

Image credit: Paul Wray, Iowa State University, Bugwood.org

Iowa's Forest Resources, 2011

Research Note NRS-135

This publication provides an overview of forest resource attributes for Iowa based on an annual inventory (2007-2011) 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, 2007-2011.

	Estimate	Sampling error (%)	Change since 2006 (%)
Forest Land Estimates			
Area (1,000 acres)	3,014	2.2	.2
Number of live trees 1-inch diameter or larger (1,000,000 trees)	1,103	3.8	-4.4
Biomass of live trees 1-inch diameter or larger (1,000 tons)	120,439	3.3	6.6
Net volume of live trees (1,000,000 ft ³)	4,456	3.8	5.8
Annual net growth of live trees (1,000 ft ³ /year)	109,589	8.5	-38.8
Annual mortality of live trees (1,000 ft ³ /year)	78,958	9.0	52.5
Annual harvest removals of live trees (1,000 ft ³ /year)	29,257	18.5	4.5
Annual other removals of live trees (1,000 ft ³ /year)	19,884	38.3	39.4
Timberland Estimates			
Area (1,000 acres)	2,968	2.2	.4
Number of live trees 1-inch diameter or larger (1,000,000 trees)	1,085	3.9	-4.1
Biomass of live trees 1-inch diameter or larger (1,000 tons)	118,337	3.3	6.2
Net volume of live trees (1,000,000 ft ³)	4,385	3.9	5.5
Net volume of growing-stock trees (1,000,000 ft ³)	3,156	4.6	.8
Annual net growth of growing-stock trees (1,000 ft ³ /year)	73,099	9.3	-41.6
Annual mortality of growing-stock trees (1,000 ft ³ /year)	49,432	11.9	66.1
Annual harvest removals of growing-stock trees (1,000 ft ³ /year)	22,409	22.0	34.9
Annual other removals of growing-stock trees (1,000 ft ³ /year)	15,312	46.2	11.5

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.

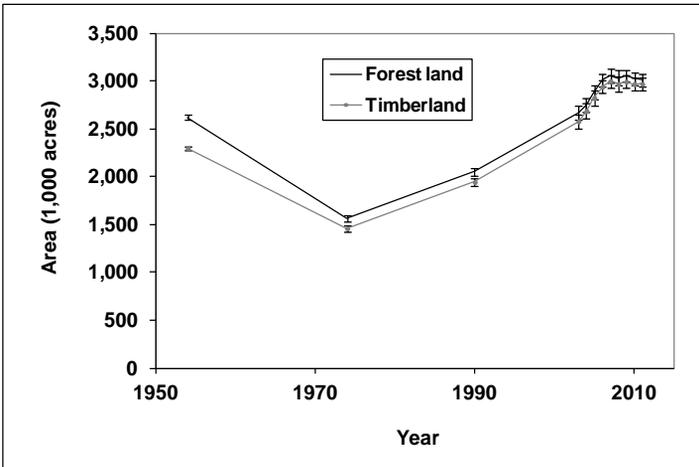


Figure 1.—Area of timberland and forest land in Iowa by year.

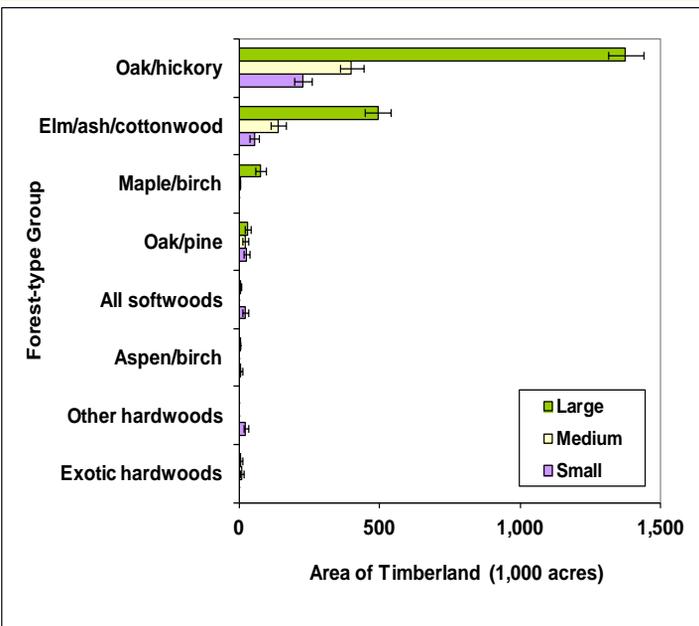
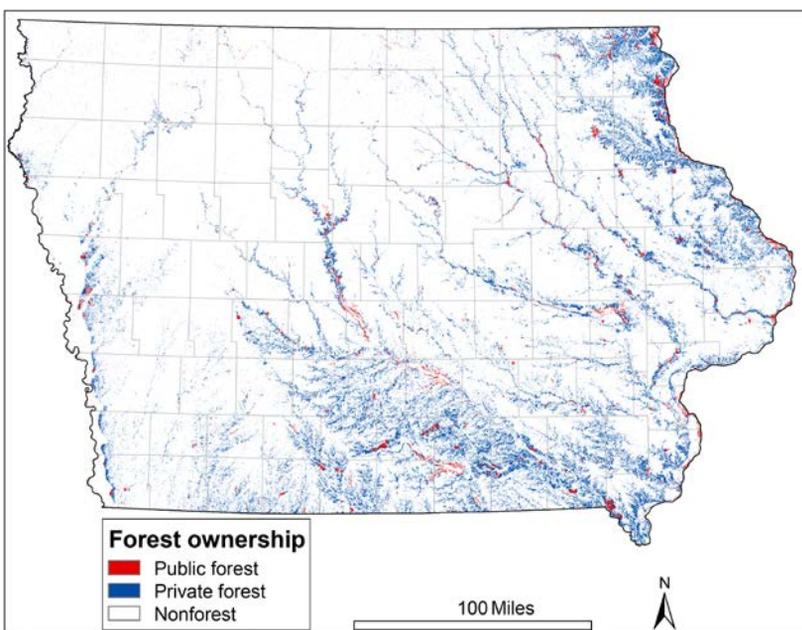


Figure 2.—Area of timberland by forest-type group and stand-size class, Iowa, 2007-2011.

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, 2007-2011.

Rank	Species	Volume of live trees on forest land (1,000,000 ft ³)	Sampling error (%)	Change since 2006 (%)	Volume of sawtimber trees on timberland (1,000,000 board feet)	Sampling error (%)	Change since 2006 (%)
1	Silver maple	485.5	17.4	-1.9	1,343.7	22.0	-4.9
2	Bur oak	464.6	11.3	-0.2	1,035.6	14.4	-6.1
3	Cottonwood	365.7	24.6	0.2	1,447.4	24.4	-6.5
4	White oak	361.8	13.3	2.1	1,237.0	14.6	3.7
5	Black walnut	306.8	12.3	17.8	1,026.3	15.0	15.2
6	Northern red oak	283.4	14.3	9.0	1,121.7	15.9	14.4
7	Hackberry	211.4	12.6	14.4	563.9	15.7	18.1
8	American basswood	211.3	14.2	9.8	669.3	17.3	1.7
9	American elm	201.8	7.7	-14.6	289.8	15.0	-17.8
10	Shagbark hickory	172.6	11.5	5.4	465.4	15.0	6.1
	Other softwood species	58.1	14.6	22.3	49.1	35.4	-53.4
	Other hardwood species	1,333.2	4.7	12.3	2,590.5	7.6	9.5
	All species	4,456.2	3.8	5.8	11,839.8	5.3	2.7



The vast majority of Iowa forest land is privately owned (Fig. 3). The majority of 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.

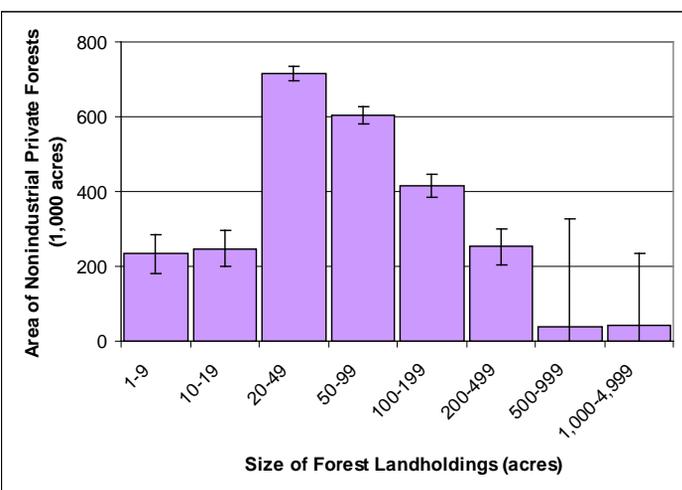


Figure 4.—Area (± 1 s.e.) of nonindustrial private forest land by size of forest landholding, Iowa, 2006. Data were derived from Butler (2008).

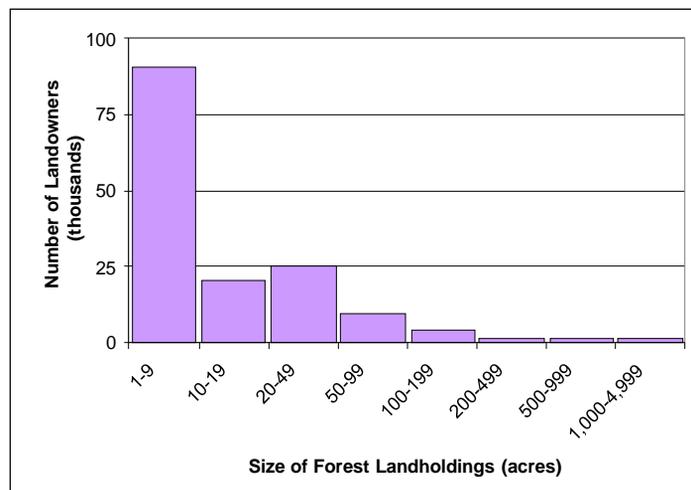


Figure 5.—Number of nonindustrial private forest landowners by size of forest landholding, Iowa, 2006. Data were derived from Butler (2008).

Issue Update: Forest Biomass

Forest ecosystems offset greenhouse gas emissions through sequestration of carbon dioxide in living biomass. Forest biomass, both live and dead, is also a renewable fuel source which may provide a cost-effective, carbon friendly alternative to fossil fuels used for energy production. Combined, these climate-mitigating factors have led to a renewed interest in forest biomass and created silvicultural opportunities that might otherwise not exist in some forest ecosystems. There are many definitions of forest biomass but this report will focus on the biomass in aboveground components of live and standing dead trees ≥ 5 inches diameter at breast height (d.b.h.) and live saplings 1 to 4.9 inches d.b.h. The biomass in tree components is estimated using regional species- and species group-specific volume equations (Woodall et al. 2011).

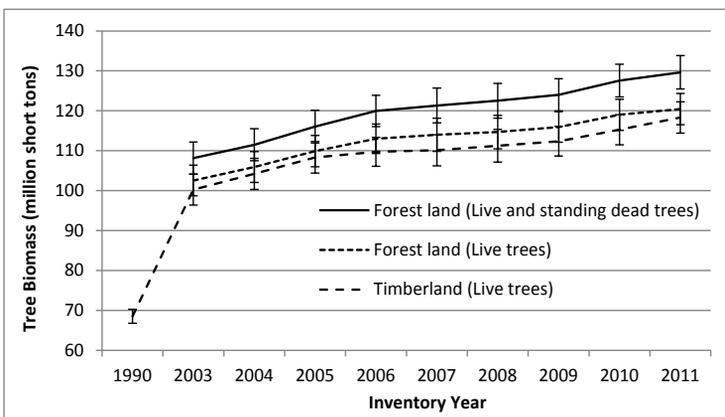


Figure 6.—Aboveground live and standing dead tree biomass (million short tons) on forest land and timberland by inventory year, Iowa.

Iowa currently has more than 129 million tons of aboveground tree biomass on forest land which has increased by an estimated 2.3 percent annually over the last two decades (Fig. 6). Most forest land in the State is occupied by relatively young, second-growth forest, and this is reflected in the distribution of biomass by age class (Fig. 7). The oak/hickory, and to a lesser extent, elm/ash/cottonwood forest types dominate each age class and account for more than 95 percent of all tree biomass. These forest types also have the largest per-acre biomass estimates for live and standing dead trees, at more than 44 and 47 tons, respectively. Bolewood accounts for the largest proportion of aboveground biomass per-acre at 59 percent, followed by tops and limbs at more than 14 percent, saplings at 12 percent, and standing dead trees at more than 10 percent (Fig. 8).

Iowa has a long history of forest biomass utilization for energy. In fact, fuelwood was the predominant timber product output reported in forest surveys conducted in 1953, 1974, and 1988. Canvassing records suggest that the vast majority of fuelwood output was from nongrowing stock roundwood – cull trees, salvable dead trees, noncommercial species, sapling-size trees, and top and limbs – with a small amount of coarse and fine residual biomass generated from forest product mills. Residential fuelwood surveys do not exist for recent decades, however it is likely – particularly given renewed interest in biomass for energy – that fuelwood utilization will continue to be a substantial component of timber product outputs in Iowa. Given the current distribution (Fig. 9) of live and standing dead tree nongrowing stock biomass, there may also be opportunities to expand biomass utilization for energy while improving the health and vigor of forests in Iowa. However, it is important to note that not all trees are available for harvest and that proper harvesting should be used to maintain this renewable resource.

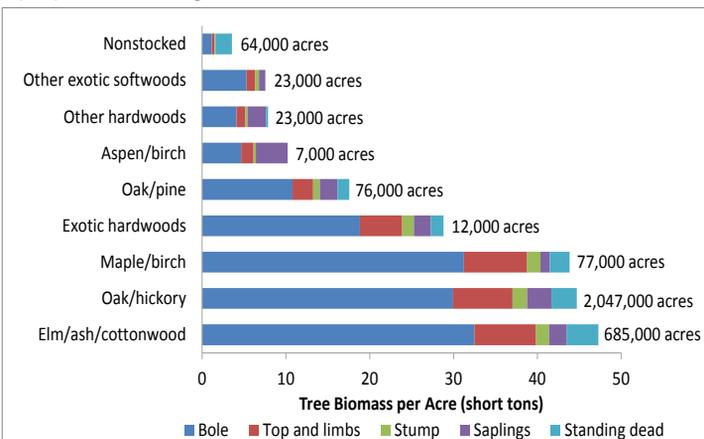


Figure 8.—Live and standing dead tree aboveground biomass (short tons) per acre by forest type and component, Iowa, 2007-2011.

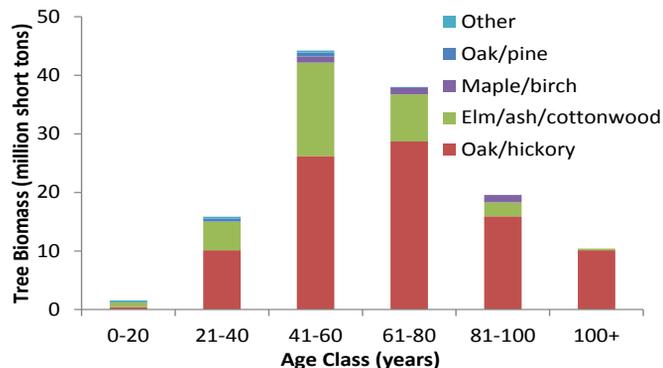


Figure 7.—Live and standing dead tree aboveground biomass (million short tons) on forest land by forest type and age class, Iowa, 2007-2011. Note the Other group includes the following forest type-groups: other eastern softwoods, aspen/birch, other hardwoods, exotic hardwoods, and nonstocked.

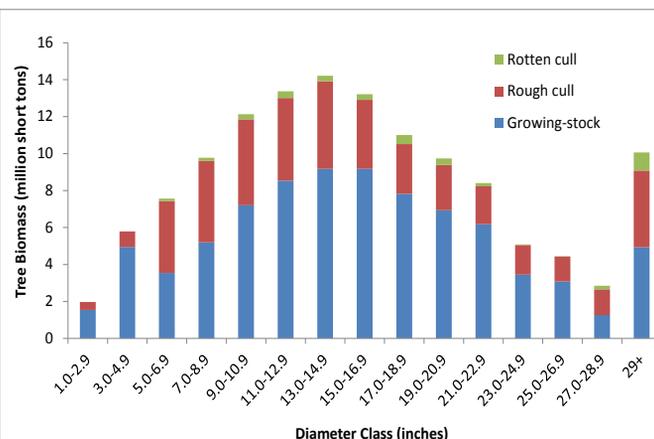


Figure 9.—Live and standing dead tree aboveground biomass (million short tons) by tree class and diameter, Iowa, 2007-2011.

Citation for this Publication

Nelson, M.D.; Brewer, M.; Domke, G. 2012. **Iowa's forest resources, 2011**. Res. Note NRS-135. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 4 p.

FIA Program Information

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. 2008. **Family forest owners of the United States, 2006**. Gen. Tech. Rep. NRS-27. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 72 p.

USDA Forest Service. 2007. **Forest inventory and analysis national core field guide, Vol. 1: Field data collection procedures for phase 2 plots, ver. 4.0**. Washington, D.C.: U.S. Department of Agriculture, Forest Service. Available at <http://www.fia.fs.fed.us/library/field-guides-methods-proc/> (verified Oct. 30, 2008).

Woodall C.W.; Heath, L.S.; Domke, G.M.; Nichols, M.; Oswalt, C. 2011. **Methods and models for estimating volume, biomass, and C for forest trees in the U.S's national inventory, 2010**. Gen Tech. Rep. NRS-88. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 30 p.

Additional Iowa Inventory Information

Nelson, M.D.; Brewer, M. 2011. **Iowa's forest resources, 2010**. Res. Note NRS-118. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 4 p.

Nelson, M.D.; Brewer, M.; Crocker, S.J. 2010. **Iowa's forest resources, 2009**. Res. Note NRS-102. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 4 p.

Nelson, M.D.; Brewer, M.; Woodall, C.W.; Perry, C.H.; Domke, G.M.; Piva, R.J.; Kurtz, C.M.; Moser, W.K.; Lister, T.W.; Butler, B.J.; Meneguzzo, D.M.; Miles, P.D.; Barnett, C.J.; Gormanson, D. 2011. **Iowa's Forests 2008**. Resour. Bull. NRS-52. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 48 p.

Leatherberry, E.C.; Brand, G.J.; Pennington, S. 2005. **Iowa's forest resources in 2003**. Resour. Bull. NC-240. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. 31 p.

Leatherberry, E.C.; Pennington, S.; Flickinger, A.; Perry, C.H.; Jepson, E.; Woodall, C.W. 2006. **Iowa's forests, 1999-2003 Part A**. Resour. Bull. NC-266A. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. 84 p.

Leatherberry, E.C.; Roussopoulos, S.M.; Spencer, J.S., Jr. 1992. **An analysis of Iowa's forest resources, 1990**. Resour. Bull. NC-142. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. 67 p.

Spencer, J.S., Jr.; Jakes, P.J. 1980. **Iowa forest resources, 1974**. Resour. Bull. NC-52. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 90 p.

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.

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 5.0 and compiled in National Information Management System (NIMS) version 5.1, installed on January 23, 2012. Due to periodic 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>

Contact Information

Lead Analyst: Mark Nelson, (651) 649-5104; mdnelson@fs.fed.us Cover image credit: Paul Wray, Iowa State University, bugwood.org

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternate means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, DC 20250-9410, or call (800)795-3272 (voice) or (202)720-6382 (TDD). USDA is an equal opportunity provider and employer.