



Forests of Iowa, 2014

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. This report includes inventory years 2009-2014 (2014) with comparisons made to 2005-2009 (2009). The current data consist of 634 field plots on forest land, with about 20 percent of plots measured each year.*

* (See footnotes on page 4.)

Overview

Currently, Iowa is home to almost 3 million acres of forest land. Forest land area has decreased by 3.2 percent (97,800 acres) since the previous inventory period (2009) (Table 1). The number of live trees on Iowa’s forest land in 2014 was estimated at 1.1 billion trees, a decrease of 8.8 percent from 2009. Live tree aboveground biomass and net volume increased on both forest land and timberland**. Both average annual net growth, net harvest removals, and annual other removals (e.g., land use change) decreased, while average annual mortality increased since 2009, on both forest land and timberland (Table 1).

Table 1.—Iowa forest statistics, change between 2009 and 2014.

	2009 Estimate	Sampling error (percent)	2014 Estimate	Sampling error (percent)	Change since 2009 (percent)
Forest Land					
Area (thousand acres)	3,055.1	2.1	2,957.3	2.1	-3.2
Number of live trees ≥1 in diameter (million trees)	1,162.6	3.8	1,060.3	3.4	-8.8
Aboveground biomass of live trees ≥1 in (thousand oven-dry tons)	115,957.0	3.3	123,298.3	3.1	6.3
Net volume of live trees ≥5 in diameter (million ft ³)	4,281.8	4	4,567.0	3.7	6.7
Annual net growth live trees ≥5 in (thousand ft ³ /yr)	143,343.3	7.6	97,235.7	9.2	-32.2
Annual mortality of live trees ≥5 in (thousand ft ³ /yr)	62,315.4	8	89,716.6	9.1	44.0
Annual harvest removals of live trees ≥5 in (thousand ft ³ /yr)	33,267.4	18.7	28,770.2	21.2	-13.5
Annual other removals of live trees ≥5 in (thousand ft ³ /yr)	24,263.0	35.4	11,314.4	31	-53.4
Timberland					
Area (thousand acres)	2,925.7	2.3	2,844.7	2.3	-2.8
Number of live trees ≥1 in diameter (million trees)	1,114.3	4	1,019.8	3.6	-8.5
Aboveground biomass of live trees ≥1 in (thousand oven-dry tons)	109,855.1	3.4	117,549.8	3.2	7.0
Net volume of live trees ≥5 in diameter (million ft ³)	4,035.8	4	4,334.5	3.7	7.4
Net volume of growing stock trees (million ft ³ t)	2,907.3	4.9	3,060.7	4.5	5.3
Annual net growth of growing stock trees (thousand ft ³ /yr)	93,068.5	8	69,096.4	9.1	-25.8
Annual mortality of growing stock trees (thousand ft ³ /yr)	35,605.5	11	47,298.4	11.9	32.8
Annual harvest removals of growing stock trees (thousand ft ³ /yr)	23,343.8	21.7	22,063.8	25.6	-5.5
Annual other removals of growing stock trees (thousand ft ³ /yr)	20,357.3	39.4	7,288.7	40.4	-64.2



Forest Area



Northeastern Iowa forest land. Photograph by Linda Haugen, U.S. Forest Service.

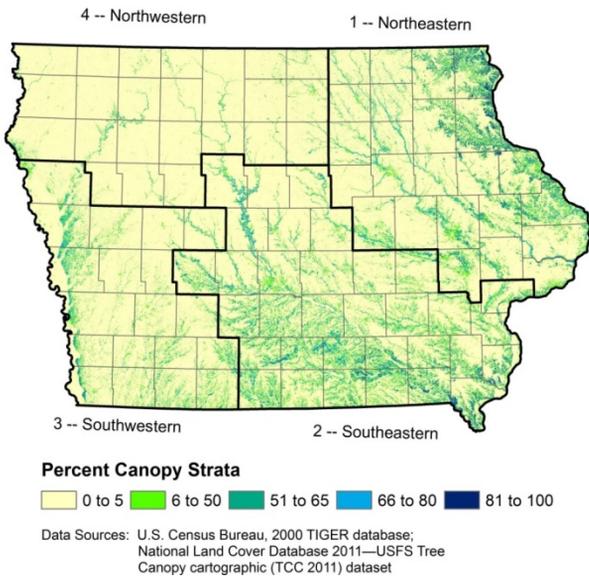


Figure 1.—Forest land by canopy cover stratum and survey unit, Iowa.

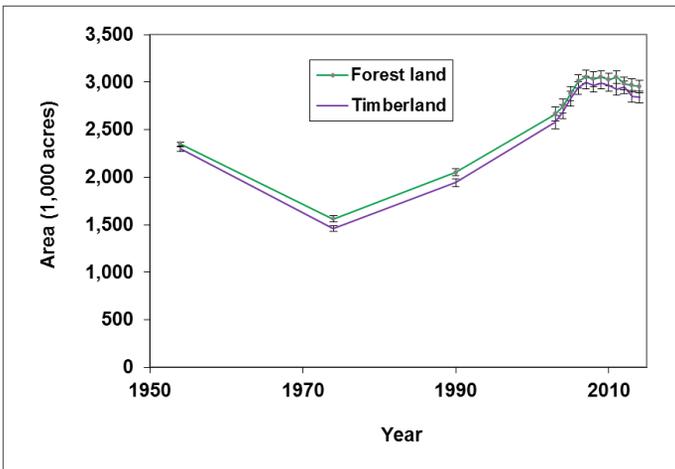


Figure 2.—Area of timberland and forest land in Iowa, by year. Note: Sampling errors and error bars shown in the tables and figures in this report represent 68 percent confidence intervals for the estimated values.

Iowa is divided into four survey units, with forest land area unevenly distributed among units: Northeastern (33 percent of statewide forest land area), 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 declined between the 1950s and 1970s, rebounded during the 1990s, and is now showing a slightly 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 658,000 acres, maple/birch at 75,000 acres, and oak/pine at 72,000 acres (Fig. 3). Most of Iowa’s forests are in large diameter stand-size class (71 percent); small diameter stand-size class dominates timberland acreage for oak/pine, other hardwoods, and all softwoods forest type-groups (Fig. 3).

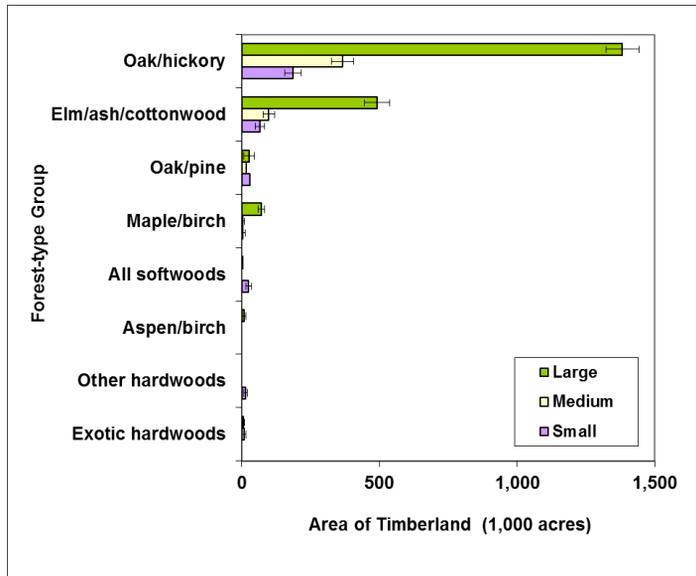


Figure 3.—Area of timberland by forest-type group and stand-size class, Iowa, 2014. Note: Forest type definitions have changed and may not be directly comparable with published estimates from previous years. Composition of forest-type groups varies geographically. In Iowa, maple/beech/birch forest-type 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 (2007).

Volume, Biomass, and Trends

FIA field crews recorded trees of 60 species on Iowa forest land in the 2014 inventory. More than one-third of Iowa’s 1.1 billion trees are represented by just five species: American elm (*Ulmus americana*, 121 million), eastern hophornbeam (*Ostrya virginiana*, 94 million), hackberry (*Celtis occidentalis*, 75 million), shagbark hickory (*Carya ovata*, 49 million), and mulberry spp. (including red mulberry, *Morus rubra*, and white mulberry, *Morus alba*, 48 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 4.6 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-ninth in terms of number of trees (11.7 million).

Total cubic foot volume on forest land increased by 6.7 percent and board foot volume on timberland increased by 6.4 percent since 2009, with gains and losses varying among individual species (Table 2). Iowa’s growth, harvest removals (excluding ‘other’ removals), and mortality between 2009 and 2014 were 97.2, 28.8, and 89.7 million cubic feet on forest land and 69.1, 22.1, and 47.3 million cubic feet in growing-stock trees on timberland, respectively (Table 1). Individual species with the largest contributions to change were black walnut (*Juglans nigra*) (18 percent of growth, 23 percent of removals) and American elm (23 percent of mortality).

Iowa currently has more than 123 million tons of aboveground tree biomass on forest land, 84 percent of which is on private land (Fig. 4). Growing-stock biomass is nearly 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 diameter at breast height (d.b.h.) (Fig. 4). Biomass trends are similar to volume, with biomass increasing since 2009 by 6.3 percent on forest land, 7.0 percent on timberland (Table 1).

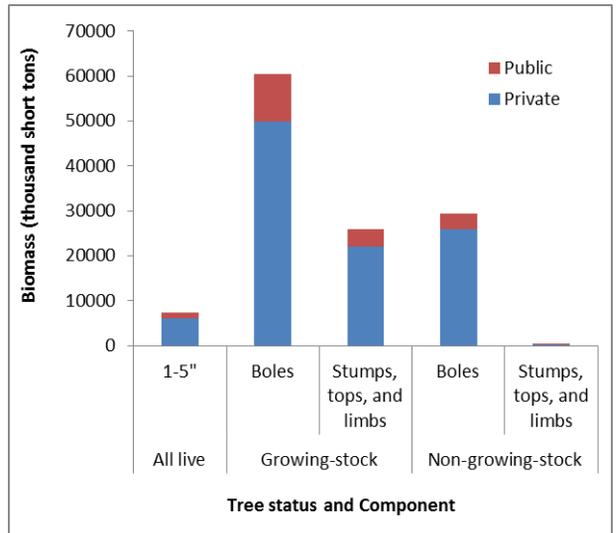


Figure 4.—Aboveground dry weight of live trees (at least 1 inch d.b.h./d.r.c.), in thousand dry short tons, on forest land by owner category and tree component, Iowa, 2014.

Table 2.—Top tree species by statewide volume estimates on forest land and timberland, Iowa, 2014

Rank	Species	Volume of live trees on forest land (1,000,000 ft ³)	Sampling error (%)	Change since 2009 (%)	Volume of sawtimber trees on timberland (1,000,000 board feet)	Sampling error (%)	Change since 2009 (%)
1	Bur oak	494.4	10.8	9.2	1,084.2	13.1	8.2
2	Silver maple	463.7	18.1	-6.6	924.5	20.1	-6.8
3	White oak	366.2	13.3	0.8	1,229.4	14.9	4.1
4	Cottonwood	335.0	25.5	-5.7	1,371.9	25.8	-1.2
5	Black walnut	318.2	11.1	9.3	1,011.2	14.0	3.8
6	Northern red oak	291.3	13.8	12.4	1,122.3	15.6	16.1
7	Hackberry	244.2	12.5	24.4	644.6	15.8	28.1
8	American basswood	231.1	14.1	16.7	780.9	16.9	25.7
9	Shagbark hickory	195.0	11.3	18.3	518.6	15.3	17.8
10	American elm	192.6	7.4	-11.6	247.1	14.6	-9.6
	Other softwood species	58.0	13.7	17.4	45.4	35.7	-26.1
	Other hardwood species	1,377.5	4.7	11.3	2,651.4	7.7	15.2
	All species	4,567.0	3.7	6.7	11,631.5	5.1	8.6

National Woodland Owner Survey

FIA conducts the National Woodland Owner Survey (NWOS) in order to better understand: who owns America's forests, why they own it, what they have done with it in the past, and what they intend to do with it in the future (Fig. 5, Fig. 6). Summaries reported here are based on the responses from randomly selected Iowa family forest owners, with 10+ acres of forest land, surveyed between 2011 and 2013 (n=138) (Butler et al. 2014).

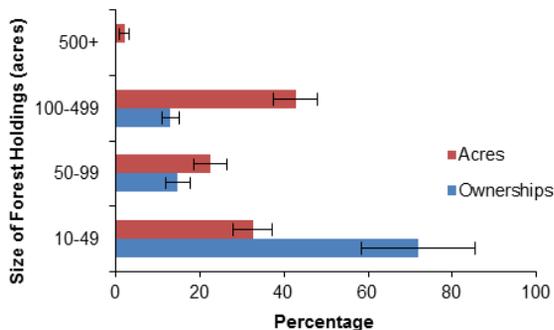


Figure 5.—Percentage of ownerships and percentage of area of family forests, by size of holdings, Iowa, 2011-2013.

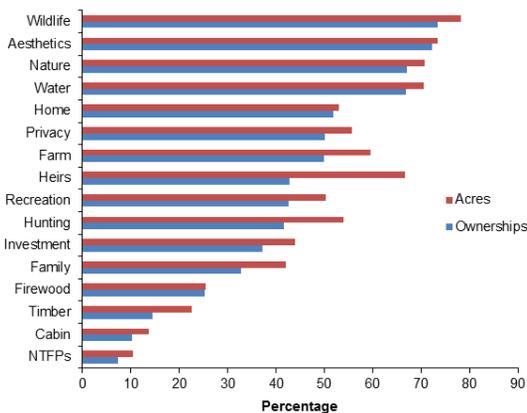


Figure 6.—Reasons for owning family forests, Iowa, 2011-2013. (NTFPs: Nontimber forest products)

Additional Inventory Information

Metadata

Information published in this report and in related tables is based on Forest Inventory and Analysis database (FIADB), accessed in November 2014. Data were collected under field guides 4.0 to 6.02, 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://fiatools.fs.fed.us>. See Bechtold and Patterson (2005) and O'Connell et al. (2013) for definitions and technical details.

Footnotes

*Cycle length is defined as the period of time required to measure a complete set of panels (70 subpanels). For annual inventory years in Iowa 1999-2013, the cycle length was equal to 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. The complete set of plots will be retained. All inventory estimates (both current and change) will continue to be based on the most recent measurements and remeasurements taken on these plots. As the 7-year cycle is phased in, the difference between the report year and average date of the recent data will increase from 2 to 3 years. The difference between the report year and the average midpoint year for change will increase from 4.5 to 6.5 years. For the 2014 report, these differences are 2.3 and 4.8 years, respectively.

**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 excluding reserved forest lands.

References

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.

Butler, B.J.; Hewes, J.H.; Dickinson, B.J.; Andrejczyk, K.; Markowski-Lindsay, M.; Butler, S.M. **Preliminary results from the USDA Forest Service, National Woodland Owner Survey**. On file at Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station.

O'Connell, B.M.; LaPoint, E.B.; Turner, J.A.; Ridley, T.; Boyer, D.; Wilson, A.M.; Waddell, K.L.; Pugh, S.A.; Conkling, B.L. 2013. **The Forest Inventory and Analysis database: database description and users manual version 5.16 for Phase 2**. Washington, DC: U.S. Department of Agriculture, Forest Service. (www.fia.fs.fed.us/library/database-documentation/)

Thornton, P.L.; Morgan, J.T. 1959. **The forest resources of Iowa**. For. Surv. Release 22. Columbus, OH: U.S. Department of Agriculture, Forest Service, Central States Forest Experiment Station. 46 p.

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