



Forests of Kansas, 2013

This resource update provides an overview of forest resource attributes for Kansas based on annual inventories conducted by the Forest Inventory and Analysis (FIA) program of the Northern Research Station (NRS) of the U.S. Forest Service. The estimates presented in this update are based on field data collected in 2009-2013 with comparisons made to data collected from 2004-2008. These estimates, along with web-posted core tables, are updated annually. For more information, please refer to inventory citations on page 5 of this report.

Overview

Kansas is home to 2.5 million acres of forest land, a gain of 14 percent since 2008 (Table 1). Timberland accounts for ninety-five percent of all forest land, while the remaining 5 percent of forest land is reserved or unproductive. Mortality and removal rates have decreased since 2008 while area of forest land, number of trees, volume, biomass, and net growth have all experienced gains.

Note: when comparing estimates on forest land versus timberland, please note that timberland estimates are often for growing-stock trees, which are live trees (5-inches diameter at breast height [d.b.h.] or larger) of commercial species and are not rough or rotten trees. As such, they are a subset of all live trees and the estimates will likely be smaller. See page 5 for more definitions.

Table 1.—Kansas forest statistics, 2013

	2013 estimate	Sampling error (%)	Change since 2008 (%)
Forest Land			
Area (thousand acres)	2,533	3	14
Number of live trees ≥1 in diameter (million trees)	842	4	12
Live-tree and sapling aboveground biomass (thousand oven-dry tons)	87,700	4	12
Net volume of live trees ≥5 in diameter (million ft ³)	3,296	5	12
Net growth of live trees ≥5 in (thousand ft ³ /yr)	106,384	10	70
Annual mortality of live trees ≥5 in (thousand ft ³ /yr)	41,668	10	-6
Annual harvest removals of live trees ≥5 in (thousand ft ³ /yr)	22,464	24	71
Annual other removals of live trees ≥5 in (thousand ft ³ /yr)	1,694	62	-58
Timberland			
Area (thousand acres)	2,404	3	15
Number of live trees ≥1 in diameter (million trees)	791	5	16
Live-tree aboveground biomass (thousand oven-dry tons)	84,479	4	13
Net volume of live trees ≥5 in diameter (million ft ³)	3,189	5	13
Net volume of growing-stock trees ≥5 in diameter (million ft ³)	1,415	7	-2
Net growth of growing-stock trees ≥5 in (thousand ft ³ /yr)	45,832	16	68
Annual mortality of growing-stock trees ≥5 in (thousand ft ³ /yr)	11,919	17	-27
Annual harvest removals of growing-stock trees ≥5 in (thousand ft ³ /yr)	11,061	32	176
Annual other removals of growing-stock trees ≥5 in (thousand ft ³ /yr)	3,528	67	37



Forest Area

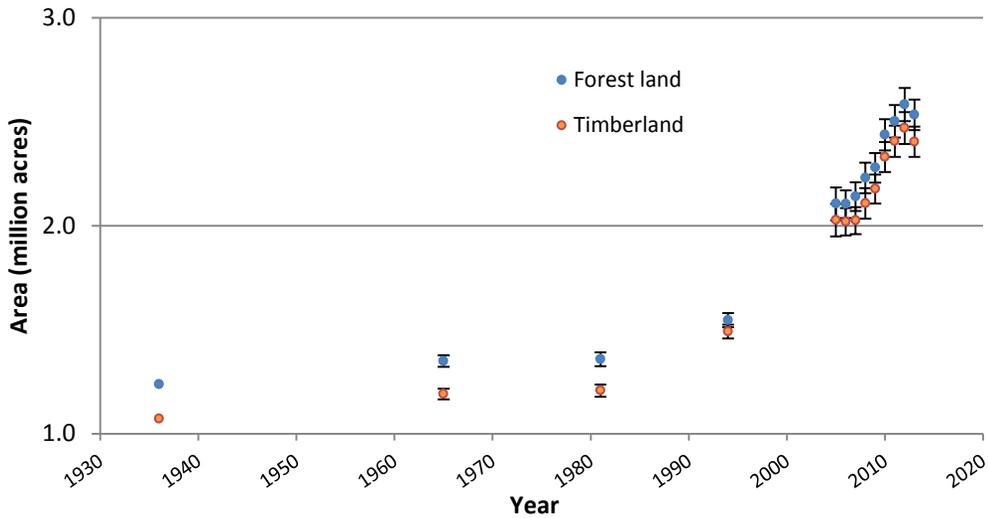


Figure 1.—Area of timberland and forest land by year, Kansas, 1936-2013.

Generally, forest land in Kansas has increased since the earliest inventory (Fig. 1). Hardwoods occupy most (93 percent) of the forest land and 2 percent of forested lands are nonstocked. In terms of stand-size class, sawtimber stands comprise half of all timberland area while poletimber and sapling-seedling stands occupy 29 and 19 percent of timberland area, respectively.

The top 10 most frequently occurring forest types, according to the 2013 forest inventory data, are shown in Figure 2. The most commonly found forest type is elm/ash/black locust (Fig. 2). The sugarberry/hackberry/elm/green ash forest type had the largest gain in area since 2008 while the post oak/blackjack oak and white oak/red oak/hickory types lost area. The top softwood forest type in terms of regeneration is eastern redcedar with nearly 54,000 acres in the sapling-seedling stand-size class; the top two regenerating hardwood types are elm/ash/black locust and sugarberry/hackberry/elm/green ash with 158,000 and 62,000 acres of saplings and seedlings, respectively. This trend is further illustrated in Figure 2 where it shows the area of these forest types have increased since 2008, especially the eastern redcedar type, which has nearly doubled in area.

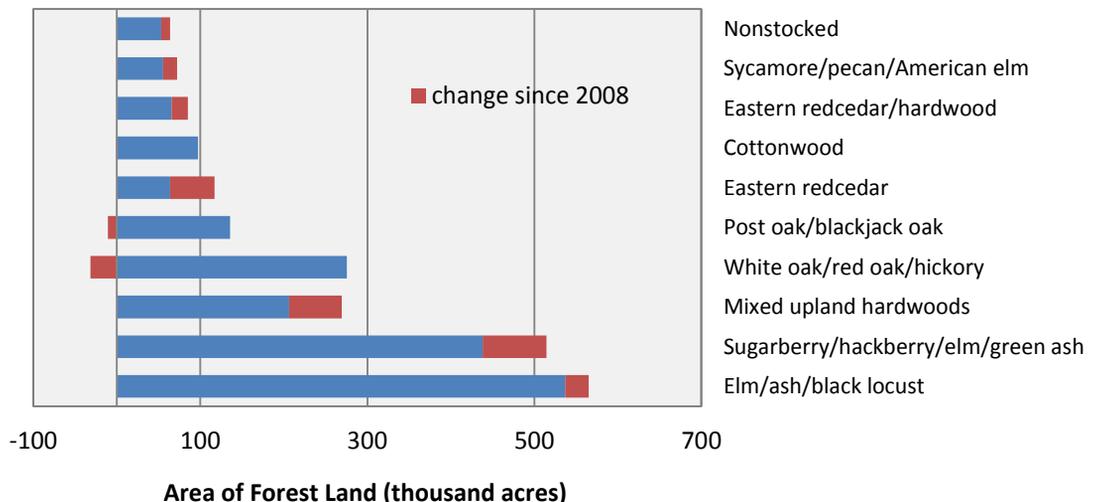


Figure 2.—Area of forest land for the 10 most common forest types, Kansas, 2008-2013. The red portion of the bar indicates the amount of area gained or lost since 2008.

Volume, Biomass, and Trends

Kansas forests contain approximately 842 million live trees according to the 2013 inventory, one-fourth of which are comprised of two species: hackberry and American elm. Hackberry is the most abundant species with approximately 114 million trees and has the most aboveground biomass but it ranks second in terms of net volume behind eastern cottonwood (Table 2). Together, hackberry and eastern cottonwood account for more than one-fourth (27 percent) of the total net volume and nearly 22 percent of all biomass. Interestingly, cottonwood has less than one-tenth of the number of trees compared to hackberry, indicating that the cottonwood resource is primarily made up of fewer and larger trees while hackberry is a growing resource with many smaller trees. This abundance of smaller trees results in the collective biomass of hackberry being larger than that of the voluminous cottonwood. There is a similar story to be told with eastern redcedar and northern red oak: they have similar volumes yet eastern redcedar trees outnumber the northern red oak by a 10:1 ratio. This information provides insight about what the future forests of Kansas may look like.

Black walnut has the third highest growth rate but also the highest removal rate, which is much higher than any of the other species in Table 2. American elm and eastern cottonwood have the two highest mortality rates, respectively. Combined with having a relatively low number of trees, eastern cottonwood could be a declining resource. There is evidence of this in Figure 2 which shows a slight decline in area of cottonwood forest type since 2008. However, the average annual growth of cottonwood continues to outpace mortality so net volume is still increasing. Overall, the major species have positive net growth, which indicates no serious forest health issues at this point and is good news for the sustainability of Kansas' forest resources.

Table 2.—Number, volume, biomass, growth, mortality, and removals of live trees on forest land by species of the top 12 tree species by net volume, Kansas, 2009-2013

Common name	Latin name	Number of trees ^a (millions)	Net volume ^b (million ft ³)	Aboveground biomass ^a (thousand dry tons)	Average annual net growth ^b (thousand ft ³)	Average annual mortality ^b (thousand ft ³)	Average annual harvest removals ^b (thousand ft ³)
Eastern cottonwood	<i>Populus deltoides</i>	9.8	455.5	8,189.3	10,942.2	5,978.9	--
Hackberry	<i>Celtis occidentalis</i>	114.0	439.2	10,854.6	15,778.9	3,492.6	1,655.6
Green ash	<i>Fraxinus pennsylvanica</i>	40.1	249.7	6,691.5	6,464.4	4,488.3	85.3
American elm	<i>Ulmus americana</i>	105.8	246.6	6,316.8	8,384.8	6,323.5	1,611.5
Osage-orange	<i>Maclura pomifera</i>	87.7	238.4	9,536.5	10,015.1	1,000.5	1,721.0
Black walnut	<i>Juglans nigra</i>	24.3	209.2	4,988.2	10,546.4	1,581.6	4,161.2
Red mulberry	<i>Morus rubra</i>	34.1	163.8	4,697.1	6,866.9	2,634.2	429.4
Bur oak	<i>Quercus macrocarpa</i>	8.1	138.3	3,752.4	1,181.4	1,431.1	1,867.0
Honeylocust	<i>Gleditsia triacanthos</i>	30.8	133.6	4,200.0	6,935.1	2,100.1	1,010.0
Northern red oak	<i>Quercus rubra</i>	8.1	114.7	3,260.7	3,020.0	290.9	1,025.9
Eastern redcedar	<i>Juniperus virginiana</i>	82.0	109.1	2,484.6	5,534.5	1,117.4	392.1
American sycamore	<i>Platanus occidentalis</i>	4.39	98.8	2,025.6	1,259.0	237.3	1,481.2

^a Trees ≥ 1 -inch diameter ^b Trees ≥ 5 -inches diameter Note: Table cells without data are indicated by --

Ownership of Kansas Forests

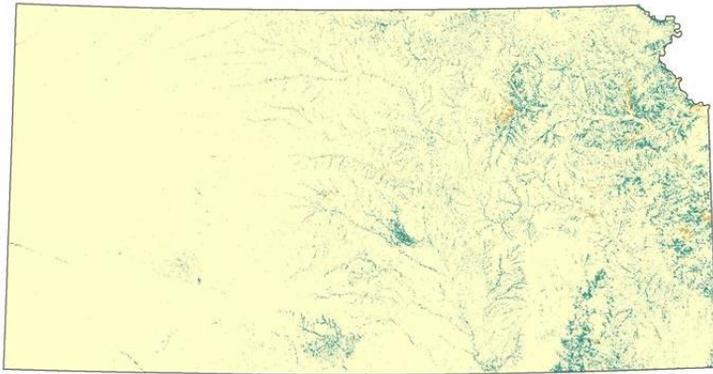


Figure 3.—Private (blue) and public (orange) forest ownership, Kansas, 2013 (Hewes et al. 2014)

An estimated 94 percent of Kansas forests are privately owned (Fig. 3). Of these private forests, most are owned by families and individuals, collectively referred to as family forest ownerships. This group accounts for 90 percent of the State’s forest land.

Other private ownerships, including corporate, tribal, conservation groups, and clubs, account for an additional 4 percent. Federal, State, and local governments own 4, 1, and 0.5 percent, respectively.

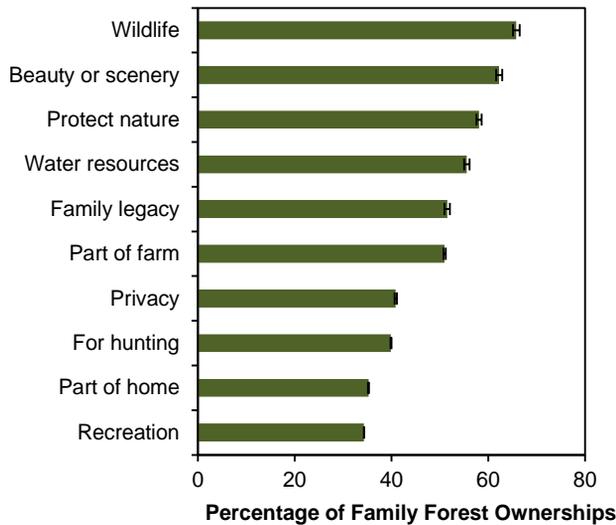


Figure 4.—Reasons for owning* forest land, family forest ownerships with 10+ac of forest land, Kansas, 2011-2013.
 * Many ownerships have multiple reasons for owning.

The 2011-2013 National Woodland Owner Survey (NWOS; Butler et al., in review) provides insights into the dominant ownership groups, family forest ownerships, and focuses more specifically on family forest ownerships with 10+ acres of forest land. There are an estimated 62,000 family forest ownerships in Kansas with 10+ acres of forest land. On average they own 35 acres of forest land. The reasons for owning this land are varied, but many are related to amenity values, such as wildlife and aesthetics (Fig. 4). More information will be available in forthcoming NWOS reports (www.fia.fs.fed.us/nwos).

Literature Cited

Butler, B.J.; Dickinson, B.J.; Hewes, J.H.; Andrejczyk, K.; Markowski-Lindsay, M.; Butler, S.M. In review. Preliminary results from the USDA Forest Service, National Woodland Owner Survey, family forest ownerships (with 10+ forested acres) in Kansas, 2011-2013. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station.

Hewes, J.H.; Butler, B.J.; Liknes, G.C.; Nelson, M.D.; Snyder, S.A. 2014. Distribution of forest ownership types in the conterminous United States: FOR_OWN_TYP geospatial dataset [database]. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. Available at <http://dx.doi.org/10.2737/RDS-2014-0002>.

Definitions

Average annual mortality — The average cubic foot volume of sound wood in growing-stock trees that died in 1 year.

Average annual removals— The average net growing-stock volume in growing-stock trees removed annually for roundwood forest products, in addition to the volume of logging residues and the volume of other removals.

Biomass— The aboveground weight of wood and bark in live trees 1.0 inch (2.5 cm) d.b.h. and larger from the ground to the tip of the tree, excluding all foliage. The weight of wood and bark in lateral limbs, secondary limbs, and twigs under 0.5 inch (1.3 cm) in diameter at the point of occurrence on sampling-size trees is included but is excluded on poletimber and sawtimber-size trees. Biomass is typically expressed as green or oven-dry weight and the units are tons.

Forest land — Land that has at least 10 percent canopy cover of live trees of any size or formerly having had such tree cover and is not currently developed for nonforest uses. The area with trees must be at least 1 acre and at least 120 feet wide.

Forest type — A classification of forest land based upon and named for the tree species that forms the plurality of live-tree stocking. A forest type classification for a field location indicates the predominant live-tree species cover for the field location; hardwoods and softwoods are the first group to be determine predominant group, and forest type is selected from the predominant group.

Net annual growth — The average annual net increase in the volume of trees during the period between inventories. Components include the increment in net volume of trees at the beginning of the specific year surviving to its end, plus the net volume of trees reaching the minimum size class during the year, minus the volume of trees that died during the year, and minus the net volume of trees that became cull trees during the year.

Net volume in cubic feet — The gross volume in cubic feet less deductions for rot, roughness, and poor form. Volume is computed for the central stem from a 1-foot stump to a minimum 4.0-inch top diameter outside bark, or to the point where the central stem breaks into limbs.

Nonstocked — Land that currently has less than 10 percent stocking but formerly met the definition of forest land. Forest conditions meeting this definition have few, if any, trees sampled.

Physiographic class — A measure of soil and water conditions that affect tree growth on a site.

Reserved forest land — Land permanently reserved from wood products utilization through statute or administrative designation. Examples include national forest wilderness areas and national parks and monuments.

Timberland — Forest land that is producing or is capable of producing in excess of 20 cubic feet per acre per year of industrial wood in natural stands and is not withdrawn from timber utilization by statute or administrative regulation.

Additional Inventory Sources

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.

Moser, W. Keith; Hansen, Mark H.; Atchison, Robert L.; Butler, Brett J.; Crocker, Susan J.; Domke, Grant; Kurtz, Cassandra M.; Lister, Andrew J.; Miles, Patrick D.; Nelson, Mark D.; Piva, Ronald J.; Woodall, Christopher W. 2013. **Kansas' Forests 2010**. Resour. Bull. NRS-85. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 63 p.

How to Cite This Publication

Meneguzzo, D.M.; Butler, B.J. 2014. Forests of Kansas, 2013. Resource Update FS-17. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 5 p.
Northern FIA: <http://nrs.fs.fed.us/fia/>
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