



# Kentucky, 2011

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## FOREST INVENTORY & ANALYSIS FACTSHEET



Cumberland Falls. (photo by Chris Kuehl, Wikimedia.org)

This science 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 United States Department of Agriculture Forest Service in cooperation with the Kentucky Department of Natural Resources Division of Forestry. These annual 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.

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### Annual Update

Kentucky forest resources have changed very little since the previous annual inventory in 2010. In 2011, 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, nearly 1,600 trees for every person living in the State. Contained in those trees  $\geq 5$  inches diameter at breast height (d.b.h.), there is over 24.7 billion cubic feet of wood volume in the State's forests. Average annual net growth and removals have both declined since 2010 while mortality has increased (table 1).

**Table 1—Kentucky forest statistics, associated sampling error, and change between 2010 and 2011**

Forest statistics	2011 estimate	Sampling error	Change since 2010	Forest statistics	2011 estimate	Sampling error	Change since 2010
			---- percent ----				---- percent ----
<b>Forest land estimates</b>				<b>Timberland estimates</b>			
Area (acres)	12,471,761	0.83	0.49	Area (acres)	12,296,618	0.87	0.64
Number of live trees $\geq 1$ -inch diameter (trees)	7,133,017,367	1.51	1.93	Number of live trees $\geq 1$ -inch diameter (trees)	7,055,190,605	1.54	2.13
Net volume in live trees $\geq 5$ inches diameter (ft <sup>3</sup> )	24,716,595,016	1.43	0.69	Net volume in live trees $\geq 5$ inches diameter (ft <sup>3</sup> )	24,278,925,806	1.46	0.86
Net volume of growing-stock trees (ft <sup>3</sup> )	21,074,130,570	1.56	0.15	Net volume of growing-stock trees (ft <sup>3</sup> )	20,658,917,669	1.59	0.32
All-live tree aboveground biomass $\geq 1$ -inch diameter (oven-dry short tons)	659,466,966	1.32	0.62	All-live tree aboveground biomass $\geq 1$ -inch diameter (oven-dry short tons)	648,569,504	1.35	0.77
Annual net growth of live trees $\geq 5$ inches (ft <sup>3</sup> /year)	596,333,898	3.10	-10.01	Annual net growth of live trees $\geq 5$ inches (ft <sup>3</sup> /year)	632,228,515	3.50	-8.42
Annual removals of live trees $\geq 5$ inches (ft <sup>3</sup> /year)	296,791,829	7.92	-9.36	Annual removals of live trees $\geq 5$ inches (ft <sup>3</sup> /year)	301,737,682	7.87	-9.23
Annual mortality of live trees $\geq 5$ inches (ft <sup>3</sup> /year)	245,954,011	4.36	7.46	Annual mortality of live trees $\geq 5$ inches (ft <sup>3</sup> /year)	239,386,949	4.44	7.54



# KENTUCKY, 2011

## Forest Extent

In 2011, forest land in the State of Kentucky covered an estimated 12.5 million acres. The Kentucky landscape has remained  $\geq 45$  percent forested for approximately the past 50 years. In fact, forest land has been increasing over that time period (table 2). From an estimate of 11.7 million acres in 1963 to the 2011 estimate of 12.5 million acres, forest land has increased 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 (fig. 1).

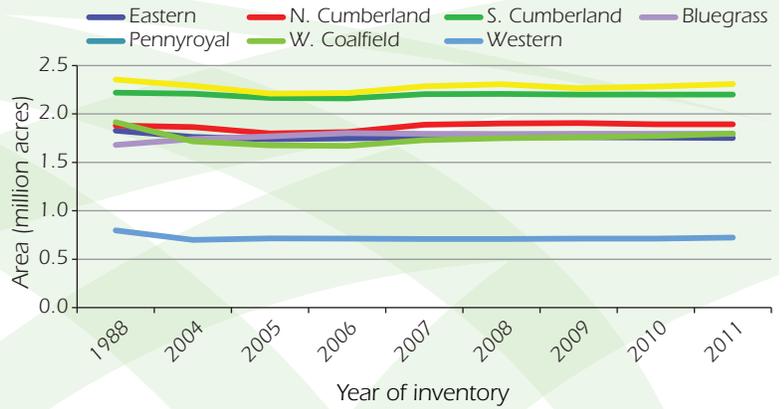


Figure 1—Area of forest land for each FIA unit in Kentucky for the 1988 and 2004–11 inventories.

**Table 2—Area of forest land for the State of Kentucky for the periodic inventories conducted prior to the year 2000 and the annual inventories of 2004 and 2011**

Year	Forest land	
	thousand acres	percent <sup>a</sup>
1963	11,700	45.2
1975	11,900	46.0
1988	12,675	49.0
2004	12,283	47.5
2005	12,071	46.7
2006	12,121	46.9
2007	12,369	47.8
2008	12,426	48.0
2009	12,401	47.9
2010	12,411	48.0
2011	12,472	48.2

<sup>a</sup>Based on the current U.S. Census Bureau estimate of 25.9 million acres of land in Kentucky.

## Forest Land Ownership

Kentucky forests are largely held within private ownerships across the State. In fact, 89 percent of all forest land in Kentucky, or 11.0 million acres, is privately owned (fig. 2). Approximately 9 percent or 1.2 million acres is Federally owned and managed. The remaining 2 percent of forest land across Kentucky is owned by State and local governments.

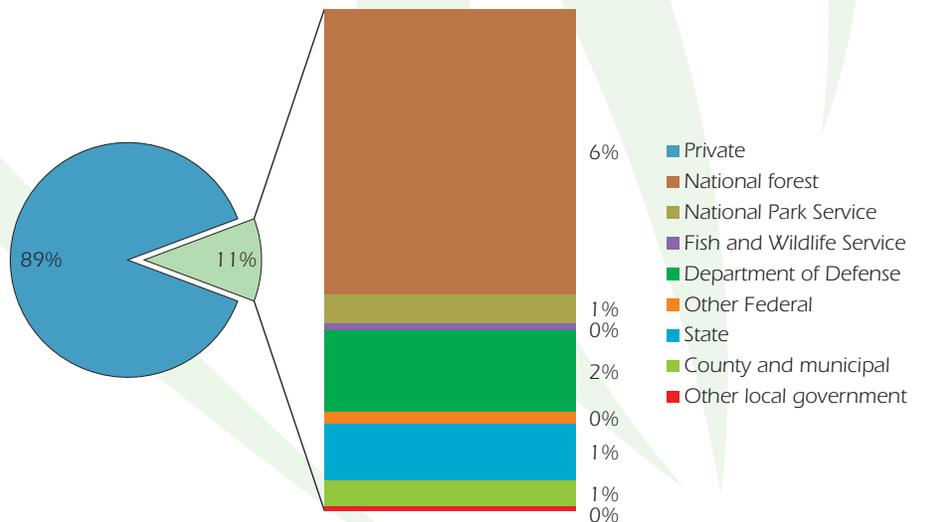


Figure 2—Area of forest land by ownership, Kentucky, 2011.

Elk grazing in Cataloochee, in the Great Smoky Mountains of North Carolina. Elk were reintroduced into the Smokies in February of 2001, when 25 elk were moved from Land Between the Lakes in Kentucky to Cataloochee. (photo by Brian Stansberry, Wikimedia.org)



## Common Trees

The most common tree species in 2011, ranked by the estimated size of the population (number of trees) across all forest land in Kentucky was red maple (table 3). Red maple accounted for over 12 percent of all trees in Kentucky forests. Sugar maple accounted for 9.2 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 451 million trees. All oak species combined accounted for nearly 8 percent (564 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 were found in lower crown positions (fig. 3). 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  $\geq 5$  inches d.b.h.), yellow-poplar would rank as the most important tree (table 4) in the 2011 inventory. Yellow-poplar represented nearly 12 percent of all standing tree volume in forests of Kentucky in 2011. White oak, chestnut oak, and sugar and red maple followed in importance. Since yellow-poplar is third on the list of tree population (table 3) and first on the list of volume (table 4), this indicates that yellow-poplar was represented by fewer but larger specimens. Conversely, these results suggest that red maple, while numerous, was generally represented by smaller trees when found and coincides with the fact that a large number of red maple stems are in overgrown or suppressed canopy positions (fig. 3).

In terms of both estimated population and estimated standing volume, 18 of the top 20 species are hardwood species. Eastern redcedar and Virginia pine are the only softwoods 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 3—The 20 most common trees (ranked by estimated number of trees  $\geq 1.0$ -inch d.b.h.) on forest land, Kentucky, 2011**

Species	Trees	
	-- number --	percent
Red maple	868,739,575	12.2
Sugar maple	656,834,518	9.2
Yellow-poplar	450,760,983	6.3
American beech	382,453,476	5.4
Eastern redcedar	362,055,857	5.1
Blackgum	279,790,038	3.9
Flowering dogwood	262,210,828	3.7
Sourwood	258,623,027	3.6
Eastern redbud	247,296,318	3.5
Sassafras	218,078,005	3.1
White oak	187,164,765	2.6
Winged elm	139,589,483	2.0
Chestnut oak	137,215,827	1.9
White ash	128,927,790	1.8
Green ash	128,925,360	1.8
Virginia pine	128,332,603	1.8
Pignut hickory	127,477,625	1.8
Sweetgum	112,374,579	1.6
Black cherry	105,585,156	1.5
Slippery elm	100,662,318	1.4

d.b.h. = diameter at breast height.

**Table 4—The 20 most common trees (ranked by standing live volume of all trees  $\geq 5.0$ -inch d.b.h.) on forest land, Kentucky, 2011**

Species	Live volume		Saw-timber percent
	-- cubic feet --	---	
Yellow-poplar	2,901,555,761	11.7	79.5
White oak	2,684,090,069	10.9	85.4
Chestnut oak	1,634,548,234	6.6	84.2
Sugar maple	1,504,827,297	6.1	58.4
Red maple	1,393,718,817	5.6	54.4
Pignut hickory	1,077,304,829	4.4	74.3
American beech	1,072,108,994	4.3	83.0
Black oak	950,109,958	3.8	89.7
Northern red oak	895,328,320	3.6	87.6
Scarlet oak	833,981,498	3.4	86.3
White ash	675,615,465	2.7	71.9
Mockernut hickory	604,562,691	2.4	69.6
American sycamore	544,230,370	2.2	84.8
Eastern redcedar	530,998,823	2.1	55.9
Green ash	484,360,779	2.0	68.4
Sweetgum	418,450,817	1.7	69.7
Virginia pine	399,748,269	1.6	78.5
Shagbark hickory	390,174,863	1.6	69.5
Chinkapin oak	355,515,048	1.4	69.3
Blackgum	349,074,455	1.4	60.0

d.b.h. = diameter at breast height.

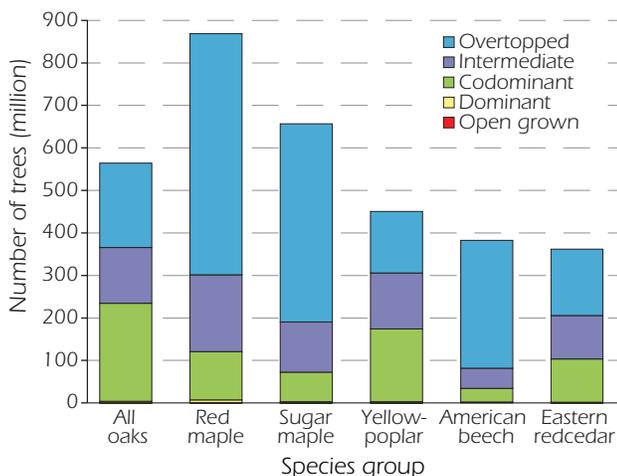


Figure 3—Number of trees by species group and crown class, Kentucky, 2011.

# KENTUCKY, 2011

## Forest Land Composition

In 2011, the oak-hickory forest-type group represented greater than three-fourths of all forests across the Commonwealth with 9.4 million acres (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 722,000 and 563,000 acres, respectively.

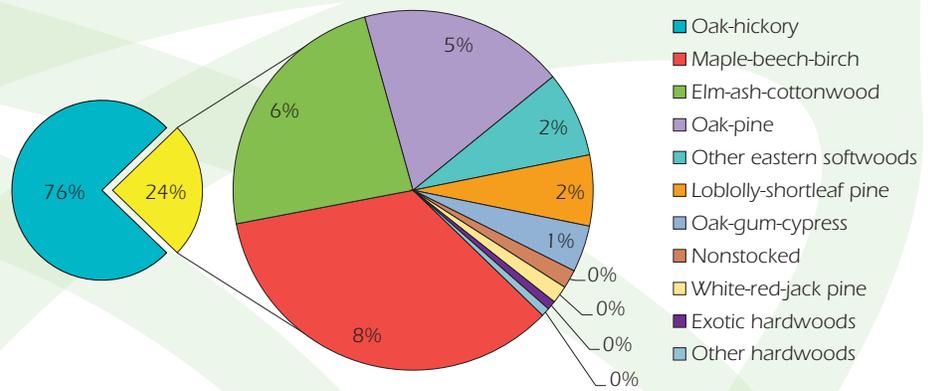


Figure 4—Area of forest land by forest-type group, Kentucky, 2011.

## Inventory Volume

In 2011 there was an estimated 24.7 billion cubic feet of standing tree wood volume distributed across Kentucky forests. An overwhelming 93 percent of the standing volume in Kentucky is represented by hardwood species. Pine species and other softwood species accounted for only 7 percent of the total standing tree wood volume. Select white oaks accounted for the greatest live tree volume on forest land across all species groups (fig. 5). Yellow-poplar accounted for the greatest sawtimber volume (board feet) on timberland (forest land available for timber production) across Kentucky (fig. 6).



Land between lakes. (Wikimedia.org)

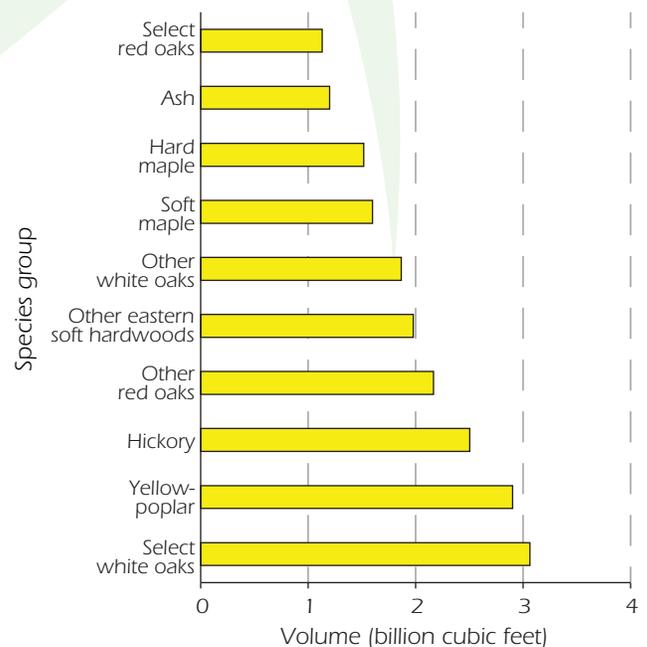


Figure 5—Standing live-tree volume (≥5.0 inches d.b.h.) for the top 10 species groups on forest land, Kentucky, 2011.

## Stand Origin

In 2011, only 0.5 percent (66,000 acres) of forests across the State were of artificial origin (planted). Ninety-nine percent of all forests in the State originated through natural reproduction (fig. 8). The number of acres observed by FIA as originating from planting activity has been declining in recent years. For the 1988 inventory it was estimated that 1.2 percent of forest land in Kentucky was planted.



Figure 8—Area of forest land with clear evidence of artificial regeneration (planted) by year, Kentucky.

## Average Annual Net Growth, Removals, and Mortality

Average annual net growth and removals of all-live volume on forest land have both declined since 2010 (table 1). Average annual net growth (gross growth minus mortality) declined an estimated 10 percent and average annual removals declined 9 percent. Average annual mortality increased approximately 7 percent from 2010 to 2011.

### Net Growth ( $ft^3/year$ )

- Total = 632,228,515
- Pines = 12,723,712
- Other softwoods = 29,543,773
- Soft hardwoods = 233,084,838
- Hard hardwoods = 356,876,192

### Mortality ( $ft^3/year$ )

- Total = 245,954,011
- Pines = 26,026,676
- Other softwoods = 5,078,308
- Soft hardwoods = 73,784,744
- Hard hardwoods = 141,064,283

### Removals ( $ft^3/year$ )

- Total = 296,791,830
- Pines = 17,738,166
- Other softwoods = 4,066,562
- Soft hardwoods = 80,937,440
- Hard hardwoods = 194,049,663

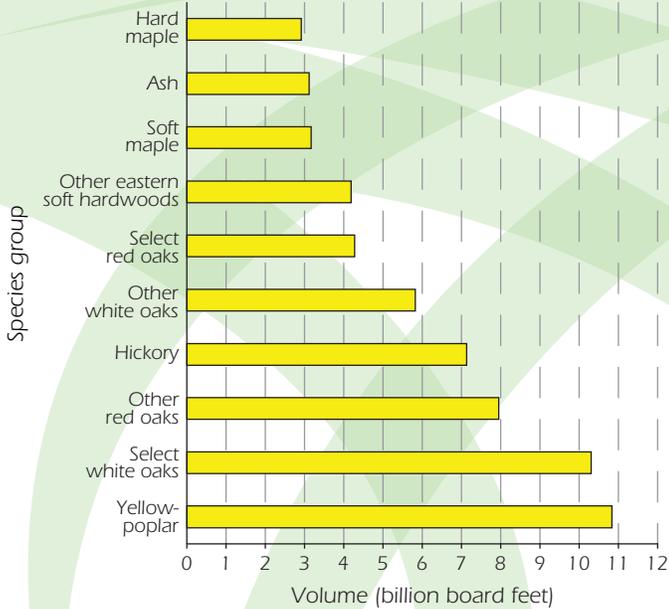


Figure 6—Sawtimber tree volume (≥5.0 inches d.b.h.) for the top 10 species groups on timberland, Kentucky, 2011.

Where tree grade was collected, grade 3 tree volume (saw-log portion) comprised the largest grade class across and within all major species groups (fig. 7) on Kentucky timberland. Grade 1 tree volume accounted for 21 percent of graded trees in the other softwoods species group. Volume in grade 1 trees accounted for 12, 14, 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.

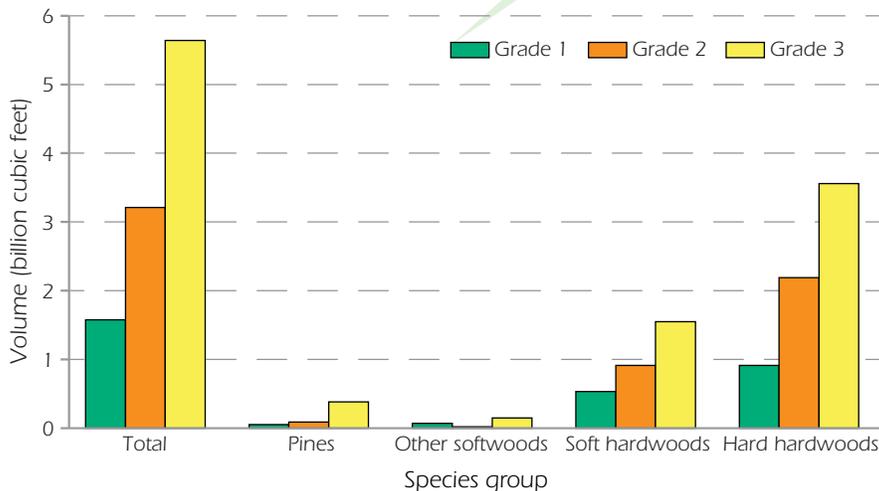


Figure 7—Net volume of the saw-log portion of sawtimber trees by tree grade and species group on timberland, Kentucky, 2011.

## FIA Program Information

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Note: This data was accessed and compiled from the FIA Database (FIADB) on January 28, 2013. Publicly available data from the FIADB is 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.



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Wet wooden post. (photo by Heather Moreton,  
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