Kentucky, 2010

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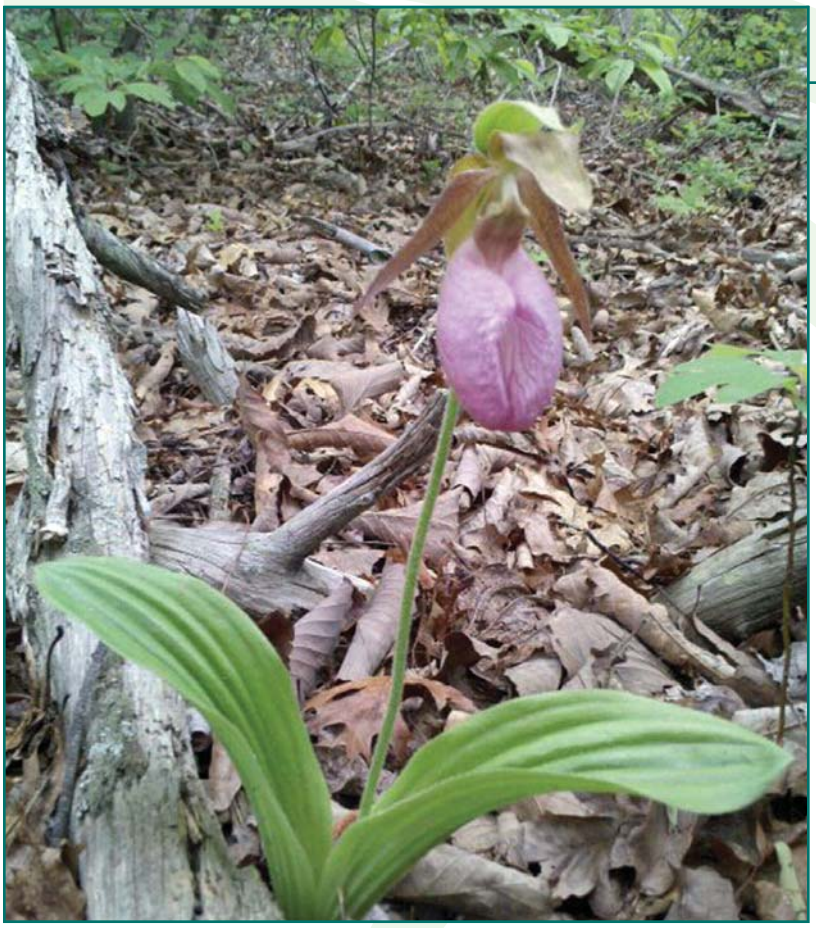
Forest Inventory & Analysis Factsheet

FIA
The Nation's Forest Census



Pink ladyslipper. (photo by Ross Helm)

This publication 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 U.S. Department of Agriculture Forest Service 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 Kentucky, inventory program information, field sampling methodology, and estimation procedures, please refer to the additional information at the end of this report.

Annual Update

Kentucky forest resources have changed very little since the previous annual inventory. In 2010, Kentucky forests accounted for an estimated 12.4 million acres (table 1). 12.2 million acres (98 percent) are considered available for timber production (timberland). About 7 billion live trees are estimated to be growing in Kentucky forests, nearly 1,600 trees for every person living in the State. Including all of the trees in the State >5.0 inches diameter at breast height (d.b.h.), Kentucky's forests contain over 24.5 billion cubic feet of wood volume. There has been little to no change in estimates of average annual mortality and removals on forest land, while average annual net growth on forest land has declined 6 percent between 2009 and 2010 (table 1).

Table 1—Kentucky forest statistics, associated sampling error, and change between 2009 and 2010

Forest statistics	2010 estimate	Sampling error	Change since 2009	Forest statistics	2010 estimate	Sampling error	Change since 2009
		---- *percent* ----				---- *percent* ----	
Forest land estimates				**Timberland estimates**			
Area (*acres*)	12,410,918	0.84	0.08	Area (*acres*)	12,217,967	0.88	0.14
Number of live trees ≥1-inch diameter (*trees*)	6,998,069,387	1.53	0.48	Number of live trees ≥1-inch diameter (*trees*)	6,908,337,134	1.53	0.53
Net volume in live trees ≥5 inches diameter (ft^3)	24,547,182,592	1.43	1.20	Net volume in live trees ≥5 inches diameter (ft^3)	24,071,944,717	1.46	1.25
Net volume of growing-stock trees (ft^3)	21,042,165,322	1.56	1.32	Net volume of growing-stock trees (ft^3)	20,593,668,096	1.59	1.36
All-live tree and sapling aboveground biomass (*oven-dry short tons*)	655,415,828	1.33	0.88	All-live tree and sapling aboveground biomass (*oven-dry short tons*)	643,584,868	1.36	0.92
Annual net growth of live trees ≥5 inches (ft^3/*year*)	662,657,572	2.86	-5.63	Annual net growth of live trees ≥5 inches (ft^3/*year*)	690,371,230	3.11	-5.37
Annual removals of live trees ≥5 inches (ft^3/*year*)	327,455,496	7.78	1.72	Annual removals of live trees ≥5 inches (ft^3/*year*)	332,425,893	7.73	0.60
Annual mortality of live trees ≥5 inches (ft^3/*year*)	228,888,274	4.70	2.28	Annual mortality of live trees ≥5 inches (ft^3/*year*)	222,602,023	4.79	2.16

U.S. Department of Agriculture
Forest Service
Southern Research Station
e–Science Update SRS–057
July 2012
www.srs.fs.usda.gov

Forest Extent

In 2010, forest land in the State of Kentucky covered an estimated 12.4 million acres. The Kentucky landscape has remained ≥45 percent forested for about the past 50 years. In fact, forest land has been increasing over that time period (table 2). From an estimate in 1963 of 11.7 million acres to the 2010 estimate of 12.4 million acres, forest land has increased 6 percent. Essentially, while small fluctuations in area have occurred over the last 5 decades, there is more forest land in the State now than there was in the 1960s. Since the 1988 inventory, there has been very little change in any region (fig. 1).

Table 2—Area of forest land by year, Kentucky

Year	Forest land		Year	Forest land	
	thousand acres	*percent*[a]		*thousand acres*	*percent*[a]
1963	11,700	45.2	2006	12,121	46.9
1975	11,900	46.0	2007	12,369	47.8
1988	12,675	49.0	2008	12,426	48.0
2004	12,283	47.5	2009	12,401	47.9
2005	12,071	46.7	2010	12,411	48.0

[a] Based on the current U.S. Census Bureau estimate of 25.9 million acres of land in Kentucky.

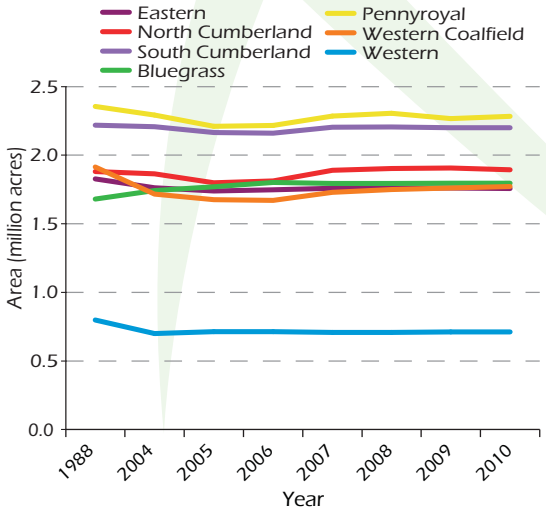


Figure 1—Area of forest land by year and survey unit, Kentucky.

Common Trees

The most common tree species in 2010, 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 12.2 percent of all trees in Kentucky forests. Sugar maple accounted for 9.3 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 445.0 million trees.

Red maple was the most common tree species in the Eastern, Northern Cumberland, and Southern Cumberland FIA units in 2010 (table 4). In the Pennyroyal and Western Coalfield units the most common tree species was sugar maple, while eastern redcedar and winged elm were observed as the most common tree species in the Bluegrass and Western FIA units.

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 (table 5) in the 2010 inventory. Yellow-poplar represented nearly 12 percent of all standing-tree volume in forests of Kentucky in 2010. White oak, chestnut oak, and sugar and red maple followed in importance. Yellow-poplar is third on the list of tree population (table 3) and first on the list of volume (table 5), indicating 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.

In terms of both estimated population and estimated standing volume, 18 of the 20 top 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 considered the predominate forest; these results indicate that is still the case today.

Forest Land Ownership

Kentucky forests are largely held within private ownerships across the State. In fact, 88 percent of all forest land, or 11.0 million acres, is privately owned (fig. 2). About 10 percent of the forest land, or 1.2 million acres, is federally owned and managed. The remaining 2 percent is owned by State and local governments.

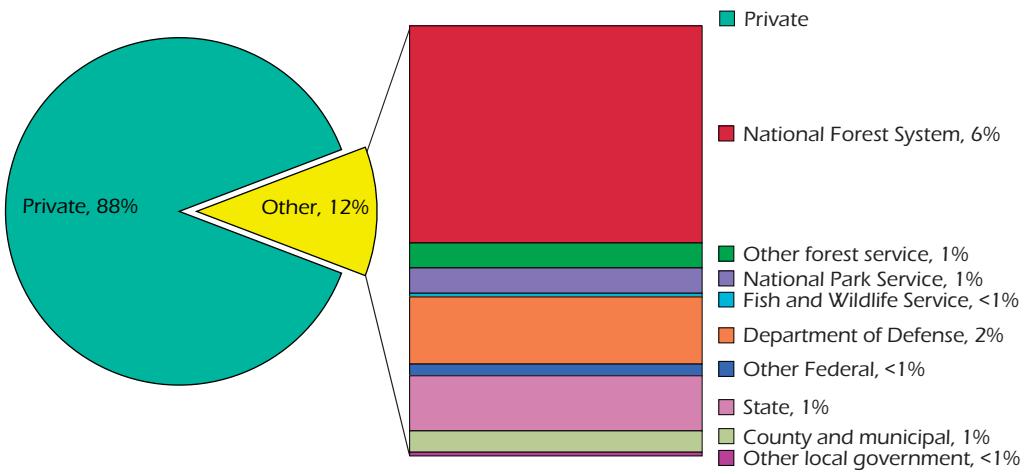


Figure 2—Area of forest land by ownership, Kentucky, 2010.

Table 3—The 20 most common trees (ranked by estimated number of trees ≥1.0-inch d.b.h.) on forest land, Kentucky, 2010

Species	Trees	
	-- number --	percent
Red maple	852,477,416	12.2
Sugar maple	651,724,905	9.3
Yellow-poplar	444,542,823	6.4
American beech	364,990,546	5.2
Eastern redcedar	360,365,749	5.1
Flowering dogwood	272,645,003	3.9
Blackgum	272,295,957	3.9
Sourwood	261,251,283	3.7
Eastern redbud	237,451,560	3.4
Sassafras	219,367,115	3.1
White oak	186,284,124	2.7
Chestnut oak	135,696,005	1.9
Pignut hickory	128,572,197	1.8
Green ash	126,205,502	1.8
Virginia pine	126,174,484	1.8
Winged elm	126,094,583	1.8
White ash	123,012,142	1.8
Sweetgum	109,244,481	1.6
Black cherry	105,659,554	1.5
Mockernut hickory	94,512,096	1.4

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

Table 5—The top 20 trees (ranked by standing-live volume of all trees ≥1.0-inch d.b.h.) on forest land, Kentucky, 2010

Species	Trees	
	-- number --	percent
Yellow-poplar	2,856,297,908	11.6
White oak	2,672,111,868	10.9
Chestnut oak	1,616,702,327	6.6
Sugar maple	1,481,999,465	6.0
Red maple	1,368,502,616	5.6
Pignut hickory	1,089,029,735	4.4
American beech	1,066,950,747	4.3
Black oak	970,163,332	4.0
Scarlet oak	889,773,619	3.6
Northern red oak	887,774,282	3.6
White ash	676,566,665	2.8
Mockernut hickory	594,823,940	2.4
American sycamore	535,620,561	2.2
Eastern redcedar	523,269,855	2.1
Green ash	481,474,779	2.0
Sweetgum	406,625,522	1.7
Virginia pine	394,982,763	1.6
Shagbark hickory	382,200,449	1.6
Chinkapin oak	352,527,477	1.4
Blackgum	346,072,856	1.4

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

Table 4—The 20 most common trees (ranked by estimated number of trees ≥1.0-inch d.b.h.) on forest land, by survey unit and species, Kentucky, 2010

Survey unit and species	Trees		Survey unit and species	Trees	
	-- number --	percent		-- number --	percent
Eastern			Bluegrass (continued)		
Red maple	147,907,777	14.6	White ash	48,773,723	5.4
American beech	91,425,006	9.0	Green ash	39,332,053	4.3
Sugar maple	89,773,665	8.9	Pennyroyal		
Yellow-poplar	79,014,821	7.8	Sugar maple	201,011,712	19.8
Sourwood	65,026,404	6.4	Eastern redcedar	117,570,348	11.6
Northern Cumberland			Yellow-poplar	103,666,578	10.2
Red maple	260,201,868	22.0	Red maple	81,808,804	8.1
Yellow-poplar	100,841,576	8.5	American beech	71,527,787	7.1
Blackgum	78,033,961	6.6	Western Coalfield		
Sourwood	70,275,948	5.9	Sugar maple	109,336,976	12.2
Sugar maple	68,328,479	5.8	Eastern redcedar	67,348,335	7.5
Southern Cumberland			Red maple	58,558,294	6.5
Red maple	269,516,511	19.8	Winged elm	52,580,599	5.9
Yellow-poplar	99,079,268	7.3	Sweetgum	49,686,827	5.6
American beech	97,069,178	7.1	Western		
Sourwood	91,379,442	6.7	Winged elm	29,257,174	9.2
Blackgum	81,894,175	6.0	Sugar maple	22,165,186	7.0
Bluegrass			White oak	15,504,785	4.9
Eastern redcedar	152,491,690	16.7	Blackgum	15,486,721	4.9
Sugar maple	83,615,022	9.2	Green ash	13,529,585	4.3
Hackberry	51,088,739	5.6			

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

Forest Land Composition

In 2010, the oak-hickory forest-type group represented three-fourths of all forests across the Commonwealth with 9.3 million acres (fig. 3). 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 734,700 and 555,900 acres, respectively.

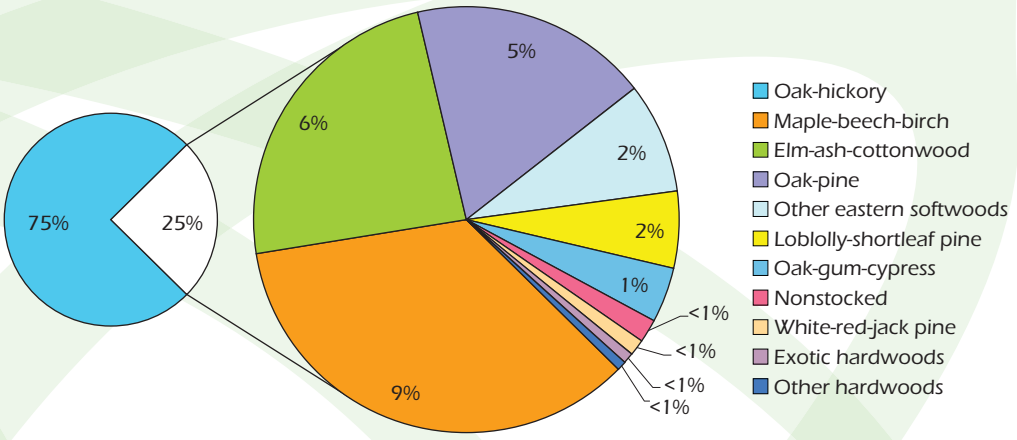


Figure 3—Area of forest land by forest-type group, Kentucky, 2010.

Inventory Volume

In 2010 there was an estimated 24.5 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 6.6 percent each of the total standing-tree wood volume, respectively. Select white oaks accounted for the greatest live tree volume on forest land across all species groups (fig. 4). Yellow-poplar accounted for the greatest sawtimber volume (board feet) on timberland (forest land available for timber production) across Kentucky (fig. 5).

Where tree grade data was collected, grade 3 tree volume (saw-log portion) comprised the largest grade class across and within all major species groups (fig. 6) on Kentucky timberland. Grade 1 tree volume accounted for nearly 23 percent of graded trees in the other softwoods species group. Volume in grade 1 trees accounted for 12, 12, and 10 percent of the saw-log volume in the pine, soft hardwood, and hard hardwood species groups, respectively.

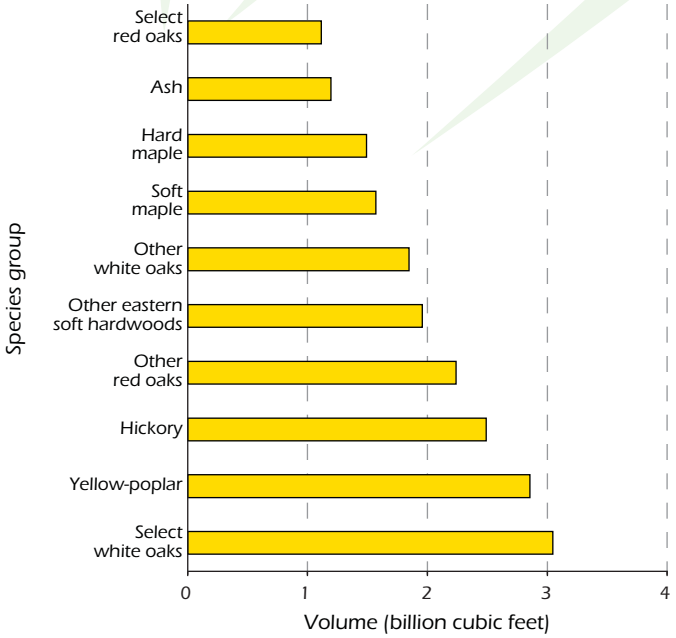


Figure 4—Standing-live tree volume (≥5.0 inches d.b.h.) for the top 10 species groups on forest land, Kentucky, 2010.

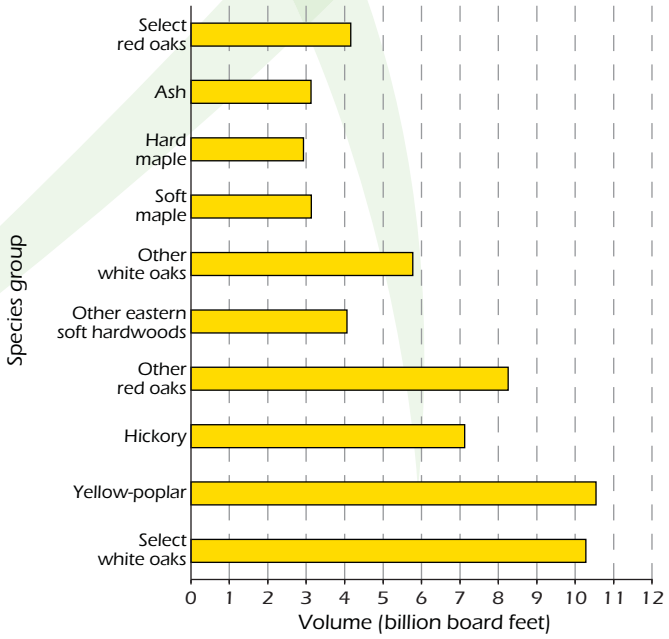


Figure 5—Sawtimber volume (≥5.0 inches d.b.h.) for the top 10 species groups on forest land, Kentucky, 2010.

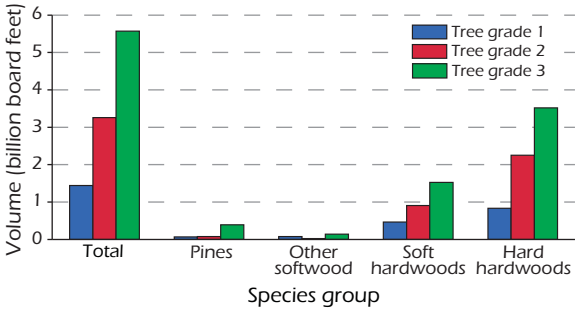


Figure 6—Net volume of the saw-log portion of sawtimber trees by tree grade and species group, on timberland, Kentucky, 2010.

Stand Origin

In 2010, only 0.5 percent (62,000 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. 7). The number of acres observed by the 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 from planting.

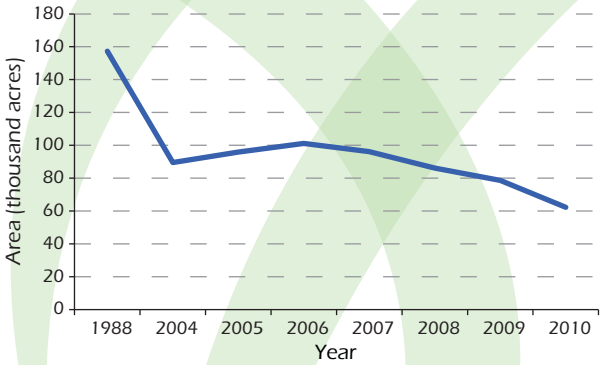


Figure 7—Area of forest land with clear evidence of artificial regeneration (planted), by year, Kentucky.

A trail winds through Mammoth Cave National Park. (photo by Huw Williams)

Average Annual Net Growth, Removals, and Mortality

Average annual mortality and removals of all-live volume on forest land have changed very little since 2009 (table 1). Average annual net growth (gross growth minus mortality) declined an estimated 6 percent since 2009.

Kentucky forests are still growing more wood volume than is being lost to harvest and other removals. In fact, the gross growth and net growth to removals ratios (forest land) are 2.8 and 2.0, respectively, across all species groups (fig. 8). This indicates that greater than two times more wood volume is being grown each year on Kentucky forest land than is being removed (both when mortality is and is not included).

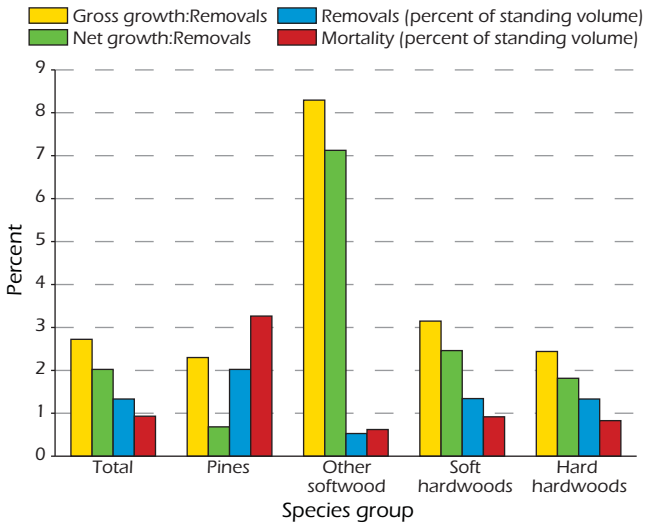


Figure 8—Ratios of gross growth and net growth to removals, average annual removals as a percent of standing volume and average annual mortality as a percent of standing volume by species group on forest land, Kentucky, 2010.

For the period between 2005 and 2010, average annual removals were greater than average annual net growth for the pine species group, resulting in a net growth to removals ratio below one (fig. 8). While average annual removals accounted for 2 percent of the total standing inventory, a mortality rate of slightly >3 percent of the standing pine inventory each year was a significant contributing factor to the net growth to removals ratio estimate. Other species groups in Kentucky, during the same period, maintained mortality <1 percent of standing inventory and removals near or <1 percent.

Net Growth (*ft³ per year*)
- Total = 662,657,572
- Pines = 11,502,728
- Other softwoods = 29,438,022
- Soft hardwoods = 246,531,848
- Hard hardwoods = 375,184,973

Mortality (*ft³ per year*)
- Total = 228,888,274
- Pines = 27,066,232
- Other softwoods = 4,842,972
- Soft hardwoods = 68,674,155
- Hard hardwoods = 128,304,916

Removals (*ft³ per year*)
- Total = 327,455,496
- Pines = 16,770,432
- Other softwoods = 4,132,427
- Soft hardwoods = 100,113,726
- Hard hardwoods = 206,438,911

FIA Program Information

Bechtold, W.A.; Patterson, P.L., eds. 2005. The enhanced forest inventory and analysis program—national sampling design and estimation procedures. Gen. Tech. Rep. SRS–80. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 85 p.

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Note: This data was accessed and compiled from the FIA database (FIADB) on February 17, 2012. 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

Additional Kentucky Inventory Information

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How to Cite this Publication

Oswalt, Christopher M. 2012. Kentucky, 2010—forest inventory and analysis factsheet. e-Science Update SRS–057. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 6 p.

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Creek. (photo by Ray Campbell, Kentucky Division of Forestry)

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