USDA
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RESOURCE UPDATE FS-1

Forests of Iowa, 2013

This resource update provides an overview of forest resources in Iowa based on an inventory conducted by the U.S. Forest Service, Forest Inventory and Analysis (FIA) program at the Northern Research Station in cooperation with the Iowa Department of Natural Resources. Estimates are based on field data collected using the FIA annualized sample design and are updated yearly, for the measurement years 2009-2013 with comparisons made to 2004-2008. The current, 2009-2013, sample data consist of 641 field measured plots on forest land, with about 20 percent of plots measured each year. Data used in this publication were accessed from the FIA Database in March 2014. See Bechtold and Patterson (2005) and O'Connell et al. (2013) for definitions and technical details.

Overview

Currently, Iowa is home to almost 3 million acres of forest land. Forest land area has decreased by 2.2 percent (66,300 acres) since the previous inventory period (2004-2008) (Table 1). The number of live trees on Iowa's forest land in 2013 was estimated at 1.1 billion trees, a decrease of 7.2 percent from 2008. Live tree aboveground biomass and net volume increased on both forest land and timberland. Both average annual net growth and net harvest removals decreased, while average annual mortality and annual other removals (e.g., land use change) increased since 2008, on both forest land and timberland (Table 1).

Table 1.—Iowa forest statistics, change between 2004-2008 and 2009-2013

	2008 Estimate	Sampling error (percent)	2013 Estimate	Sampling error (percent)	Change since 2008 (percent)
Forest Land					
Area (thousand acres)	3,032.8	2.5	2,966.5	2.2	-2.2
Number of live trees ≥1 in diameter (million trees)	1,159.1	4.2	1,075.3	3.8	-7.2
Aboveground biomass of live trees ≥1 in (thousand oven-dry tons)	114,681.8	3.7	122,709.8	3.3	7.0
Net volume of live trees ≥5 in diameter (million ft^3)	4,256.1	4.3	4,540.4	3.8	6.7
Annual net growth live trees ≥5 in (thousand ft^3/yr)	148,044.2	8.2	102,990.6	8.5	-30.4
Annual mortality of live trees ≥5 in (thousand ft^3/yr)	61,025.3	8.6	87,276.4	9.4	43.0
Annual harvest removals of live trees ≥5 in (thousand ft^3/yr)	34,793.7	19.6	28,517.5	21.7	-18.0
Annual other removals of live trees ≥5 in (thousand ft^3/yr)	13,872.0	35.5	15,767.2	45.9	13.7
Timberland					
Area (thousand acres)	2,912.9	2.7	2,850.4	2.4	-2.1
Number of live trees ≥1 in diameter (million trees)	1,107.3	4.3	1,035.1	3.9	-6.5
Aboveground biomass of live trees ≥1 in (thousand oven-dry tons)	109,110.0	3.8	117,066.7	3.4	7.3
Net volume of live trees ≥5 in diameter (million ft^3)	4,036.0	4.4	4,314.5	3.9	6.9
Net volume of growing stock trees (million ft^3t)	2,961.1	5.2	3,077.2	4.7	3.9
Annual net growth of growing stock trees (thousand ft^3/yr)	95,930.6	8.4	70,819.5	8.6	-26.2
Annual mortality of growing stock trees (thousand ft^3/yr)	35,514.3	11.6	47,542.5	11.6	33.9
Annual harvest removals of growing stock trees (thousand ft^3/yr)	23,979.3	23.2	22,510.5	25.8	-6.1
Annual other removals of growing stock trees (thousand ft^3/yr)	10,957.0	39.0	13,461.1	51.7	22.9

Forest Area

Forest land in the Loess Hills of western Iowa. Photograph by Lisa Schulte-Moore, Iowa State University, used with permission.

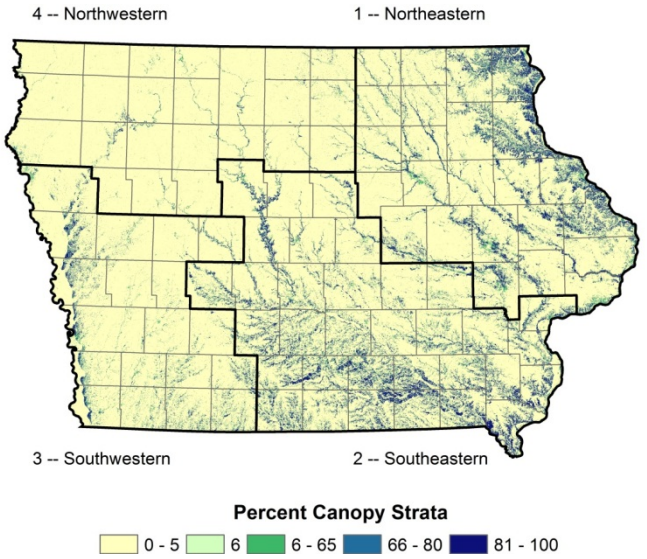

Figure 1.—Forest land by canopy cover stratum and survey unit, Iowa.

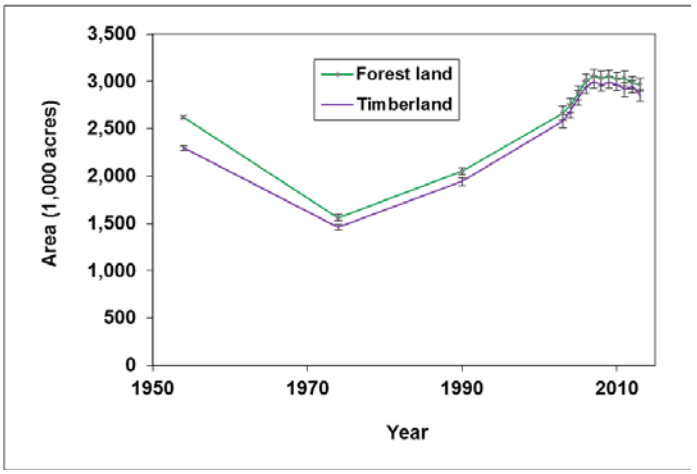

Figure 2.—Area of timberland and forest land in Iowa, by year. Note: Sampling errors and error bars shown in the tables and figures in this report represent 68 percent confidence intervals for the estimated values.

Iowa is divided into four survey units, with forest land area unevenly distributed among units: Northeastern (33 percent), Southeastern (49 percent), Southwestern (14 percent) and Northwestern (4 percent) (Fig. 1).

Area of Iowa forest land has remained relatively stable during recent years, but differs substantially from past decades (Table 1, Fig. 2). Historical forest land area exceeded 7 million acres during the mid 1800s (Thornton and Morgan, 1959). Forest land area encompassed 2.6 million acres of the state in the1950s, declining to 1.6 million acres in the 1970s, rebounding to 2.1 million acres during the 1990s, peaking at over 3 million acres during the past several years, and now showing a potential declining trend (Fig. 2).

The oak/hickory forest-type group occupies the largest proportion of timberland in Iowa at 1.9 million acres. The next most common forest-type groups are elm/ash/cottonwood at 643,000 acres, oak/pine at 88,000 acres, and maple/birch at 78,000 acres (Fig. 3). Most of Iowa's forests are in large diameter stand-size class (70 percent); small diameter stand-size class dominates timberland acreage for oak/pine, other hardwoods, and all softwoods forest type-groups (Fig. 3).

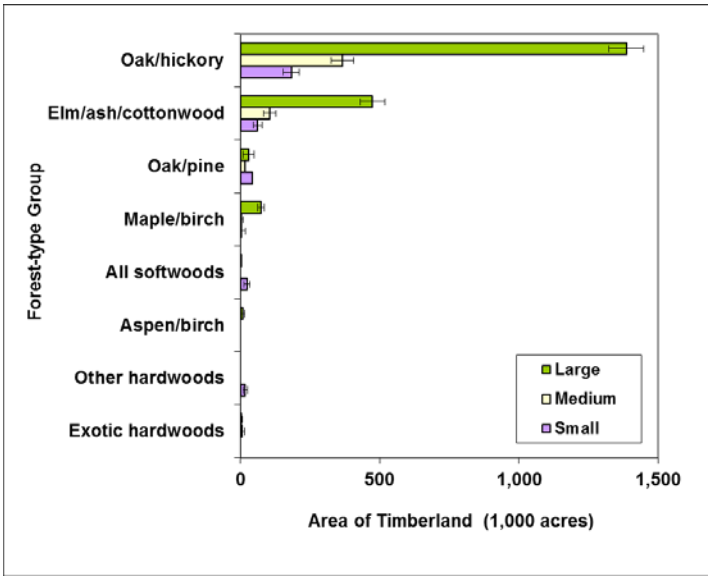

Figure 3.—Area of timberland by forest-type group and stand-size class, Iowa, 2009-2013. Note: Forest type definitions have changed and may not be directly comparable with published estimates from previous years. Composition of forest-type groups varies geographically. In Iowa, maple/beech/birch forest-type group is referred to as 'maple/birch' due to the absence of beech. Large diameter trees are at least 11.0 inches diameter for hardwoods and at least 9.0 inches diameter for softwoods. Medium diameter trees are at least 5.0 inches diameter but smaller than large diameter trees. Small diameter trees are less than 5.0 inches diameter. Additional details are available in USDA Forest Service (2007).

Volume, Biomass, and Trends

FIA field crews recorded trees of 60 species on Iowa forest land during 2009-2013. More than one-third of Iowa's 1.1 billion trees are represented by just five species: American elm (*Ulmus americana*, 122 million), eastern hophornbeam (*Ostrya virginiana*, 92 million), hackberry (*Celtis occidentalis*, 75 million), red mulberry (*Morus rubra*, 50 million), and shagbark hickory (*Carya ovata*, 47 million).

None of these five most numerous species, however, make the top five list in terms of volume (Table 2). Three oak species together comprise over 1.1 billion cubic feet of Iowa's 4.5 billion cubic feet of live tree volume on forest land. The top 10 tree species comprise more that two-thirds of all cubic foot volume on forest land, and more than three-fourths of all sawtimber board foot volume on timberland, with five tree species each exceeding 1 billion board feet (Table 2). Eastern cottonwood (*Populus deltoides*) ranks first in board foot volume and fourth in cubic foot volume, but only twenty-eighth in terms of number of trees (13.2 million).

Total cubic foot volume and board foot volume have both increased by 6.7 percent since 2008, with gains and losses varying among individual species (Table 2). Iowa's growth, harvest removals (excluding 'other' removals), and mortality between 2008 and 2013 were 148.0, 34.8, and 61.0 thousand cubic feet on forest land and 70.8, 22.5, and 47.5 thousand cubic feet on timberland, respectively (Table 1). Individual tree species with the largest contributions to change were black walnut (*Juglans nigra*) (18 percent of growth), eastern cottonwood (32 percent of total removals), and American elm (27 percent of mortality).

Iowa currently has more than 122 million tons of aboveground tree biomass on forest land, 85 percent of which is on private land (Fig. 4). Growing-stock biomass is three times larger than non-growing-stock biomass. About 73 percent of biomass is contained in the boles of trees; the remaining 27 percent is distributed among stumps, tops, limbs, and in trees smaller than 5 inches d.b.h. (Fig. 4). Biomass trends are similar to volume, with biomass increasing since 2008 by 7 percent on forest land, 7.3 percent on timberland (Table 1).

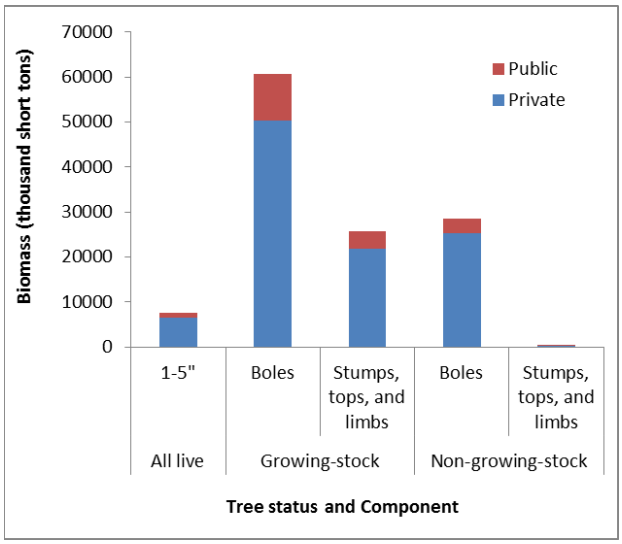

Figure 4.—Aboveground dry weight of live trees (at least 1 inch d.b.h./d.r.c.), in thousand dry short tons, on forest land by owner category and tree component, Iowa, 2013.

Table 2.—Top 10 tree species by statewide volume estimates on forest land and timberland, Iowa, 2009-2013

Rank	Species	Volume of live trees on forest land (1,000,000 ft^3)	Sampling error (%)	Change since 2008 (%)	Volume of sawtimber trees on timberland (1,000,000 board feet)	Sampling error (%)	Change since 2008 (%)
1	Bur oak	473.1	11.2	-0.7	1,046.5	14.0	-2.5
2	Silver maple	458.7	17.0	-5.4	930.9	19.8	-13.2
3	White oak	379.0	13.3	8.2	1,292.8	14.8	12.0
4	Cottonwood	342.7	27.3	-6.6	1,389.2	27.3	-5.2
5	Black walnut	321.1	11.8	13.6	1,051.4	14.7	11.3
6	Northern red oak	288.6	14.5	24.8	1,124.0	16.3	30.4
7	Hackberry	239.2	12.5	23.0	642.8	15.6	32.3
8	American basswood	224.1	14.4	12.4	743.2	17.2	10.4
9	American elm	188.3	7.6	-15.3	221.3	15.3	-26.3
10	Shagbark hickory	183.6	11.4	10.3	488.1	15.1	9.9
	Other softwood species	62.3	14.1	31.2	53.9	33.7	-16.4
	Other hardwood species	1,379.5	4.7	11.9	2,674.0	7.7	11.8
	All species	4,540.4	3.8	6.7	11,658.0	5.3	6.7

Black Walnut Trees Have Highest Density in Iowa

Figure 5.—Black walnut (*Juglans nigra*). Photographs by Vern Wilkins, Indiana University, (left), and Paul Wray, Iowa State University (right), via Bugwood.org.

More than 40 million black walnut trees were estimated to occur on Iowa forest land during 2009-2013, comprising 3.75 percent of Iowa's trees on forest land. Among Iowa's 60 tree species measured during 2009-2013, black walnut is ranked seventh in terms of number of trees, fifth in terms of volume (Table 2), but first in terms of growth (see previous page). A large majority of Iowa's black walnut trees are considered sawtimber, with a minority labeled rough cull, and very few as rotten cull (Fig. 6). Compared with estimates for the surrounding states of Minnesota, Wisconsin, Illinois, Indiana, Missouri, Kansas, and South Dakota during 2008-2012 (the most recent year available for all states), Iowa's black walnut resource ranks first in terms of number of trees per acre (tpa) on timberland: 12.9 tpa for all live trees of at least 1 inch d.b.h., and 5.6 tpa for growing stock trees.

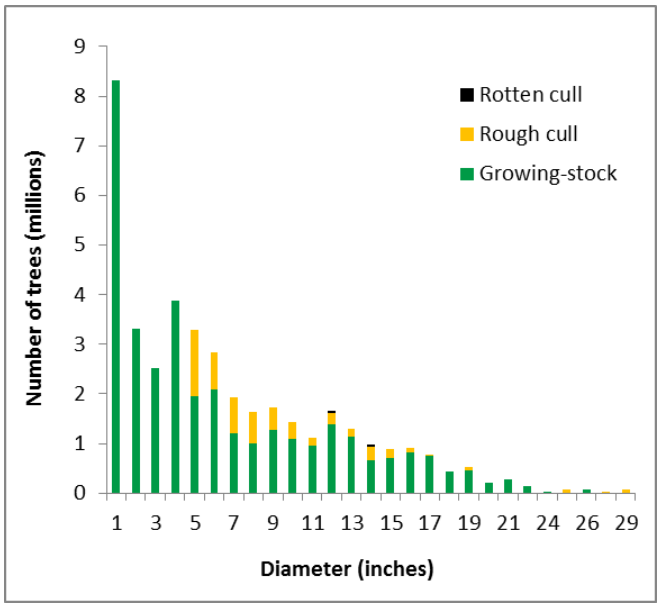

Figure 6.—Number of live black walnut trees (at least 1 inch d.b.h./d.r.c.) on forest land, Iowa, 2009-2013.

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Metadata

Information published in this report and in related tables is based on Forest Inventory and Analysis Database (FIADB), collected under field guides 3.0 to 6.0 and compiled in National Information Management System (NIMS) version 6.0, installed on November 15, 2012. Due to occasional changes to NIMS and FIADB, trend analyses should be made using FIA's online estimation tools, not by comparing published reports or tables. FIA estimates, tabular data, and maps may be generated at http://www.fia.fs.fed.us/tools-data/

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