



# FORESTS OF Kentucky, 2012

This resource update provides an overview of forest resource attributes for the Commonwealth of Kentucky based on an annual inventory conducted by the Forest Inventory and Analysis (FIA) Program at the Southern Research Station of the Forest Service, U.S. Department of Agriculture in cooperation with the Kentucky Department of Natural Resources Division of Forestry. These estimates, along with Web-posted supplemental tables, will be updated annually. For more information regarding past inventory reports for this State, inventory program information, field sampling methodology, and estimation procedures, please refer to the citations at the end of this report. The estimates presented in this update are for the measurement year 2012 with comparisons made to data reported in 2011. The sample plot population in Kentucky consists of 4,357 plots of which 2,469 contained a forested condition, collected across a period of 5 years. Growth, removals, and mortality (GRM) estimates are based solely on remeasured plots. Approximately 98.5 percent (2,433 plots) of forested plots

were measured previously with an average of a 5-year remeasurement period. The data used in this publication were accessed from the FIA database (FIADB) at <http://fia.fs.fed.us/tools-data/> in September of 2014.

## Overview

Kentucky forest resources have changed very little since the 2011 annual inventory. In 2012, Kentucky forests accounted for an estimated 12.5 million acres (table 1) of which 12.3 million acres (99 percent) are considered available for timber production (timberland). Approximately 7.0 billion live trees are estimated to be growing in Kentucky forests. Contained in those trees  $\geq 5$  inches diameter at breast height (d.b.h.), there is over 25 billion cubic feet of wood volume in the State's forests. Average annual net growth and removals have both declined since 2011, while mortality has increased (table 1).

Table 1—Kentucky forest statistics, sampling error, and change between 2011 and 2012

Forest statistics	2012 estimate	Sampling error (percent)	Change since 2011 (percent)
<b>Forest land estimates</b>			
Area (acres)	12,510,090	0.80	0.31
Number of live trees $\geq 1$ inch d.b.h. (trees)	7,264,360,597	1.48	1.84
Net volume of live trees $\geq 5$ inches d.b.h. (cubic feet)	25,094,954,131	1.39	1.53
Net volume of growing stock trees (cubic feet)	21,454,896,103	1.51	1.81
All live tree aboveground biomass $\geq 1$ inches d.b.h. (oven-dry short tons)	669,017,945	1.28	1.45
Annual net growth of live trees $\geq 5$ inches d.b.h. (cubic feet per year)	556,610,944	3.53	-6.66
Annual removals of live trees $\geq 5$ inches d.b.h. (cubic feet per year)	236,370,032	8.33	-20.36
Annual mortality of live trees $\geq 5$ inches d.b.h. (cubic feet per year)	259,976,412	4.25	5.70
<b>Timberland estimates</b>			
Area (acres)	12,301,490	0.85	0.04
Number of live trees $\geq 1$ inch d.b.h. (trees)	7,172,417,785	1.52	1.66
Net volume of live trees $\geq 5$ inches d.b.h. (cubic feet)	24,525,147,252	1.42	1.01
Net volume of growing stock trees (cubic feet)	20,921,270,204	1.54	1.27
All live tree aboveground biomass $\geq 1$ inches d.b.h. (oven-dry short tons)	468,632,855	1.42	1.50
Annual net growth of live trees $\geq 5$ inches d.b.h. (cubic feet per year)	549,880,161	3.57	-13.03
Annual removals of live trees $\geq 5$ inches d.b.h. (cubic feet per year)	236,826,062	8.32	-21.51
Annual mortality of live trees $\geq 5$ inches d.b.h. (cubic feet per year)	254,956,658	4.31	6.50



# Forest Area

In 2012, forest land in the State of Kentucky (fig. 1) covered an estimated 12.5 million acres. The Kentucky landscape has remained >45 percent forested for approximately the past 50 years. In fact, forest land has increased over that time period (fig. 2) from an estimate of 11.7 million acres in 1963 to the 2012 estimate of 12.5 million acres, an increase of nearly 7 percent. Essentially, while small fluctuations have occurred over the last 5 decades, Kentucky forests are more plentiful today than they were in the 1960s. Since the 1988 inventory, there has been very little change in any region.

While the Pennyroyal unit contained the greatest acreage of forest land, the three most eastern units (Eastern, Southern Cumberland, and Northern Cumberland) were more densely forested with >75 percent of each Unit being forested (fig. 3). The Bluegrass, Western Coalfield, and Western Units had similar proportions of forest land as compared to nonforest land (32-33 percent). The Western unit contained the fewest forested acres of any with an estimated 718,000 acres of forest land. Eastern Kentucky has consistently remained more heavily forested than the western portion of the State, which has a higher concentration of agricultural lands.

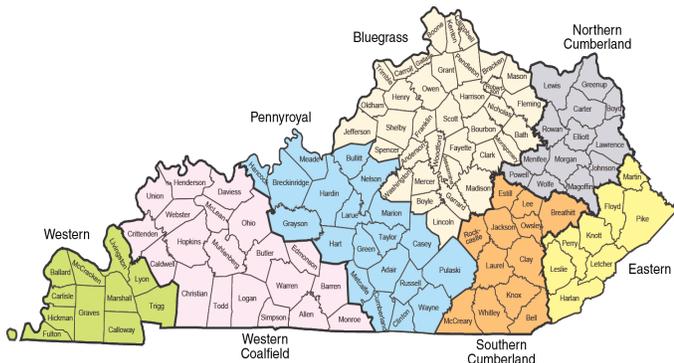


Figure 1—Counties and forest survey units in Kentucky.

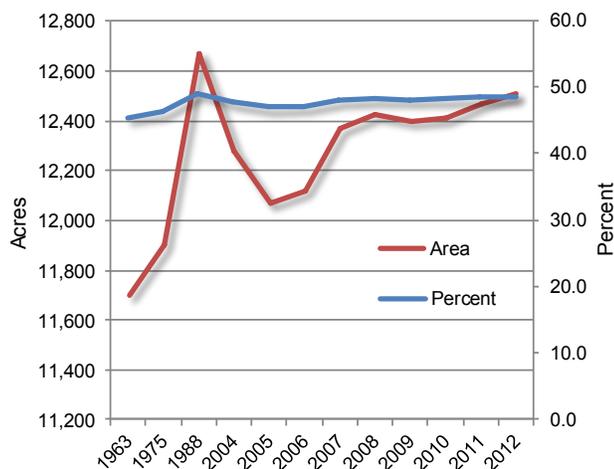


Figure 2—Forest land area in Kentucky, 1963–2012.

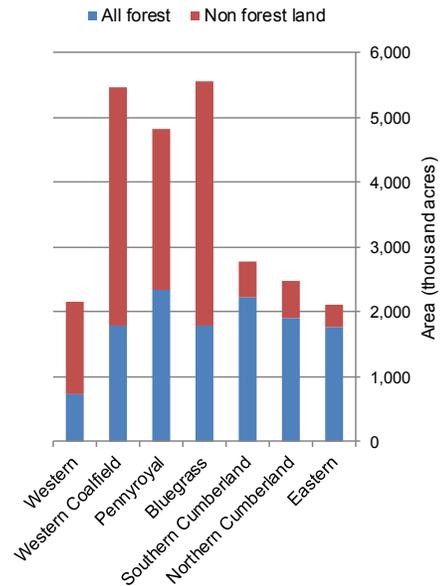


Figure 3—Forest land and nonforest land area in Kentucky by survey unit, 2012.

In 2012, the oak-hickory forest-type group was found on an estimated 9.5 million acres, or greater than three-fourths of all forests across the State (fig. 4). The maple-beech-birch forest-type group was the second largest group with an estimated 1.1 million acres distributed across Kentucky. The elm-ash-cottonwood and oak-pine forest-type groups were found on 732,000 and 550,000 acres, respectively.

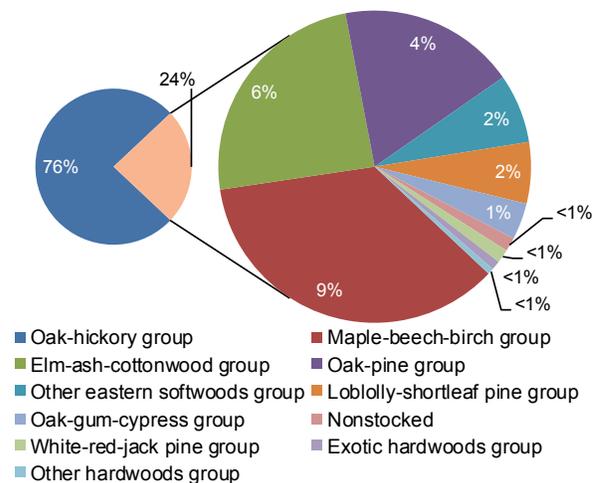


Figure 4—Proportion of forest land area by forest-type group, Kentucky, 2012.

## Volume, Biomass, and Trends

Over 100 different species were observed and measured during the 2012 inventory of Kentucky forests. The most common tree species in 2012, ranked by the estimated size of the population (number of trees) across all forest land in Kentucky, was red maple (table 2). Red maple accounted for over 12 percent of all trees in Kentucky forests. Sugar maple accounted for 9.4 percent of all trees on forest land in the Commonwealth, and yellow-poplar, the State tree, was the third most common tree species with an estimated 471 million trees. All oak species combined accounted for nearly 10 percent (712 million trees) of all trees across Kentucky. While red and sugar maples were the two most common tree species observed, a greater proportion of those populations was found in lower crown positions. In contrast, the populations of all oak species combined and yellow-poplar were represented by greater numbers of trees in dominant and codominant positions within the forest canopy.

If you were to rank the importance of tree species in Kentucky by standing volume (trees >5 inches d.b.h.), yellow-poplar would rank as the most important tree in the 2012 inventory; it represents nearly 12 percent of all standing tree volume in forests of Kentucky in 2012. White oak is the second most voluminous species, and as a result, the select white oak group contains more volume than any other species group (table 3). Select white oaks account for 13 percent of all volume in trees ≥5 inches d.b.h. Yellow-poplar and hickories are the second and third largest groups in terms of volume, respectively. In terms of both estimated population and estimated standing volume, 18 of the top 20 species are hardwood species. Only eastern redcedar and Virginia pine are found on each list. Kentucky has long been considered a State where hardwoods are the predominate forest; these results indicate that is still the case.

**Table 2—Number of live trees (≥1 inch d.b.h./d.r.c.), in trees, on forest land, Kentucky, 2012**

Species	Total
Red maple	885,211,257
Sugar maple	681,501,398
Yellow-poplar	471,100,236
American beech	407,118,482
Eastern redcedar	362,228,830
Blackgum	291,156,669
Sourwood	263,542,795
Eastern redbud	254,660,360
Flowering dogwood	246,288,199
Sassafras	214,985,092
All species	7,264,360,596

**Table 3—Net volume of live trees (≥5 inch d.b.h./d.r.c.), in trees, on forest land for top 10 species groups, Kentucky, 2012**

Species	Total
Select white oaks	3,143,290,624
Yellow-poplar	2,987,573,248
Hickory	2,535,881,216
Other red oaks	2,151,565,056
Other eastern soft hardwoods	1,979,414,272
Other white oaks	1,890,435,456
Soft maple	1,646,255,104
Hard maple	1,538,344,192
Ash	1,212,840,960
Select red oaks	1,159,223,552
All species groups	25,094,955,008

In 2012, there was an estimated 25.1 billion cubic feet of standing tree wood volume distributed across Kentucky forests. Approximately 98 percent of that volume was found on timberland and classified as available as harvestable material (located on timberland, forest land available for timber production). Of the 24.5 billion cubic feet of wood located on timberland in Kentucky, a little over half (13.7 billion cubic feet) was observed as within the saw-log portion of sawtimber trees. An overwhelming 94 percent of the standing sawtimber volume in Kentucky is represented by hardwood species. Pine species and other softwood species accounted for only 6 percent of the total saw-log volume. Select white oaks accounted for the greatest saw-log volume on timberland across all species groups.

Where tree grade was collected, grade 3 tree volume (saw-log portion) made up the largest grade class across and within all major species groups on Kentucky timberland. Grade 1 tree volume accounted for 23 percent of graded trees in the other softwoods species group. Volume in grade 1 trees accounted for 12, 15, and 10 percent of the saw-log volume in the pine, soft hardwood, and hard hardwood species groups, respectively. Volume in trees grade 3 and below, particularly hardwood trees, has been increasing recently as volume in grade 1 trees has been declining. A decline in high-quality hardwood stems is of particular concern in States like Kentucky, where quality hardwood material is so important to the State and local economies.

# The White Oak Resource in Kentucky

White oak is an extremely important resource in forests of Kentucky. Not only does white oak have the greatest volume of all tree species within the State, Kentucky contains 14 percent of the entire white oak resource located within all Southern States. White oak is just outside of the top 10 most numerous tree species (table 2) with an estimated 196 million trees distributed across the State. Moreover, white oak is the primary species that comprises the select white oak group which contains the greatest volume of wood in Kentucky (table 3). White oak can be found in forests across the State (fig. 5), with a limited occurrence in the Bluegrass unit located around Lexington (fig. 1). The Bluegrass unit is one of the least forested in the State (fig. 3). While white oak is found throughout the State, the highest concentrations of white oak basal area are located in the East (fig. 5)—the Northern and Southern Cumberland units and the Eastern unit.

The white oak and white oak-red oak-hickory forests types have long accounted for a significant portion of Kentucky forests (fig. 6). In 2012, these two forest types were found on

an estimated 4.2 million acres of timberland (34 percent of all timberland in the State). An estimated 89 percent of timberland acreage in these two forest types is found on private land. The fact that white oak is an extremely valuable forest resource, coupled with large acreage and volumes on private land within the State, suggests that the white oak resource in Kentucky is of considerable importance to the Kentucky economy and therefore deserves attention now and in the future. While it is encouraging that the volume of select white oaks has been increasing recently (fig. 7), it is somewhat concerning that the quality of that resource appears to be declining. The proportion of select white oak volume found in grade 1 logs has declined from 15 to 10 percent from 2004 to 2012, while the volume in below-grade logs has increased the same amount from 9 to 14 percent. It is important to note, however, that the FIA grade variable is subject to additional sampling error due to the subjectivity of grading standing trees. The estimates are probably a reflection of both real change and sampling error.

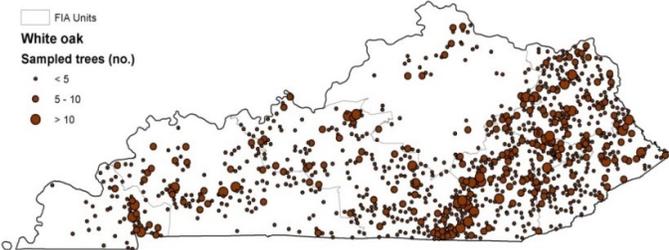


Figure 5—Geographic distribution of sampled white oak trees, Kentucky, 2012.

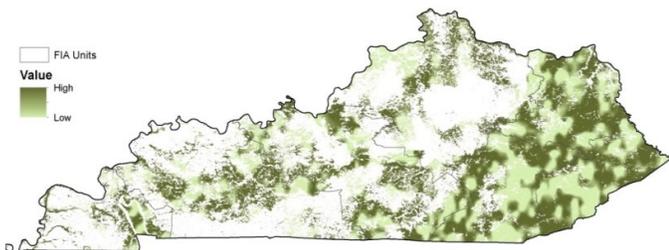


Figure 6—Density of white oak basal area, Kentucky, 2012.

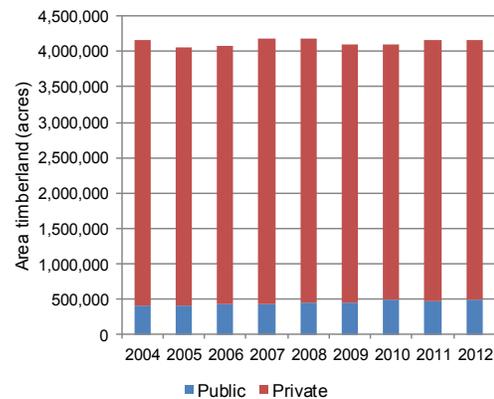


Figure 7—Estimate of timberland area of white oak and white oak-red oak-hickory forest types combined by broad ownership in Kentucky, 2004–12.

Note: These data were accessed and compiled from the FIA Database (FIADB) in September of 2014. Publicly available data from the FIADB are regularly updated when data collection and/or processing anomalies are found and corrected. Additionally, new data are added on a regular basis which may be reflected by small changes in the past or current estimates.

### How to Cite This Publication

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