USDA
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RESOURCE UPDATE FS-145

Forests of Iowa, 2017

This resource update provides an overview of forest resources in Iowa based on inventories 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. This report includes inventory years 2011-2017 (2017) with five-year comparisons[1] made to 2008-2012 (2012). The current data consist of 615 field plots on forest land.

(See footnotes on page 4.)

Overview

Currently, Iowa is home to about 2.9 million acres of forest land. Forest land area has decreased by 110,500 acres since 2012 (Table 1). The number of live trees on Iowa's forest land in 2017 was estimated at over 1 billion trees, a decrease of 9 percent from 2012. Live tree aboveground biomass and net merchantable volume increased slightly on both forest land and timberland.[2] Average annual net growth decreased while average annual net mortality increased on both forest land and timberland. Average annual harvest removals increased while average annual other removals decreased on both forest land and timberland (Table 1).

Table 1.—Iowa forest statistics, change between 2012 and 2017

	2012 Estimate	Sampling error (percent)	2017 Estimate	Sampling error (percent)	Change since 2012 (percent)
Forest Land					
Area (thousand acres)	2,986.1	2.2	2,875.6	2.1	-3.7
Number of live trees ≥1 in (million trees)	1,098.9	3.9	1,003.7	3.5	-8.7
Aboveground biomass of live trees ≥1 in (thousand oven-dry tons)	121,903.2	3.2	124,122.9	3.2	1.8
Net merchantable bole volume of live trees ≥5 in diameter (million ft^3)	4,507.5	3.8	4,638.8	3.7	2.9
Average annual net growth live trees ≥5 in (thousand ft^3/yr)	108,319.0	8	82,863.8	10.4	-23.5
Average annual mortality of live trees ≥5 in (thousand ft^3/yr)	85,584.5	8.4	97,526.0	8.3	14.0
Average annual harvest removals of live trees ≥5 in (thousand ft^3/yr)	26,876.1	22.4	32,035.7	20.8	19.2
Average annual other removals of live trees ≥5 in (thousand ft^3/yr)	17,675.9	42.2	6,298.7	29.5	-64.4
Timberland					
Area (thousand acres)	2,832.5	2.4	2,737.1	2.3	-3.4
Number of live trees ≥1 in (million trees)	1,050.2	4.1	965.4	3.7	-8.1
Aboveground biomass of live trees ≥1 in (thousand oven-dry tons)	114,934.2	3.4	117,183.0	3.3	2.0
Net merchantable bole volume of live trees ≥5 in diameter (million ft^3)	4,233.4	3.9	4,353.8	3.8	2.8
Net merchantable bole volume of growing-stock trees (million ft^3)	3,016.5	4.7	3,043.4	4.6	0.9
Average annual net growth of growing-stock trees (thousand ft^3/yr)	69,639.7	8.1	62,073.3	10.0	-10.9
Average annual mortality of growing-stock trees (thousand ft^3/yr)	46,026.7	11	49,011.3	11.4	6.5
Average annual harvest removals of growing-stock trees (thousand ft^3/yr)	20,838.2	26.9	22,627.8	25.2	8.6
Average annual other removals of growing-stock trees (thousand ft^3/yr)	13,238.0	52.5	1,794.4	40.7	-86.4

Forest Area

Forest and other land uses, Iowa. Photograph by Iowa Department of Natural Resources, used with permission.

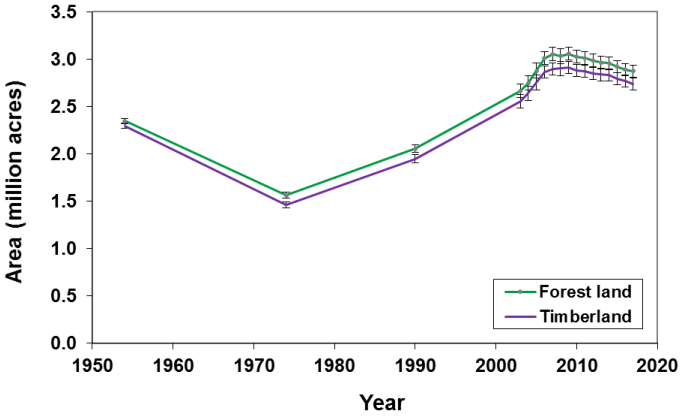

Figure 1.—Area of timberland and forest land in Iowa, by year. Sampling errors and error bars shown in the tables and figures in this report represent 68 percent confidence intervals for the estimated values.

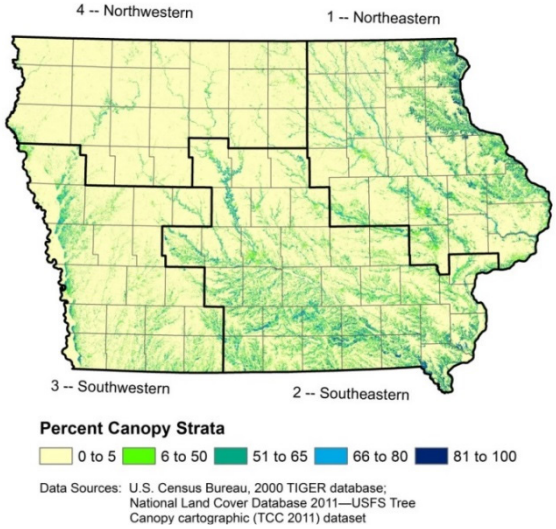

Figure 2.—Forest land by canopy cover stratum and survey unit, Iowa.

Area of forest land has remained relatively stable during recent years, but differs substantially from past decades (Table 1, Fig. 1). Historical forest land area exceeded 7 million acres during the mid 1800s (Thornton and Morgan 1959). Forest land area declined between the 1950s and 1970s, rebounded during the 1990s, and now shows a slight declining trend (Fig. 1). Eighty-five percent of forest land is privately owned.

Iowa is divided into four survey units, with forest land area unevenly distributed among units: Northeastern Unit (34 percent of statewide forest land area), Southeastern (48 percent), Southwestern (14 percent) and Northwestern (4 percent) (Fig. 2).

The oak/hickory forest-type group occupies the largest proportion of forest land in Iowa at 1.96 million acres, followed by elm/ash/cottonwood at 631,000 acres, maple/birch at 93,000 acres, and oak/pine at 82,000 acres (Fig. 3). Most of Iowa's forests are in the large diameter stand-size class (74 percent); the small diameter stand-size class dominates forest land acreage for other hardwoods, and all softwoods forest type-groups (Fig. 3).

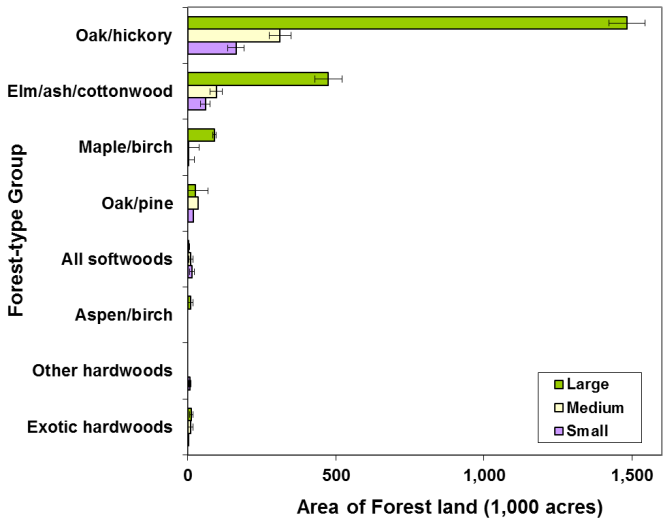

Figure 3.—Area of forest land by forest-type group and stand-size class, Iowa, 2017. Note: Forest type definitions have changed and may not be directly comparable with published estimates from previous years. Composition of forest-type groups varies geographically. For this report, maple/beech/birch forest-type group is referred to as 'maple/birch' due to the absence of beech in Iowa. 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 (2015).

Volume, Biomass, and Trends

In 2017, 58 tree species were recorded on Iowa forest land. More than one-third of Iowa's 1 billion trees are represented by just five species: American elm (*Ulmus americana*, 113 million), eastern hophornbeam (*Ostrya virginiana*, 90 million), hackberry (*Celtis occidentalis*, 76 million), shagbark hickory (*Carya ovata*, 46 million), and mulberry spp. (including red mulberry, *Morus rubra*, and white mulberry, *Morus alba*, 48 million).

Three oak species together comprise 64 million trees containing 1.1 billion cubic feet of Iowa's 4.6 billion cubic feet of live tree volume on forest land (Table 2). The 10 most voluminous tree species comprise more than 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 fifth in cubic foot volume, but is twenty-seventh in terms of number of trees (11.8 million).

Total cubic foot volume on forest land increased by 2.9 percent and board foot volume on timberland increased by 3.3 percent since 2012, with gains and losses varying among individual species (Table 2). Individual species with the largest contributions to change were black walnut (*Juglans nigra*) (17 percent of growth, 7 percent of removals) and silver maple (*Acer saccharinum*) (14 percent of mortality).

Iowa currently has 124 million tons of aboveground tree biomass on forest land, 83 percent of which is on private land (Fig. 4). Growing-stock biomass is almost twice as large as non-growing-stock biomass. About 74 percent of biomass is contained in the boles of trees; the remaining 26 percent is distributed among stumps, tops, limbs, and in trees smaller than 5 inches diameter at breast height (d.b.h.) (Fig. 4). Biomass trends are similar to volume, with biomass increasing since 2012 by 1.8 percent on forest land, and 2.0 percent on timberland (Table 1).

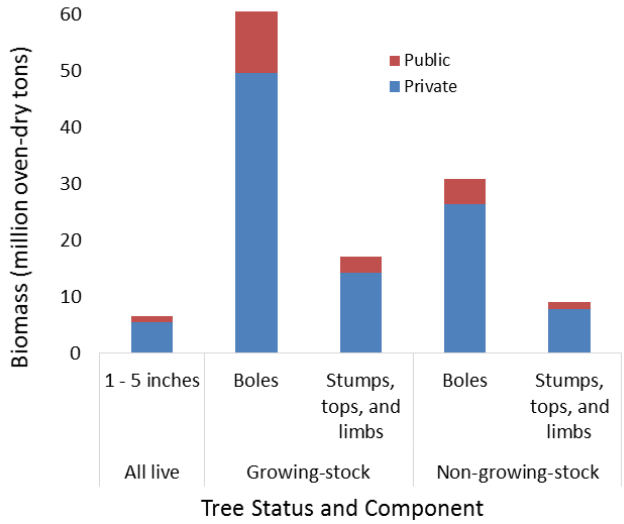

Figure 4.—Aboveground oven-dry weight of live trees (at least 1 inch d.b.h./d.r.c.), in million tons, on forest land by owner category and tree component, Iowa, 2017.

Table 2.—Top tree species by statewide volume estimates on forest land and timberland, Iowa, 2017

Rank	Species	Volume of live trees on forest land (1,000,000 ft^3)	Sampling error (%)	Change since 2012 (%)	Volume of sawtimber trees on timberland (1,000,000 board feet)	Sampling error (%)	Change since 2012 (%)
1	Silver maple	494.5	17.4	2.2	894.3	20.5	-7.1
2	Bur oak	466.0	11.1	-2.1	1,001.1	13.2	-4.2
3	White oak	356.7	13.6	-3.8	1,270.0	14.8	1.1
4	Black walnut	350.9	12.7	12.3	1,125.6	16.3	10.1
5	Cottonwood	333.4	25.8	-6.4	1,420.7	25.2	4.8
6	Northern red oak	299.2	13.3	4.1	1,121.2	15.1	-0.3
7	Hackberry	252.1	12.0	10.6	679.5	15.1	12.8
8	American basswood	247.6	14.3	14.5	838.5	17.2	20.4
9	American elm	205.5	7.6	6.6	282.5	13.9	24.2
10	Shagbark hickory	191.2	11.6	6.9	526.0	15.7	8.7
	Other softwood species	65.5	13.8	10.6	40.9	42.7	-10.1
	Other hardwood species	1,376.2	4.7	2.2	2,565.6	7.7	0.1
	All species	4,638.8	3.7	2.9	11,765.7	5.2	3.3

Land Use Change

Conversion of forest land to nonforest and water uses is referred to as gross forest loss (or diversion), and conversion of nonforest land and water to forest is known as gross forest gain (or reversion). The magnitude of the difference between gross loss and gross gain is defined as net forest change. Since 2012, net change in Iowa forest land was -3.7 percent (Table 1), with gross gain partly offsetting gross loss (Figure 5). Spatial distribution of forest loss and gain is shown in Figure 6.

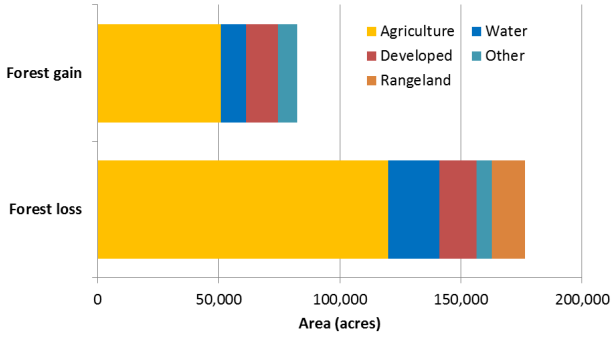

Figure 5.—Gross area forest loss and forest gain by land use category, Iowa, 2008-2012 to 2011-2017.

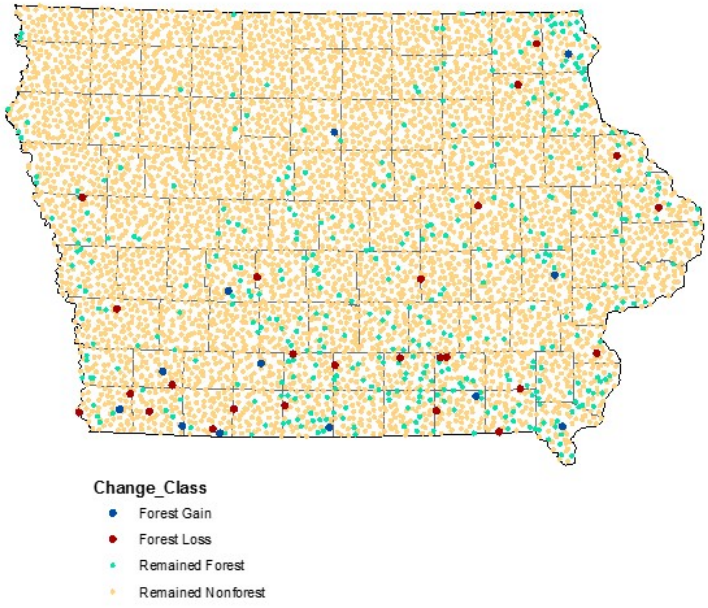

Figure 6.—Approximate locations of remeasured FIA plots showing forest gain, forest loss, persisting forest, and persisting nonforest, Iowa, 2008-2012 to 2011-2017.

Additional Inventory Information

Metadata

Information published in this report and in related tables is based on Forest Inventory and Analysis database (FIADB), accessed in December 2017. Data were collected under field guides 4.0 to 7.01, compiled in National Information Management System (NIMS) version 7.0, installed on November 3, 2017. 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 https://www.fia.fs.fed.us/tools-data/. See O'Connell et al. (2016) for definitions and technical details.

Footnotes

[1]See Nelson et al. (2015) for additional details.

[2]Timberland is defined as forest land that is producing or capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment and excludes reserved forest lands.

Literature Cited

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Contact Information

Mark D. Nelson, Research Forester
USDA Forest Service, Northern Research Station
1992 Folwell Ave.
St. Paul, MN 55108
Ph: 651-649-5104 / Fax: 651-649-5140
mdnelson@fs.fed.us
Northern FIA: https://nrs.fs.fed.us/fia/National FIA: https://fia.fs.fed.us

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