



# FORESTS OF Oklahoma, 2013

This resource update provides an overview of forest resources in Oklahoma based on an inventory conducted by the U.S. Forest Service, Forest Inventory and Analysis (FIA) program at the Southern Research Station, in cooperation with Oklahoma Forestry Services (OFS). Estimates are based on field data collected using the FIA annualized sample design and are updated yearly (moving average). The estimates presented in this update are for the 2013 measurement year with comparisons made to data reported in 2012 where appropriate (table 1). The sample plot population in 2013 for Oklahoma consists of 7,535 plots for all units, collected across a period of 5 years in the east (units 1 and 2) and a period of 10 years in central and west (units 3-7), where 4,550 plots were collected as of 2013. Growth, removals, and mortality estimates are based solely on units 1 and 2. Prior to 2010, only units 1 and 2 were surveyed. Currently, all of Oklahoma’s forest land is being sampled. Forested area (acres) was calculated for all

seven units. The data used in this publication were accessed from the FIA database, April 14, 2015 (<http://apps.fs.fed.us/Evalidator/evalidator.jsp>).

## Overview

The 77 counties of Oklahoma are partitioned into seven FIA survey units (fig.1): Southeast (unit 1), Northeast (unit 2), North Central (unit 3), South Central (unit 4), Southwest (unit 5), High Plains (unit 6), and Great Plains (unit 7). East Oklahoma comprises units 1 and 2, while central and west Oklahoma consist of units 3 through 7. This overview represents the 2013 annual inventory plot data. Data for east Oklahoma include the initial establishment of fixed plots in 2008. Central and west Oklahoma plot collection started in 2009. Currently, east Oklahoma is 80 percent complete (5-year cycle), while west Oklahoma is only 50 percent complete (10-year cycle).

Table 1—Oklahoma forest statistics, change between 2012 and 2013

Forest statistics	2012 estimate	Sampling error (percent)	2013 estimate	Sampling error (percent)	Change since 2012
<b>Forest land</b>					
Area (thousand acres)	12,654.0	1.7	12,362.7	1.5	-291.3
Number of live trees ≥1 inch d.b.h. (million trees)	5,425.0	2.7	5,371.2	2.5	-53.8
Net volume live trees ≥5 inches d.b.h. (million cubic feet)	9,519.3	2.5	9,510.8	2.3	-8.5
Live trees aboveground biomass (thousand oven-dry tons)	280,934.5	2.1	279,682.6	2.0	-1,251.9
Net growth live trees ≥5 inches d.b.h. (million cubic feet) <sup>a</sup>	170.2	8.4	157.6	7.8	-12.6
Annual removals of live trees ≥5 inches d.b.h. (million cubic feet) <sup>b</sup>	115.5	18.8	103.9	16.3	-11.6
Annual mortality of live trees ≥5 inches d.b.h. (million cubic feet) <sup>c</sup>	82.4	9.9	85.7	8.0	3.3
<b>Timberland</b>					
Area (thousand acres)	7,411.7	2.3	7,282.2	2.1	-129.6
Number of live trees ≥1 inch d.b.h. (million trees)	3,685.5	3.3	3,650.4	3.2	-35.1
Net volume live trees ≥5 inches d.b.h. (million cubic feet)	7,326.8	3.2	7,293.4	3.0	-33.4
Live trees aboveground biomass (thousand oven-dry tons)	211,264.7	2.9	209,124.3	2.7	-2,140.3
Net growth live trees ≥5 inches d.b.h. (million cubic feet) <sup>a</sup>	158.9	9.0	154.1	7.9	-4.8
Annual removals of live trees ≥5 inches d.b.h. (million cubic feet) <sup>b</sup>	139.2	16.2	121.4	14.5	-17.8
Annual mortality of live trees ≥5 inches d.b.h. (million cubic feet) <sup>c</sup>	74.9	10.6	76.0	8.6	1.1

<sup>a</sup> Net growth estimates based on Units 1 and 2.

<sup>b</sup> Annual removals estimates based on Units 1 and 2.

<sup>c</sup> Annual mortality estimates based on Units 1 and 2.



# Forest Area



Figure 1—County names and survey units in Oklahoma.

Of the surveyed land area, Oklahoma’s 2013 data (table 1) show total forest area of 12.4 million acres (28 percent). Additionally, 7.3 million acres (59 percent) of the forest area were considered available for timber production (known as timberland). The remaining forest area was either reserved forest land where timber removals are prohibited by law or unproductive forest land (produces  $\leq 20$  cubic feet per acre per year). Forest land in 2013 showed a net decrease of almost 291,300 acres (table 2).

**Table 2—Area of forest land and change by survey unit, Oklahoma, 2012 and 2013**

Survey unit	2012	2013	Change
	<i>thousand acres</i>		
Unit 1: Southeast	4,296.8	4,226.8	-70.0
Unit 2: Northeast	1,538.1	1,523.2	-14.9
Unit 3: North Central	1,525.9	1,505.2	-20.7
Unit 4: South Central	2,785.5	2,745.1	-40.4
Unit 5: Southwest	1,819.4	1,754.1	-65.3
Unit 6: High Plains	137.6	120.3	-17.3
Unit 7: Great Plains	550.9	488.0	-62.9
<b>Total</b>	<b>12,654.0</b>	<b>12,362.7</b>	<b>-291.3</b>

The largest forest-type group in Oklahoma is oak-hickory (fig. 2). Loblolly-shortleaf pine is the largest forest-type group in unit 1, while the elm-ash-cottonwood forest type is present in most units. Ninety-two softwood and hardwood tree species were tallied on FIA plots within the seven units of Oklahoma. The percent stocking of these species on a plot determines the forest-type group. Loblolly-shortleaf pine and other softwood forest types accounted for 1.8 million acres of the forest land (15 percent), compared to 10.8 million acres for hardwoods (85 percent). The predominant hardwood forest types are oak-pine, oak-hickory, oak-gum-cypress, and elm-ash-cottonwood.

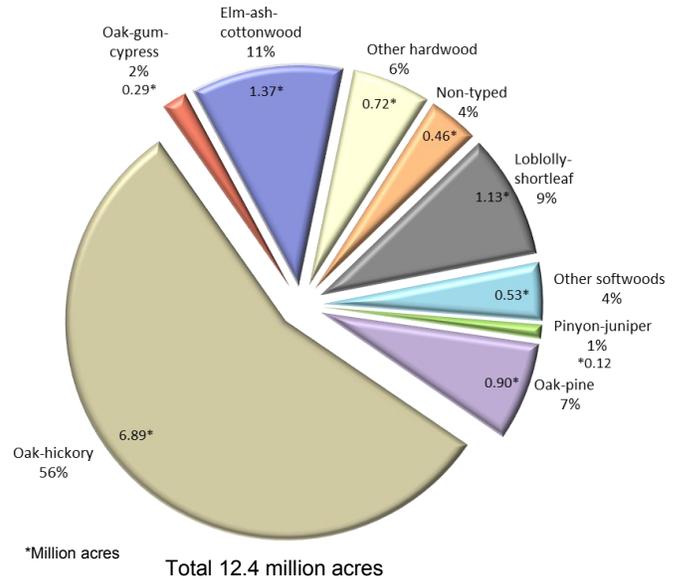


Figure 2—Area of forest land and forest-type group, Oklahoma, 2013.

There are more than 44.7 million acres (fig. 3) of land mass in Oklahoma: forest land at 12.4 million acres, nonforest land at 31.2 million acres, and water at 1.1 million acres.

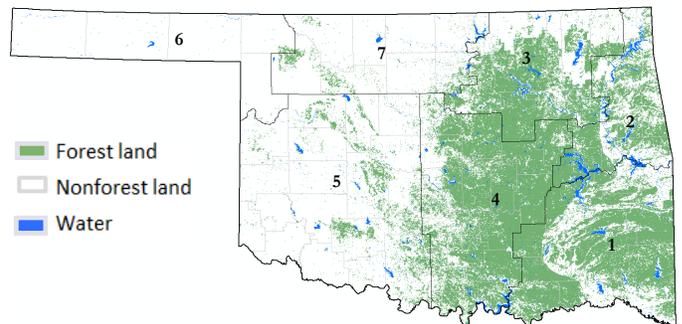


Figure 3—Area of forest land, nonforest land, and water, Oklahoma, 2013.

## Volume, Biomass, and Trends

Results of the 2013 inventory show a net volume of softwoods on forest land of 2.3 billion cubic feet (fig. 4). Of that, 1.9 billion cubic feet (82.6 percent) was concentrated in east Oklahoma, units 1 and 2. The remaining 0.4 billion cubic feet (17.4 percent) was in central and west Oklahoma, units 3-7. As stated previously, the inventory in central and west Oklahoma (units 3-7) is only 50 percent complete and should be viewed as an incomplete estimate.

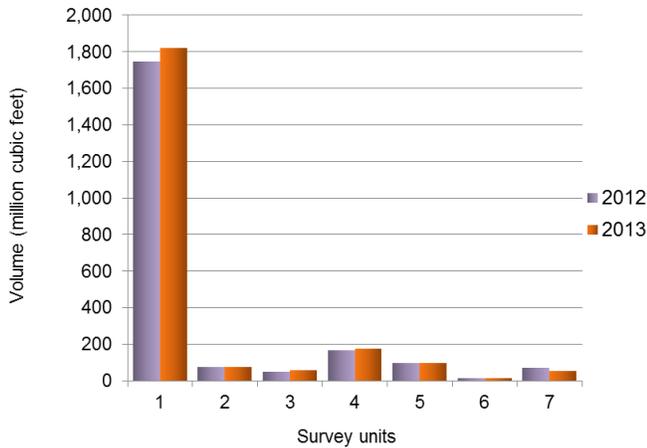


Figure 4—Net volume of softwood (≥5 inches d.b.h.), in cubic feet, on forest land, by survey unit, Oklahoma, 2012 and 2013.

The 2013 inventory also shows a total of 7.2 billion cubic feet of volume of hardwood on forest land in Oklahoma (fig. 5). Of that, 3.8 billion cubic feet (52.6 percent), was in east Oklahoma, units 1 and 2, with the remaining 3.4 billion cubic feet (47.4 percent) in central and west Oklahoma (units 3-7).

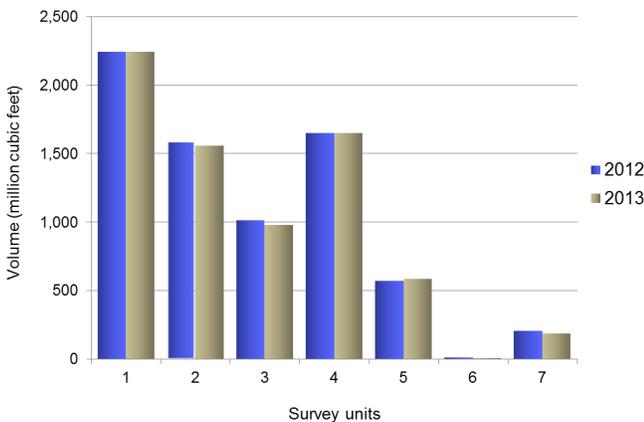


Figure 5—Net volume of hardwood (≥5 inches d.b.h.), in cubic feet, on forest land, by survey unit, Oklahoma, 2012 and 2013.

Biomass is an important resource in Oklahoma. FIA has been calculating these numbers for many years (fig. 6). The 2013 data show 50.1 thousand tons of softwoods (oven dry) on all forest land in Oklahoma. The majority of biomass was in east Oklahoma (units 1 and 2), with over 41.4 thousand tons (82.7 percent) of softwood biomass aboveground on forested land. Central and west Oklahoma (units 3-7) had 8.7 thousand tons (17.3 percent) of softwood biomass.

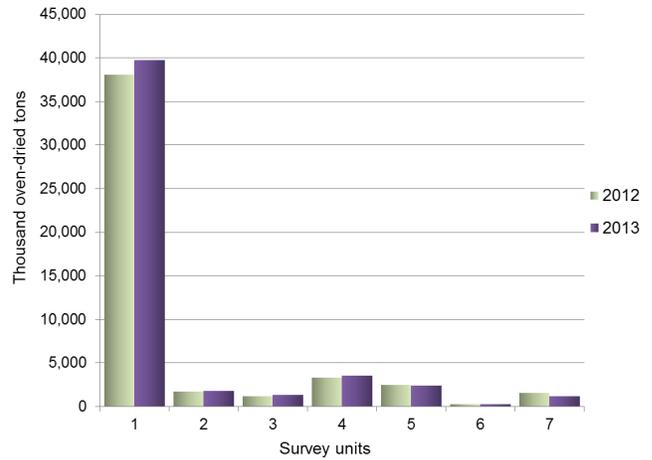


Figure 6—Biomass dry weight of softwood on forest land, by survey unit, Oklahoma, 2012 and 2013.

The hardwood biomass data show 229.5 thousand (oven dry) tons on all forest land in Oklahoma (fig. 7). The majority of hardwood biomass was in east Oklahoma (units 1 and 2), with 121.6 thousand tons (52.9 percent) aboveground on all forested land. Central and west Oklahoma (units 3-7) had 107.9 thousand tons of hardwood biomass (47.1 percent). The 2013 trend shows a slight increase in softwood volume and biomass and a slight decrease in hardwood volume and biomass in east Oklahoma (units 1 and 2).

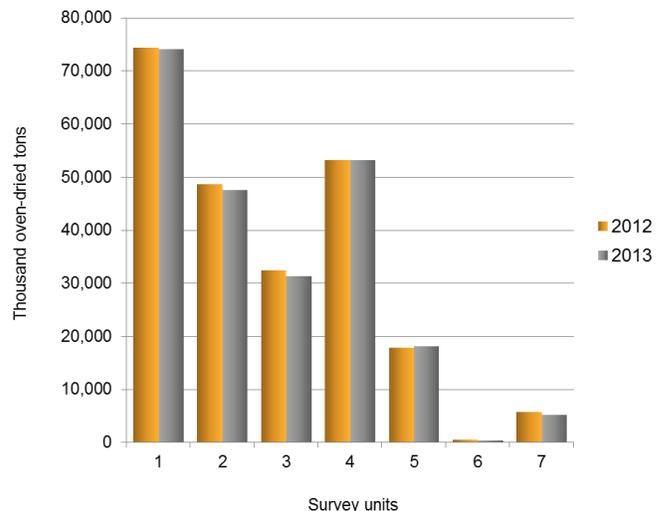


Figure 7—Biomass dry weight of hardwoods on forest land by survey units, Oklahoma, 2012 and 2013.

## Emerald Ash Borer's Potential Impact on Oklahoma Forests

The emerald ash borer (EAB) is a small green beetle in the family Buprestidae—the metallic wood-boring beetles. A native of Asia, EAB was first detected in the United States near Detroit, MI in 2002 and has since spread to 24 States. It has not yet been collected in Oklahoma, but infestations in surrounding States (Arkansas, Kansas, Missouri, Louisiana, and Colorado) and the rapid, unimpeded spread of the beetle over the last decade suggest that infestation in Oklahoma is only a matter of time. The beetle affects all species of ash (*Fraxinus* spp.) trees native to the United States and is rapidly changing the landscape where those trees occur. The adult beetles lay eggs on the bark of ash trees. When the larvae hatch, they bore into the bark, feeding on the nutrient-transporting tissues and ultimately girdling and killing the tree. To date, tens of millions of ash trees nationwide have succumbed to attack by EAB, usually dying within 2-5 years of infestation. EAB is not expected to be slowed or negatively impacted by Oklahoma winters (DeSantis and others 2013) and its effect on ash trees has been compared to the extirpation of American chestnut in the early 20<sup>th</sup> century.

According to FIA data, there are approximately 157 million ash trees (>1 inch diameter) in Oklahoma. The majority are green ash (*F. pennsylvanica*), followed by white ash (*F. americana*) and a small number of Texas ash (*F. texana*). Blue ash (*F. quadrangulata*), which has shown some degree of resistance to EAB (Anulewicz and others 2007, Tanis and McCullough 2012), occurs in northeastern Oklahoma but has not been recorded on FIA plots. The greatest concentration of ash is in the southeastern corner of the State (fig. 8). The nearest known infestations of EAB are in the south-central counties of Arkansas ([http://www.emeraldashborer.info/files/MultiState\\_EABpos.pdf](http://www.emeraldashborer.info/files/MultiState_EABpos.pdf)). The State of Oklahoma's Consumer Protection Services Division, partners with the U.S. Department of Agriculture, Animal and Plant Health Inspection Service to conduct annual surveys for EAB and other pests. Over the long term it is anticipated that ash will die and be replaced across much of its range in the United States by other trees that are adapted to similar conditions, such as maples and elms.

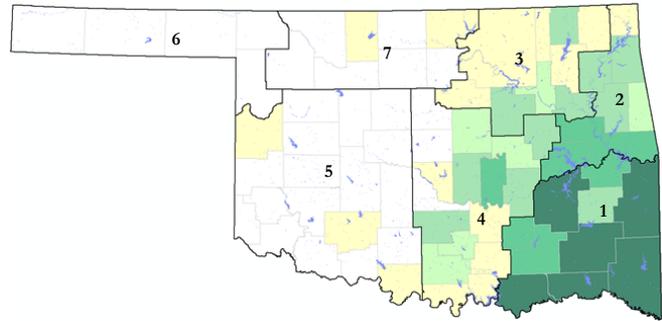


Figure 7—Ash per acre by county and unit in Oklahoma.



EAB examples. (photos courtesy of USDA, Animal and Plant Health Inspection Service, 2014)

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#### How to Cite This Publication

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