.4 | 61.2 | 39.8 | 53.7 | .6 | 2.6 |
| Elm | 160.8 | 2.5 | 51.8 | 36.1 | 63.7 | 4.1 | 5.1 |
| Cottonwood | 22.2 | .3 | 18.0 | .9 | 3.1 | .1 | .1 |
| Yellow-poplar | 406.8 | 6.2 | 207.3 | 97.7 | 92.5 | 8.3 | 1.0 |
| Basswood | 101.6 | 1.6 | 80.0 | 14.8 | 6.7 | .1 | -- |
| Sweetgum | 131.9 | 2.0 | 51.3 | 39.1 | 40.5 | .5 | .5 |
| Blackgum | 146.2 | 2.2 | 78.3 | 36.9 | 24.4 | 5.6 | 1.0 |
| Sugar maple | 161.0 | 2.5 | 87.6 | 40.0 | 28.9 | 4.2 | .3 |
| Soft maple | 126.9 | 1.9 | 57.2 | 36.6 | 31.2 | 1.7 | .2 |
| Sycamore | 79.1 | 1.2 | 33.8 | 16.9 | 24.9 | 1.9 | 1.6 |
| Beech | 353.9 | 5.4 | 256.4 | 64.2 | 26.4 | 5.9 | 1.0 |
| Black walnut | 91.0 | 1.4 | 30.0 | 20.3 | 33.2 | 4.4 | 3.1 |
| Other hardwoods | 345.0 | 5.3 | 113.5 | 68.9 | 145.3 | 13.7 | 3.6 |
| All species | 6,569.8 | | 2,812.9 | 1,859.7 | 1,744.1 | 121.5 | 31.6 |
| Percent | | 100.0 | 42.8 | 28.3 | 26.5 | 1.9 | 0.5 |

Table 9.--Cubic volume of growing stock on commercial forest area by stand-size class and tree-diameter class, 1949

| Stand-size class | Total | 6-8 inches | 10 inches | 12-14 inches | 16-18 inches | 20-22 inches | 24-26 inches | 28 inches and larger |
|---|---|---|---|---|---|---|---|---|
| | | | | Million cubic feet | | | | |
| Large saw-timber | 2,812.9 | 326.9 | 264.9 | 474.6 | 741.8 | 506.1 | 294.1 | 204.5 |
| Small saw-timber | 1,859.7 | 423.7 | 379.8 | 725.2 | 259.5 | 55.2 | 12.3 | 4.0 |
| Pole-timber | 1,744.1 | 803.2 | 486.6 | 313.1 | 101.6 | 31.3 | 3.0 | 5.3 |
| Seedling and sapling | 121.5 | 45.4 | 21.6 | 22.1 | 16.1 | 11.4 | 4.9 | -- |
| Nonstocked | 31.6 | 12.6 | 9.0 | 5.8 | 1.9 | .3 | 2.0 | -- |
| All classes | 6,569.8 | 1,611.8 | 1,161.9 | 1,540.8 | 1,120.9 | 604.3 | 316.3 | 213.8 |
| Percent | 100.0 | 24.5 | 17.7 | 23.4 | 17.1 | 9.2 | 4.8 | 3.3 |

Table 10.--Average volume per acre by stand-size class, 1949

| Stand-size class | Average volume per acre | |
|---|---|---|
| | Board feet | Cubic feet[1] |
| Large saw-timber stands | 5,288 | 1,021.8 |
| Small saw-timber stands | 3,052 | 841.1 |
| Pole-timber stands | 726 | 431.7 |
| Seedling and sapling stands | 192 | 66.4 |
| Nonstocked stands | 103 | 51.6 |
| All classes | 2,154 | 574.0 |

1/ Growing stock only.

Table 11.--Net growth and normal mortality of growing stock on commercial forest area by species group, 1949

| Species group | Live saw-timber volume | | Total growing stock | |
|---|---|---|---|---|
| | Current annual net growth | Current annual normal mortality | Current annual net growth | Current annual normal mortality |
| | Million board feet | | Million cubic feet | |
| Softwoods | 133 | 7.0 | 20.9 | 2.0 |
| Hardwoods | 1,056 | 76.0 | 246.4 | 23.9 |
| Total | 1,189 | 83.0 | 267.3 | 25.9 |

Table 12.--Commodity drain on growing stock on commercial forest area by product and species group, 1948

| Product | Live saw-timber volume | | Total growing stock | |
|---|---|---|---|---|
| | Softwood | Hardwood | Softwood | Hardwood |
| | Million board feet | | Million cubic feet | |
| Sawlogs | 49.7 | 501.4 | 7.1 | 71.2 |
| Fuelwood | -- | 104.5 | -- | 44.5 |
| Fence posts | 2.1 | 4.8 | 2.8 | 5.4 |
| Veneer bolts | .3 | 10.5 | .1 | 1.4 |
| Cooperage bolts | -- | 49.5 | -- | 6.9 |
| Pulpwood | .1 | .7 | .1 | 1.2 |
| Handle bolts | -- | 6.1 | -- | .9 |
| Hewn ties | -- | 3.1 | -- | .5 |
| Round mine timbers | -- | -- | -- | 16.5 |
| Misc. timbers | -- | 1.0 | .1 | 2.0 |
| Total | 52.2 | 681.6 | 10.2 | 150.5 |

## SUPPLEMENTARY TABLES

The following tables summarize the foregoing data in a form that will be found in all Forest Survey state or subregional reports. Readers can thus combine or compare these data with similar data for other areas.

Table 13.--Land area by major classes of land, 1949

| Class of land | Area |
|---|---|
| | Thousand acres |
| Forest: | |
| Commercial | 11,446 |
| Noncommercial: | |
| Reserved from commercial timber use | 51 |
| Unproductive for timber use | 0 |
| Total forest land | 11,497 |
| Nonforest | 14,016 |
| Total, all classes | 25,513 |

Table 14.--Commercial forest land area by ownership and stand-size classes, 1949

| Ownership class | Total | Saw-timber stands | Pole-timber stands | Seedling and sapling stands | Non-stocked 1/ |
|---|---|---|---|---|---|
| | Thousand acres | | | | |
| Federal: | | | | | |
| National forest | 406 | 227 | 148 | 31 | 0 |
| Indian | 0 | 0 | 0 | 0 | 0 |
| Other | 217 | 101 | 80 | 31 | 5 |
| Total | 623 | 328 | 228 | 62 | 5 |
| State | 53 | 28 | 18 | 5 | 2 |
| County and municipal | (2/) | -- | -- | -- | -- |
| Private | 10,770 | 4,608 | 3,794 | 1,763 | 605 |
| All ownerships | 11,446 | 4,964 | 4,040 | 1,830 | 612 |

1/ Includes areas not classified elsewhere.
2/ Totals 590 acres for the state and is included in the 10,770 thousand acres in private ownership.

Table 15.--Area of commercial forest land by major forest types, 1949

| Forest type | Thousand acres |
|---|---|
| Pine | 234 |
| Redcedar-hardwoods | 490 |
| Oak-pine | 726 |
| Oak-hickory | 5,186 |
| White oak | 311 |
| Beech-maple | 393 |
| Mixed hardwoods | 3,603 |
| Bottomland | 503 |
| Total | 11,446 |

Table 16.--Net volume of live saw timber and growing stock on commercial forest land by stand-size class, 1949

| Stand-size class | Saw timber | Growing stock |
|---|---|---|
| | Million bd. ft. | Million cu. ft. |
| Saw-timber stands | 21,308 | 4,672.6 |
| Pole-timber stands | 2,932 | 1,744.1 |
| Seedling and sapling stands | 352 | 121.5 |
| Nonstocked and other areas not classified elsewhere | 63 | 31.6 |
| Total | 24,655 | 6,569.8 |

Table 17.--Net volume of live saw timber and growing stock on commercial forest land by ownership class, 1949

| Ownership class | Saw timber | Growing stock |
|---|---|---|
| | Million bd. ft. | Million cu. ft. |
| Federal: | | |
| National forest | 1,109 | 288.9 |
| Indian | 0 | 0.0 |
| Other | 476 | 132.9 |
| Total | 1,585 | 421.8 |
| State | 141 | 36.2 |
| County and municipal | (1/) | (1/) |
| Private: | | |
| Farm | 11,671 | 3,110.9 |
| Industrial and other | 11,258 | 3,000.9 |
| Total | 22,929 | 6,111.8 |
| All ownerships | 24,655 | 6,569.8 |

1/ Less than 0.5 million board feet or 0.05 million cubic feet.

Table 18.--Net volume of live saw timber and growing stock on commercial forest land by species, 1949

| Species | Saw timber | Growing stock |
|---|---|---|
| | Million bd. ft. | Million cu. ft. |
| Softwoods: | | |
| Shortleaf and loblolly pines | 978 | 213.0 |
| Other southern yellow pines | 523 | 174.8 |
| White and red pines | 61 | 9.1 |
| Hemlock | 289 | 56.1 |
| Cypress | 38 | 8.6 |
| Other eastern softwoods | 65 | 53.0 |
| Total softwoods | 1,954 | 514.6 |
| Hardwoods: | | |
| White oaks | 2,315 | 744.8 |
| Red oaks | 1,526 | 311.8 |
| Other white oaks | 2,867 | 725.3 |
| Other red oaks | 4,931 | 1,179.3 |
| Sugar maple | 526 | 161.0 |
| Soft maples | 326 | 126.9 |
| Beech | 1,959 | 353.9 |
| Sweetgum | 462 | 131.9 |
| Tupelo and blackgum | 584 | 146.2 |
| Ash | 418 | 157.9 |
| Hickory | 2,631 | 809.7 |
| Cottonwood and aspen | 124 | 22.2 |
| Basswood | 509 | 101.6 |
| Yellow-poplar | 1,830 | 406.8 |
| Black walnut | 266 | 91.0 |
| Other eastern hardwoods | 1,427 | 584.9 |
| Total hardwoods | 22,701 | 6,055.2 |
| All species | 24,655 | 6,569.8 |

Table 19.--Net volume of live saw timber on commercial forest land by diameter class groups and species, 1949

| Species | Diameter class groups (inches) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 10: | 12 | 14 | 16 | 18 | 20+ | Total |
| | Million board feet | | | | | | |
| Softwoods: | | | | | | | |
| Southern yellow pines | 355 | 437 | 380 | 151 | 99 | 79 | 1,501 |
| White and red pines | -- | -- | 2 | 7 | 10 | 42 | 61 |
| Other eastern softwoods | 51 | 53 | 47 | 50 | 54 | 137 | 392 |
| Total softwoods | 406 | 490 | 429 | 208 | 163 | 258 | 1,954 |
| Hardwoods: | | | | | | | |
| White oak | -- | 615 | 556 | 275 | 329 | 540 | 2,315 |
| Other white oaks | -- | 423 | 450 | 345 | 356 | 1,293 | 2,867 |
| Red oaks | -- | 181 | 232 | 297 | 219 | 597 | 1,526 |
| Other red oaks | -- | 901 | 994 | 996 | 780 | 1,260 | 4,931 |
| Sugar maple | -- | 83 | 80 | 57 | 61 | 245 | 526 |
| Beech | -- | 188 | 223 | 246 | 257 | 1,045 | 1,959 |
| Sweetgum | -- | 84 | 102 | 97 | 70 | 109 | 462 |
| Tupelo and blackgum | -- | 105 | 122 | 109 | 67 | 181 | 584 |
| Yellow-poplar | -- | 302 | 334 | 336 | 345 | 513 | 1,830 |
| Other eastern hardwoods | -- | 1,177 | 1,209 | 1,005 | 633 | 1,677 | 5,701 |
| Total hardwoods | -- | 4,059 | 4,302 | 3,763 | 3,117 | 7,460 | 22,701 |
| All species | 406 | 4,549 | 4,731 | 3,971 | 3,280 | 7,718 | 24,655 |

Table 20.--Net volume of all timber on commercial forest land by class of material and species group, 1949

| Class of material | Total | Softwoods | Hardwoods |
|---|---|---|---|
| | Million cubic feet | | |
| Growing stock: | | | |
| Saw-timber trees: | | | |
| Sawlog portion | 3,858.0 | 323.2 | 3,534.8 |
| Upper stem portion | 26.4 | 26.4 | (1/) |
| Total saw timber | 3,884.4 | 349.6 | 3,534.8 |
| Pole-timber trees | 2,685.4 | 165.0 | 2,520.4 |
| Total growing stock | 6,569.8 | 514.6 | 6,055.2 |
| Other material: | | | |
| Sound cull trees | 203.3 | 3.2 | 200.1 |
| Rotten cull trees | 1,482.7 | 2.9 | 1,479.8 |
| Hardwood limbs | 2/ 1,880.6 | -- | 1,880.6 |
| Salvable dead trees | 3/ 134.0 | -- | 134.0 |
| Total other material | 3,700.6 | 6.1 | 3,694.5 |
| Total, all timber | 10,270.4 | 520.7 | 9,749.7 |

1/ The volume of upper stem portion of hardwoods is estimated to be 99.0 million cubic feet. The figure is not included with growing stock in this or any of the other tables because the volume cannot be distributed by the classes called for in some of the tables.

2/ The column headed "Tops and limbs" in table 7 includes this figure plus the 99.0 million cubic feet estimated to be in the tops of sound hardwood saw-timber trees.

3/ Standing dead chestnut only; this figure is not included in table 7.

Table 21.--Net annual growth, annual mortality, and commodity drain on live saw timber and growing stock on commercial forest land by species group, 1949 [1/]

| Item | Saw timber | | | Growing stock | | |
|---|---|---|---|---|---|---|
| | Total | Soft-woods | Hard-woods | Total | Soft-woods | Hard-woods |
| | -Million board feet- | | | -Million cubic feet- | | |
| Net annual growth | 1,189 | 133 | 1,056 | 267.3 | 20.9 | 246.4 |
| Annual mortality | 83 | 7 | 76 | 25.9 | 2.0 | 23.9 |
| Commodity drain: | | | | | | |
| Timber products | 692.2 | 52.2 | 640.0 | 154.7 | 10.2 | 144.5 |
| Logging waste | 41.6 | -- | 41.6 | 6.0 | -- | 6.0 |
| Total [1/] | 733.8 | 52.2 | 681.6 | 160.7 | 10.2 | 150.5 |

1/ Though commodity drain was determined for the year 1948 (table 22), the total drain figure can be considered representative of the total drain in 1949.

Table 22.--Total output of timber products and commodity drain on live saw timber and growing stock, 1948

| Product | Volume of products cut[1] | | | Commodity drain on saw timber | | | Commodity drain on growing stock | | |
|---|---|---|---|---|---|---|---|---|---|
| | Standard unit | Number | M cu. ft. | Total | Soft-woods | Hard-woods | Total | Soft-woods | Hard-woods |
| | | | | Million bd. ft. | | | Million cu. ft. | | |
| Sawlogs | M bd. ft.[2] | 508,240 | 70,589 | 551 | 50 | 501 | 78 | 7 | 71 |
| Veneer logs and bolts | M bd. ft. | 9,614 | 1,335 | 11 | (3) | 11 | 2 | -- | 2 |
| Cooperage logs & bolts | M bd. ft. | 44,042 | 6,117 | 49 | -- | 49 | 7 | -- | 7 |
| Pulpwood bolts | Std. cords[4] | 47,225 | 3,366 | 1 | -- | 1 | 1 | -- | 1 |
| Fuelwood | Std. cords | 1,506,232 | 95,907 | 105 | -- | 105 | 45 | -- | 45 |
| Posts | M pieces | 13,544 | 10,305 | 7 | 2 | 5 | 8 | 3 | 5 |
| Hewn ties | M pieces | 75 | 434 | 3 | -- | 3 | 1 | -- | 1 |
| Mine timbers | M cu. ft. | 16,497 | 16,497 | -- | -- | -- | 16 | -- | 16 |
| Miscellaneous[5] | M cu. ft. | 3,572 | 3,572 | 7 | -- | 7 | 3 | -- | 3 |
| Total | xxxx | xxxx | 208,122 | 734 | 52 | 682 | 161 | 10 | 151 |

1/ Includes material from both growing stock and other miscellaneous sources.
2/ International 1/4-inch rule.
3/ Less than 500,000 board feet.
4/ Rough wood basis.
5/ Includes chemical wood, excelsior, handle stock, shingle bolts, etc.

## FOREST SURVEY PROCEDURE

The inventory of the forest resources of Kentucky was made during a period of 4 years. The work started in the Western Region in May 1948 and continued eastward through the State until November 1949. Because aerial photographs for the Eastern Region were not available at that time, work was temporarily stopped in Kentucky. After obtaining aerial photographs of the Eastern Region, the field crews returned to Kentucky in January 1951 and the inventory work was completed in June of that year. The tabular data can be generally interpreted as applying to the stands as they existed on January 1, 1949. No attempt has been made to adjust the data of the various sub-units to 1949 status. Since growth exceeds drain, the error, if any, probably tends to make the 1949 inventory data too great. The difference, however, is believed to be small in comparison with the sampling error. The sampling procedure used involved an office study of aerial photographs and a field examination of systematically selected forest and nonforest plots.

The proportion of forest land in each county was obtained by placing a transparent template marked with uniformly spaced dots over aerial photographs and by counting the number of dots falling on forest and nonforest areas. The percentage of forest dots in a county, multiplied by the total area, gave a preliminary estimate of the forest area. This was later adjusted after field examination indicated the number of plots that had changed from forest to nonforest since the data of aerial photography and vice versa.

The location of systematically selected dots falling on forest land was marked on the photographs. The acre surrounding each marked dot was examined under stereoscope and was classified by stand-size class on the basis of the height, crown width, and density of trees on the plot. Plots to be examined in the field were systematically drawn from those classified under the stereoscope. This selection was weighted, giving the most weight to the larger stand-size classes. In addition, several nonforest plots were selected for field examination to measure the movement of open land to forest since the photographs were taken.

The locations of the selected field plots were marked on the photographs, which were then sent to the field. Crews of two men each located these points on the ground. On forest land, a 1/5-acre plot was established for which species, size, quality, and growth of trees were recorded.

The following tabulation gives the number of dots and plots examined for the State as a whole:

| | |
|---|---|
| Number of photo dots counted for forest-area determination | 147,286 |
| Number of forest plots stereoscopically examined on photos | 12,677 |
| Number of forest plots field examined | 2,604 |
| Number of nonforest plots field examined | 685 |

## ACCURACY OF DATA

Statistical analysis of forest area and timber volume data shows the following sampling errors[3] for the State as a whole:

| Forest area | | Growing stock volume | |
|---|---|---|---|
| (M acres) | (Percent) | (Million cu. ft.) | (Percent) |
| ±103.5 | ±0.9 | ±100.1 | ±1.5 |

These estimates of sampling error do not include errors resulting from the development and application of volume tables and cull factors, or from mistakes in measurement or judgment. All phases of field and office work were closely supervised to keep these errors to a minimum. Since the percentage error increases with each subdivision of the total, small acreages or volumes may have large errors and may therefore indicate only relative magnitudes.

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3/ At one standard error; that is, the chances are two out of three that the calculated acreages and volumes do not differ from the totals that would have been obtained by 100-percent measurement by more than the errors shown here.

## EXPLANATION OF TERMS USED

Forest land.--Land bearing forest growth or land from which the forest has been removed but which shows evidence of past forest occupancy and which is not now in other use. To qualify as forest, an area must (1) be at least 100 feet wide; (2) be at least 1 acre in area; (3) have a sufficient number of trees to provide 10 percent crown coverage; or (4) lacking 10 percent crown coverage, be likely to remain in forest use.

Commercial forest land.--Forest land bearing or capable of bearing timber of commercial character (usually saw timber) and economically available now or prospectively for commercial use and not withdrawn from such use.

Reserved forest land.--Forest land withdrawn from timber utilization through statute, ordinance, or administrative order.

Noncommercial forest land.--Forest land incapable of yielding usable wood products because of adverse site conditions, or so physically inaccessible as to be permanently unavailable economically, and not withdrawn for specified purposes.

Forest types

Pine.--Stands in which pine species comprise at least 60 percent of the dominant and codominant trees.

Redcedar-hardwoods.--Stands in which redcedar comprises at least 20 percent of the dominant and codominant trees.

Oak-pine.--Stands in which pine species comprise 20-60 percent of the dominant and codominant trees.

Oak-hickory.--Hardwood stands in which oaks and hickories comprise at least 60 percent of the dominant and codominant trees.

White oak.--Hardwood stands in which white oak (*Quercus alba*) comprises at least 60 percent of the dominant and codominant trees.

Beech-maple.--Hardwood stands in which beech and sugar maple comprise at least 60 percent of the dominant and codominant trees.

Mixed hardwoods.--Stands of mixed hardwood species not qualifying for other hardwood types. Principal species include yellow-poplar, elm, maple, basswood, ash, beech, hemlock, and black locust in mixture with oaks and hickories.

Bottomland.--Stands on the alluvial bottoms of rivers and streams. The principal species include sycamore, willow, elm, blackgum, sweetgum, soft maple, oaks, hickory, cottonwood, and cypress.

Tree classes

Saw-timber tree.--A live softwood (coniferous) tree at least 9.0 inches d.b.h. or live hardwood tree of commercial species at least 11.0 inches d.b.h., with a sound butt log at least 8 feet long, or with at least half of the gross volume of the tree in sound material.

Pole-timber tree.--A live tree of commercial species at least 5.0 inches d.b.h. but less than saw-timber size that is now merchantable or gives promise of becoming merchantable.

Seedling and sapling trees.--Trees of commercial species less than 5.0 inches in diameter at breast height.

Cull tree.--A live tree at least 5.0 inches d.b.h. that does not qualify as a saw-timber or pole-timber tree because of species, poor form, limbiness, rot, or other defect.

Volume estimates

Board-foot volume includes the sound volume of sawlogs in merchantable saw-timber trees to a minimum top d.i.b. of 6 inches for softwoods and 8 inches for hardwoods. Volume deductions have been made for rot, crook, and other defects. Board-foot volumes are shown in the International 1/4-inch log rule, which approximates green lumber tally.

Cubic-foot volume

Total volume includes the sound wood inside bark in both sound and cull living trees 5.0 inches d.b.h. and larger, from the stump to a minimum top diameter of 4.0 inches inside bark. It includes the upper stems of softwood trees and the upper stems and limbs of hardwoods.

Growing stock includes the volume of sound wood inside bark in (1) the sawlog portion of hardwood saw-timber trees to a minimum top d.i.b. of 8 inches, (2) the stem

of softwood saw-timber trees to a minimum top d.i.b. of 4.0 inches, and (3) pole-timber trees to a minimum top d.i.b. of 4.0 inches.

Stand-size class

Large saw timber.--Stands having a minimum net volume of 1500 board feet per acre in saw-timber trees, with more than half of this volume in trees 15.0 inches d.b.h. and larger.

Small saw timber.--Stands having a net volume of 1500 board feet per acre in saw-timber trees, with at least half of this volume in trees smaller than 15.0 inches d.b.h.

Pole timber.--Stands with less than 1500 net board feet per acre but at least 10 percent stocked with pole-timber and larger trees and with at least half the minimum stocking in pole-timber trees.

Seedlings and saplings.--Stands not qualifying either for saw timber or pole timber but having at least 300 seedlings and saplings of commercial species per acre.

Nonstocked.--Commercial forest land not qualifying for any other class.

Hardwood log grades[4/]

Grade 1.--Butt logs at least 14.0 inches (upper logs at least 16 inches) in diameter inside bark at the small end. Minimum length of butt logs is 10 feet; 8 feet for upper logs. Five-sixths of the surface on the three best faces must be clear of defect. Two clear cuttings are allowed on any face, but the minimum length of cuttings is 7 feet for butt logs and 5 feet for upper logs. Cull deductions including sweep cannot exceed 25 percent for butt logs and 40 percent for upper logs. Such logs will normally yield at least 65 percent No. 1 common and better lumber.

Grade 2.--Logs at least 12 inches in diameter inside bark at the small end. Minimum length is 8 feet. Two-thirds of the surface on the three best faces must be clear of defect. Three clear cuttings are allowed on any face, but

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4/ The hardwood log grades used are essentially those published as "Interim Sawlog Grades for Southern Hardwoods," by C. R. Lockard and R. D. Carpenter, Southern Forest Experiment Station, 1946. Persons interested in detailed specifications should consult this publication.

the minimum length of cuttings is 3 feet. Cull deductions including sweep cannot exceed 50 percent. Such logs for most species will normally yield more than 40 percent No. 1 common and better lumber.

Grade 3.--Logs at least 8 inches in diameter inside bark at the small end. Minimum length is 8 feet. Minimum standards require that these logs be at least 50 percent sound and qualify at least for manufacture of local-use lumber or railroad ties and timbers. Such logs for most species in Kentucky will normally yield 20 to 25 percent No. 1 common and better lumber.

## SPECIES LISTED

### Softwoods

| | |
|---|---|
| Shortleaf pine includes: | |
| Shortleaf pine | - *Pinus echinata* |
| Pitch pine | - *Pinus rigida* |
| White pine | - *Pinus strobus* |
| Virginia pine | - *Pinus virginiana* |
| Other softwoods include: | |
| Cypress | - *Taxodium distichum* |
| Redcedar | - *Juniperus virginiana* |
| Hemlock | - *Tsuga canadensis* |

### Hardwoods

| | |
|---|---|
| Post oak group includes: | |
| Post oak | - *Quercus stellata* |
| Swamp white oak | - *Quercus bicolor* |
| Swamp chestnut oak | - *Quercus prinus* |
| Overcup oak | - *Quercus lyrata* |
| Bur oak | - *Quercus macrocarpa* |
| Chinquapin oak | - *Quercus muehlenbergii* |
| Chestnut oak | - *Quercus montana* |
| White oak | - *Quercus alba* |
| Black oak includes: | |
| Black oak | - *Quercus velutina* |
| Scarlet oak | - *Quercus coccinea* |
| Northern red oak includes: | |
| Northern red oak | - *Quercus borealis* |
| Swamp red oak | - *Quercus falcata* var. *pagodaefolia* |
| Other red oaks include: | |
| Southern red oak | - *Quercus falcata* |
| Pin oak | - *Quercus palustris* |
| Willow oak | - *Quercus phellos* |
| Water oak | - *Quercus nigra* |
| Shingle oak | - *Quercus imbricaria* |
| Hickory | - *Carya* spp. |
| Elm | - *Ulmus* spp. |
| Soft maple includes: | |
| Red maple | - *Acer rubrum* |
| Silver maple | - *Acer saccharinum* |
| Boxelder | - *Acer negundo* |
| Sugar maple | - *Acer saccharum* |
| Sycamore | - *Platanus occidentalis* |
| Ash | - *Fraxinus* spp. |
| Yellow-poplar | - *Liriodendron tulipifera* |

| | |
|---|---|
| Basswood | - *Tilia* spp. |
| Cottonwood | - *Populus deltoides* |
| Sweetgum | - *Liquidambar styraciflua* |
| Blackgum | - *Nyssa sylvatica* |
| Blackgum (swamp) | - *Nyssa aquatica* |
| Beech | - *Fagus grandifolia* |
| Black walnut | - *Juglans nigra* |

Other hardwoods - include all other commercial hardwood species.

Noncommercial species include species that do not normally have commercial value such as hawthorn, redbud, hornbeam, hophornbeam, alder, and serviceberry.

TERRITORY SERVED BY THE

CENTRAL STATES FOREST EXPERIMENT STATION

FOREST SERVICE

U. S. DEPARTMENT OF AGRICULTURE