USDA Forest Service, US Department of Agriculture
Northern Research Station

Iowa's Forest Resources, 2012

Research Note NRS-166

This publication provides an overview of forest resource attributes for Iowa based on an annual inventory (2008-2012) conducted by the Forest Inventory and Analysis (FIA) program of the U.S. Forest Service, Northern Research Station. These estimates, along with Web-posted core tables, are updated annually. For more information please refer to page 4 of this report.

Table 1.—Annual estimates, sampling errors, and change, Iowa, 2008-2012

	Estimate	Sampling error (%)	Change since 2007 (%)
Forest Land Estimates			
Area (1,000 acres)	2,986	2.2	-2.2
Number of live trees 1-inch diameter or larger (1,000,000 trees)	1,099	3.9	-6.5
Biomass of live trees 1-inch diameter or larger (1,000 dry tons)	121,896	3.2	6.9
Net volume of live trees (1,000,000 ft^3)	4,507	3.8	6.2
Annual net growth of live trees (1,000 ft^3/year)	108,263	8.0	-32.6
Annual mortality of live trees (1,000 ft^3/year)	85,585	8.4	52.9
Annual harvest removals of live trees (1,000 ft^3/year)	26,866	22.4	-25.6
Annual other removals of live trees (1,000 ft^3/year)	17,676	42.2	7.6
Timberland Estimates			
Area (1,000 acres)	2,946	2.2	-2.3
Number of live trees 1-inch diameter or larger (1,000,000 trees)	1,082	3.9	-6.3
Biomass of live trees 1-inch diameter or larger (1,000 dry tons)	119,841	3.3	6.5
Net volume of live trees (1,000,000 ft^3)	4,437	3.8	5.8
Net volume of growing-stock trees (1,000,000 ft^3)	3,184	4.6	2.5
Annual net growth of growing-stock trees (1,000 ft^3/year)	70,851	9.0	-39.8
Annual mortality of growing-stock trees (1,000 ft^3/year)	52,483	11.1	49.9
Annual harvest removals of growing-stock trees (1,000 ft^3/year)	20,848	26.9	-17.5
Annual other removals of growing-stock trees (1,000 ft^3/year)	13,446	51.7	-2.1

Note: Sampling errors and error bars shown in the tables and figures in this report represent 68% confidence intervals for the estimated values. Volumes are for 5-inch and larger diameter trees.

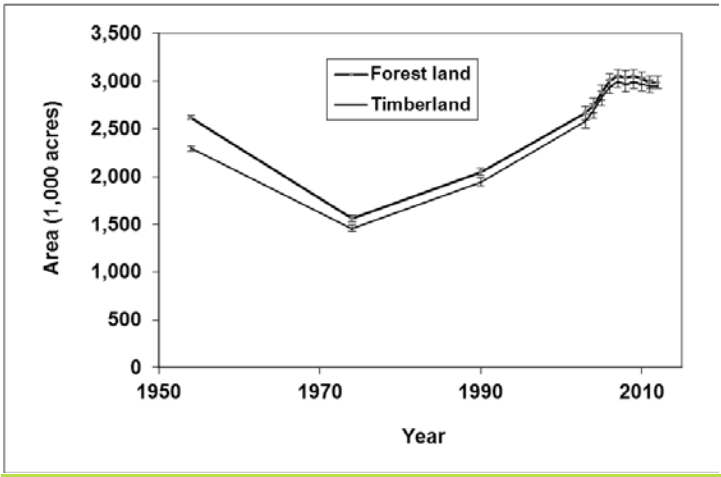


Figure 1.—Area of timberland and forest land in Iowa by year.

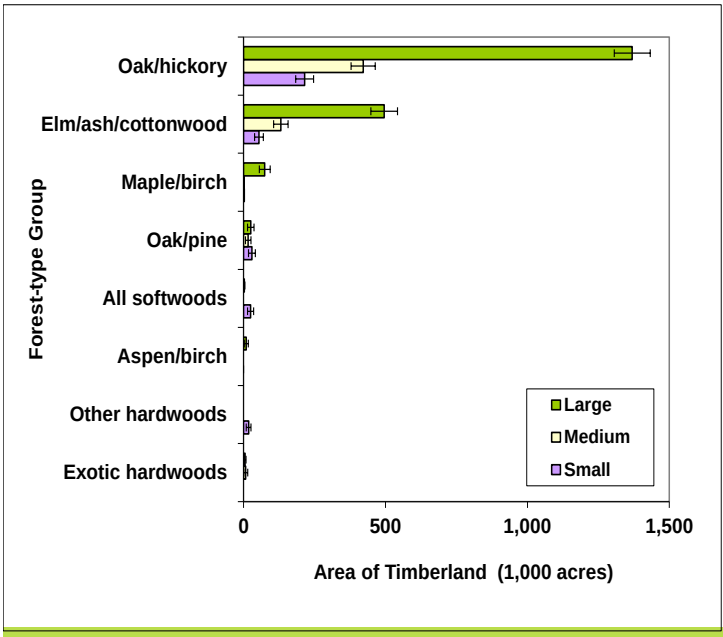
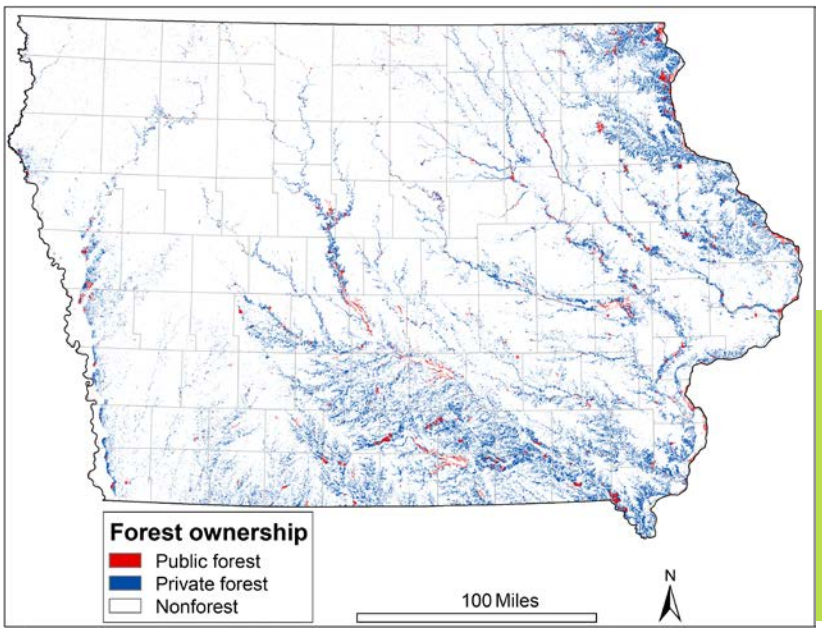


Figure 2.—Area of timberland by forest-type group and stand-size class, Iowa, 2008-2012.
Note: Forest type definitions have changed and may not be directly comparable with published estimates from previous years. Composition of forest-type groups varies geographically. In Iowa, Maple/beech/birch forest-type 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).

Table 2.—Top 10 tree species by statewide volume estimates, Iowa, 2008-2012

Rank	Species	Volume of live trees on forest land (1,000,000 ft^3)	Sampling error (%)	Change since 2007 (%)	Volume of sawtimber trees on timberland (1,000,000 board feet)	Sampling error (%)	Change since 2007 (%)
1	Silver maple	483.8	16.7	-6.3	1,312.1	20.7	-12.2
2	Bur oak	476.0	11.2	9.5	1,058.4	14.0	4.3
3	Cottonwood	370.6	13.2	5.6	1,277.4	14.5	8.3
4	White oak	356.1	26.0	-4.3	1,430.1	26.3	-7.7
5	Black walnut	312.4	12.1	17.1	1,048.4	14.8	14.9
6	Northern red oak	287.3	14.2	11.7	1,131.5	15.8	17.2
7	Hackberry	228.0	12.3	22.3	621.1	15.0	27.9
8	American basswood	216.2	14.4	12.0	701.8	17.1	10.6
9	American elm	192.7	7.6	-21.4	262.2	15.6	-29.6
10	Shagbark hickory	178.8	11.5	12.4	491.1	15.0	19.8
	Other softwood species	59.3	14.4	32.7	45.5	37.8	-42.7
	Other hardwood species	1,346.0	4.7	10.6	2,653.9	7.6	11.6
	All species	4,507.3	3.8	6.2	12,033.5	5.3	4.8



Most of Iowa forest land is privately owned (Fig. 3). Most nonindustrial private forest land area occurs within ownership parcels >20 acres in size (Fig. 4); however, the greatest number of private forest landowners own parcels of small acreages (Fig. 5). Parcelization (ownership subdivision) is of continued concern across Iowa and the Midwest. Retaining relatively large forest landholdings or aggregations of smaller parcels can help sustain operational forest management.

Figure 3.—Distribution of forest land by public (0.469 million acres) and private (2.586 million acres) owner groups, Iowa, 2006.

Projection: UTM Zone 15N, NAD83.

Data sources: forest/nonforest - U.S. Forest Service, 2001 Forest Type Groups map; ownership - Conservation Biology Institute, Protected Areas Database, 4.5; basemap - ESRI Data & Maps.

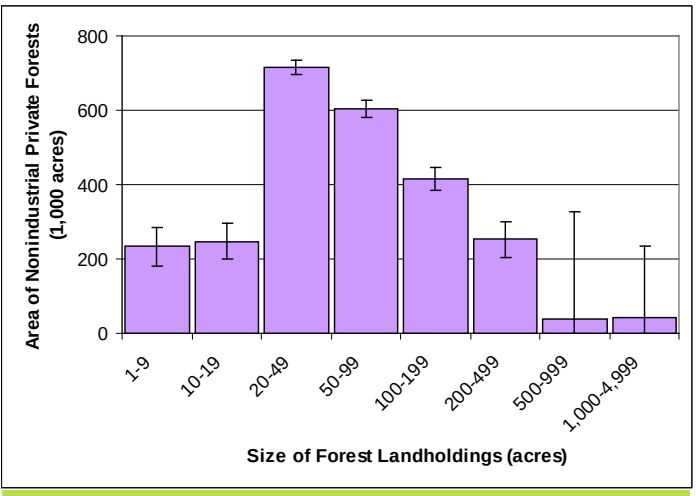


Figure 4.—Area (± 1 s.e.) of nonindustrial private forest land by size of forest landholding, Iowa, 2006. Data were derived from Butler (2008).

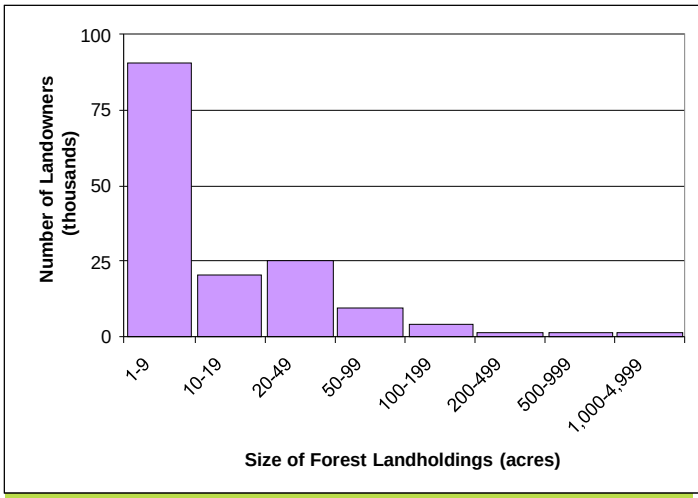


Figure 5.—Number of nonindustrial private forest landowners by size of forest landholding, Iowa, 2006. Data were derived from Butler (2008).

Issue Update: Forest Diversion, Reversion, and Net Growth

Area of Iowa forest land has remained relatively stable during recent years, but differs substantially from historical estimates (Table 1, Fig. 1). The original Iowa land survey, conducted between 1832 and 1859, indicates that historical forest land area exceeded 7 million acres in Iowa (Thornton and Morgan 1959). Iowa forest inventories (see page 4) report that 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 and stabilizing at about 3 million acres at present (Fig. 1).

FIA defines forest land using elements of both land use and land cover (Bechtold and Patterson 2005). Estimates of net change reveal useful information about overall trends in forest land area, but do not explicitly address concurrent diversion from forest to nonforest or reversion from nonforest to forest. Diversion typically occurs in Iowa when land use changes from forest to urban development or agriculture, while reversion typically occurs where historical forest had been converted to agriculture or pasture/rangeland, but is now reverting back to forest after previous land management practices are discontinued. Net growth in volume is based on observations of trees on remeasured plots, and includes growth components of survivor (trees alive during both inventories), ingrowth (trees exceeding 5 in d.b.h. since previous inventory), cut (growth until time of removal), and mortality (growth until time of death), but is also is affected by diversion (for persisting trees) and reversion (Fig. 6). Here we explore detection and dynamics of forest change, as well as how such information is used to better understand estimates of Iowa volume growth.

FIA initially identifies forest and nonforest land categories by interpreting aerial imagery. Those plots identified as forest land from imagery are inventoried on the ground by field crews; any previously forested plots also are visited on the ground. Plots that do not appear to be forested (and were not previously forested) are not visited on the ground. Since 2005, FIA has benefited from the use of newer and higher quality digital aerial imagery, which has enhanced our ability to detect forest reversion in a more timely fashion.

Annual area of forest diversion and reversion is very small relative to total forest area. During annual inventories, diversions have had consistently negligible effects on estimates of growth. Effects of reversions, however, have varied substantially between earlier and later annual inventories, decreasing from a peak in 2006 to minor amounts in recent years (Fig. 6). Estimates of growth between 1999-2003 and 2004-2006 included an increase in 'reversion growth' due to reversion of non-forest to forest land. The effect on increased growth was substantial because volumes of whole trees – not just new volume accrued via growth – are included as 'growth'. Since then, estimates of reversion have decreased and stabilized, likely due in part to use of enhanced imagery, resulting in an apparent decrease in recent growth and apparent increase in mortality. Thus, estimates for change in growth reported in Table 1, likely are inflated by previously high estimates of growth that included volume added through reversion. By stratifying our estimates of growth and mortality, we can better understand the drivers of change (Fig. 6). This gives greater assurance that actual change in growth over the past decade likely has been quite small.

Effects of reversions on estimates of growth vary considerably among tree species. Over 80 percent of bur oak growth was based on reversions during earlier annual inventories, decreasing to about 60 percent in the current inventory (Fig. 7). This is not surprising, given that bur oak is a major tree species along the forest transition zone, is frequently planted in shelterbelts, and is a pioneer species invading open areas. In contrast, reversion accounted for very little total growth in white oak, a long-lived, slow growing species. Other tree species show intermediate patterns, but all show a declining trend in reversion.

To aid in identifying change in net growth by component, a new table has been added to the FIA database (FIADB) (Pugh 2013). Additionally, summaries of net growth by component can be produced using FIA data tools (http://www.fia.fs.fed.us/tools-data/default.asp).

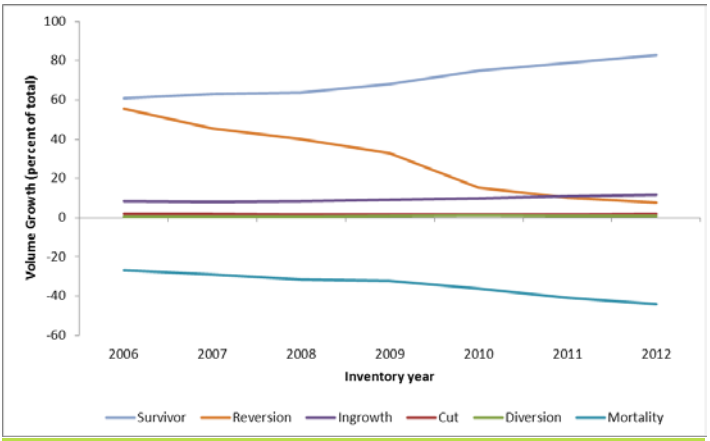


Figure 6.—Average annual net cubic foot growth of live trees (at least 5 inches d.b.h./d.r.c.) on forest, by component (percent), Iowa, 2006-2012.

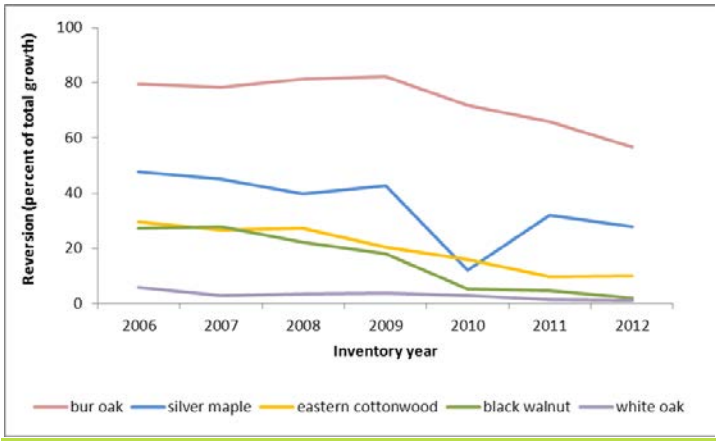


Figure 7.—Average annual net cubic foot reversions of live trees (at least 5 inches d.b.h./d.r.c.) of five top tree species, on forest, as a percentage of total growth, Iowa, 2006-2012.

Citation for this Publication

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FIA Program Information

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USDA Forest Service 2012. **Forest inventory and analysis national core field guide, Vol. 1: field data collection procedures for phase 2 plots, Ver. 6.0.** Washington, DC: U.S. Department of Agriculture, Forest Service. Available: http://www.fia.fs.fed.us/library/field-guides-methods-proc/. (Accessed March 11, 2013.)

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Special Issue

Pugh, S.A. 2012. **Michigan's forest resources, 2011.** Research Note NRS-137. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 4 p.

Pugh, S.A. 2013. **Michigan's forest resources, 2012**. Research Note NRS-165. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 4 p.

Additional Iowa Inventory Information

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Metadata

Information published in this report and in related tables is based on data from the Forest Inventory and Analysis Database (FIADB), collected under field guides 3.0 to 5.1 and compiled in the 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

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