



Forests of Iowa, 2016

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. The cycle length for annual inventory in Iowa 1999-2013, was 5 years. In 2014, NRS-FIA changed to a 7-year inventory cycle, wherein 1/7th (14.3 percent) of the plots will be measured annually until 2020.¹ This report includes inventory years 2011-2016 (2016) with comparisons made to 2007-2011 (2011). The current data consist of 624 field plots on forest land.

Overview

Currently, Iowa is home to about 2.9 million acres of forest land. Forest land area has decreased by 122,800 acres since 2011 (Table 1). The number of live trees on Iowa’s forest land in 2016 was estimated at over 1 billion trees, a decrease of 7 percent from 2011. Live tree aboveground biomass and net volume increased on both forest land and timberland.² Average annual net growth and annual other removals decreased, and average annual mortality increased since 2011, on both forest land and timberland (Table 1). Annual harvest removals increased on forest land, but decreased slightly on timberland. (See footnotes on page 4.)

Table 1.—Iowa forest statistics and change between 2011 and 2016.

	2011 Estimate	Sampling error (percent)	2016 Estimate	Sampling error (percent)	Change since 2011 (percent)
Forest Land					
Area (thousand acres)	3,013.8	2.2	2,891.0	2.1	-4.1
Number of live trees ≥1 inch (million trees)	1,102.7	3.8	1,026.1	3.5	-6.9
Aboveground biomass of live trees ≥1 inch (thousand oven-dry tons)	120,444.5	3.3	123,816.0	3.2	2.8
Net volume of live trees ≥5 inches diameter (million ft ³)	4,456.4	3.8	4,614.8	3.7	3.6
Annual net growth live trees ≥5 inches (thousand ft ³ /yr)	109,639.7	8.5	86,891.4	10.2	-20.7
Annual mortality of live trees ≥5 inches (thousand ft ³ /yr)	78,957.5	9	94,895.5	8.8	20.2
Annual harvest removals of live trees ≥5 inches (thousand ft ³ /yr)	29,257.0	18.5	33,003.7	20.2	12.8
Annual other removals of live trees ≥5 inches (thousand ft ³ /yr)	19,884.2	38.3	6,239.2	29.5	-68.6
Timberland					
Area (thousand acres)	2,870.2	2.4	2,770.2	2.3	-3.5
Number of live trees ≥1 in (million trees)	1,055.8	4	990.3	3.7	-6.2
Aboveground biomass of live trees ≥1 inch (thousand oven-dry tons)	113,648.4	3.4	117,652.0	3.3	3.5
Net volume of live trees ≥5 inches diameter (million ft ³)	4,184.4	3.9	4,360.7	3.7	4.2
Net volume of growing-stock trees (million ft ³)	2,982.8	4.7	3,066.9	4.6	2.8
Annual net growth of growing-stock trees (thousand ft ³ /yr)	70,527.6	8.6	66,081.6	9.6	-6.3
Annual mortality of growing-stock trees (thousand ft ³ /yr)	44,272.2	11.5	47,892.0	11.8	8.2
Annual harvest removals of growing-stock trees (thousand ft ³ /yr)	22,399.2	22	22,253.8	25.3	-0.6
Annual other removals of growing-stock trees (thousand ft ³ /yr)	15,103.3	46.8	2,079.1	39.6	-86.2



Forest Area



Oriental bittersweet invading Iowa forests. Photographs by Mark Vitosh, Iowa DNR, used with permission. See page 4 for details on invasive plants in Iowa.

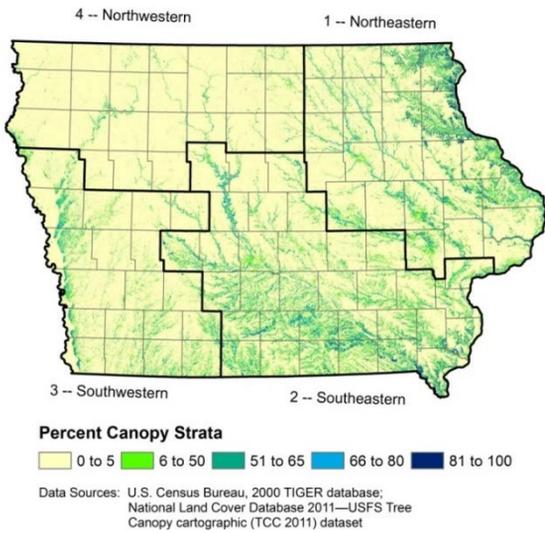


Figure 1.—Forest land by canopy cover stratum and survey unit, Iowa.

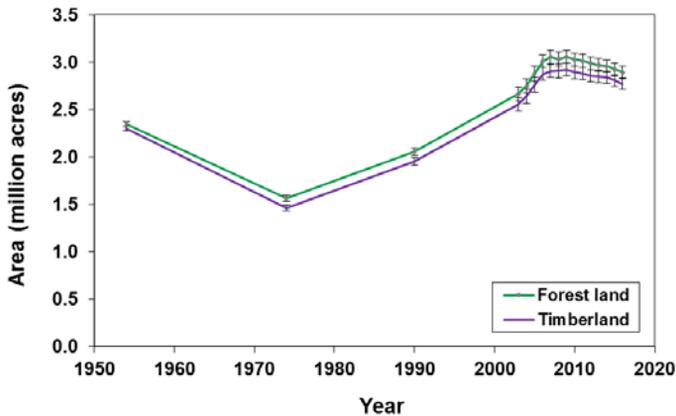


Figure 2.—Area of timberland and forest land in Iowa, by year. Sampling errors and error bars shown in the tables and figures in this report represent 68 percent confidence intervals for the estimated values.

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. 1).

Area of 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 declined between the 1950s and 1970s, rebounded during the 1990s, and now shows a slight declining trend (Fig. 2).

The oak/hickory forest-type group occupies the largest proportion of timberland in Iowa at 1.89 million acres, followed by elm/ash/cottonwood at 612,000 acres, maple/birch at 93,000 acres, and oak/pine at 74,000 acres (Fig. 3). Most of Iowa’s forests are in the large diameter stand-size class (73 percent); the small diameter stand-size class dominates timberland acreage for other hardwoods, and all softwoods forest type-groups (Fig. 3).

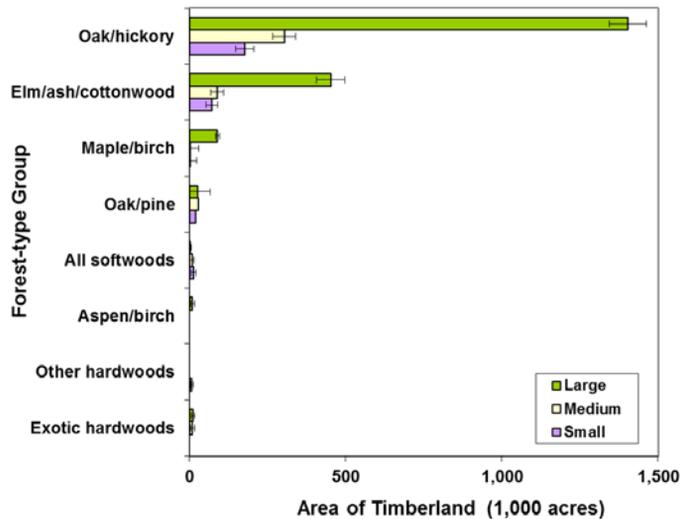


Figure 3.—Area of timberland by forest-type group and stand-size class, Iowa, 2016. Note: Forest type definitions have changed and may not be directly comparable with published estimates from previous years. Composition of forest-type groups varies geographically. In Iowa, maple/beech/birch forest-type 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 U.S. Forest Service (2015).

Volume, Biomass, and Trends

In 2016, 59 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*, 118 million), eastern hophornbeam (*Ostrya virginiana*, 91 million), hackberry (*Celtis occidentalis*, 74 million), shagbark hickory (*Carya ovata*, 48 million), and mulberry spp. (including red mulberry, *Morus rubra*, and white mulberry, *Morus alba*, 48 million).

In contrast, three oak species together comprise over 1.1 billion cubic feet of Iowa’s 4.6 billion cubic feet of live tree volume on forest land. 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 fourth in cubic foot volume, but only twenty-eighth in terms of number of trees (11.4 million).

Total cubic foot volume on forest land increased by 3.6 percent and board foot volume on timberland increased by 5.6 percent since 2011, 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*) (18 percent of mortality).

Iowa currently has more than 123 million tons of aboveground tree biomass on forest land, 83 percent of which is on private land (Fig. 4). Growing-stock biomass is twice as large as 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 diameter at breast height (d.b.h.) (Fig. 4). Biomass trends are similar to volume, with biomass increasing since 2011 by 2.8 percent on forest land, and 3.5 percent on timberland (Table 1).

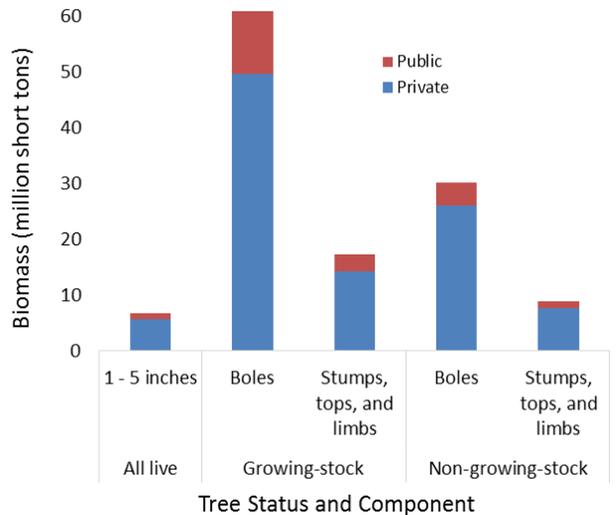


Figure 4.—Aboveground dry weight of live trees (at least 1 inch d.b.h./d.r.c.), in thousand dry short tons, on forest land by owner category and tree component, Iowa, 2016.

Table 2.—Top tree species by statewide volume estimates on forest land and timberland, Iowa, 2016.

Rank	Species	Volume of live trees on forest land (million ft ³)	Sampling error (%)	Change since 2011 (%)	Volume of sawtimber trees on timberland (million board feet)	Sampling error (%)	Change since 2011 (%)
1	Bur oak	478.7	11.1	3.0	1,030.0	13.2	0.7
2	Silver maple	466.2	18.0	-4.0	883.3	20.7	-8.0
3	White oak	361.8	13.3	0.0	1,296.9	14.5	6.6
4	Cottonwood	336.4	25.5	-8.0	1,378.4	25.6	0.4
5	Black walnut	332.9	10.8	8.5	1,040.4	13.8	4.0
6	Northern red oak	300.0	13.5	5.9	1,147.5	15.1	2.9
7	American basswood	254.3	13.9	20.4	875.8	16.6	31.9
8	Hackberry	248.3	12.1	17.5	665.0	15.3	22.9
9	American elm	201.8	7.6	0.0	267.4	14.3	6.2
10	Shagbark hickory	196.2	11.3	13.7	529.5	15.1	15.6
	Other softwood species	63.7	13.9	9.6	41.4	42.2	-15.7
	Other hardwood species	1,374.4	4.7	3.1	2,630.5	7.8	5.0
	All species	4,614.8	3.7	3.6	11,786.2	5.1	5.6

Nonnative Invasive Plants

Nonnative invasive plants (NNIP) pose a serious threat to Iowa's forest ecosystems. These NNIP reduce ecosystem diversity and degrade wildlife habitat by displacing native plants. One half of Iowa's family forest owners consider undesirable plants a concern that is either important or very important (Butler et al. 2016).

In 2016, 85 plots were assessed for the presence and cover of 40 NNIP species — woody, herbaceous, grasses, and vines. At least 14 NNIP species were observed on 94 percent of plots (Fig. 5). The frequency of multiflora rose (*Rosa multiflora*) changed slightly between 2007 (57 percent) and 2016 (55 percent), but other predominant NNIP species increased substantially: reed canary grass (*Phalaris arundinacea*, 16 to 36 percent), garlic mustard (*Alliaria petiolata*, 16 to 25 percent), and nonnative bush honeysuckles (*Lonicera spp*, now 44 percent). Oriental bittersweet (*Celastrus orbiculatus*) is an invasive vine (page 2) that poses increasing threats to Iowa's trees, shrubs, and wildlife habitat. For more information, see <http://www.iowadnr.gov/Portals/idnr/uploads/forestry/Forest%20Health/OrientalBittersweet.pdf>.

Additional Inventory Information

Metadata

Information published in this report and in related tables is based on Forest Inventory and Analysis database (FIADB), accessed in January 2017. Data were collected under field guides 4.0 to 7.0, compiled in National Information Management System (NIMS) version 6.02, 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://fiatools.fs.fed.us>. See O'Connell et al. (2016) for definitions and technical details.

Footnotes

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

²Timberland 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.

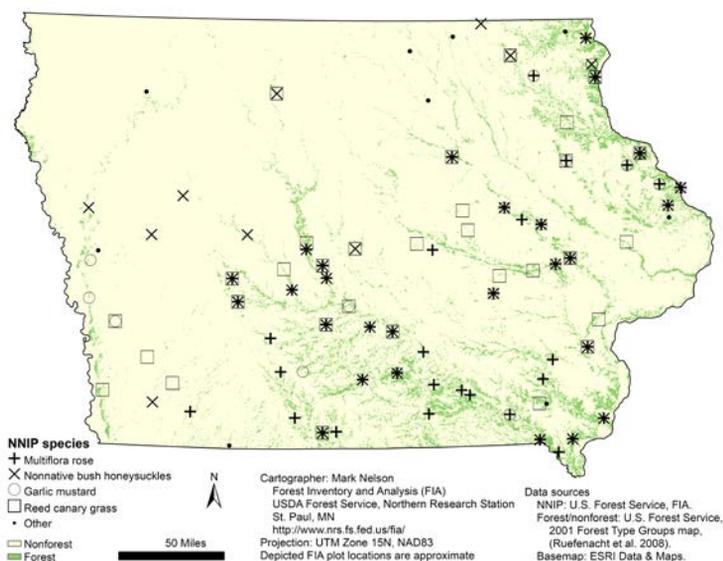


Figure 5.—Distribution of nonnative invasive plants observed on forested inventory plots in Iowa, 2011-2016.

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