Forest Service, US Department of Agriculture
Northern Research Station

Michigan's Forest Resources, 2011

Research Note NRS-137

This publication provides an overview of forest resource attributes for Michigan based on an annual inventory conducted by the Forest Inventory and Analysis (FIA) program of the Northern Research Station, U.S. Forest Service. These estimates, along with web-posted core tables, are updated annually. For more information please refer to page 4 of this report or visit our website: http://www.fia.fs.fed.us/.

Table 1. – Annual estimates, sampling error, and change
Note: Volumes are for 5-inch and larger diameter trees

	Estimate	Sampling error (%)	Change since 2006 (%)
Forest land estimates			
Area (1,000 acres)	20,127	0.5	3.0
Number of live trees 1-inch diameter or larger (1,000,000 trees)	14,046	1.2	0.5
Dry biomass of live trees 1-inch diameter or larger (1,000 tons)	837,840	0.9	6.9
Net volume in live trees (1,000,000 ft³)	33,331	0.9	7.2
Annual net growth of live trees (1,000 ft³/year)	757,984	2.2	-5.5
Annual mortality of trees (1,000 ft³/year)	351,608	2.8	2.6
Annual harvest removals of live trees (1,000 ft³/year)	339,367	5.8	1.0
Annual other removals of live trees (1,000 ft³/year)	14,845	26.4	-14.1
Timberland estimates			
Area (1,000 acres)	19,463	0.5	2.7
Number of live trees 1-inch diameter or larger (1,000,000 trees)	13,590	1.2	0.0
Dry biomass of live trees 1-inch diameter or larger (1,000 tons)	811,211	0.9	6.9
Net volume in live trees (1,000,000 ft³)	32,234	1.0	7.3
Net volume of growing-stock trees (1,000,000 ft³)	29,655	1.0	6.2
Annual net growth of growing-stock trees (1,000 ft³/year)	694,407	2.0	-9.3
Annual mortality of growing-stock trees (1,000 ft³/year)	270,519	2.9	-4.6
Annual harvest removals of growing-stock trees (1,000 ft³/year)	296,001	5.9	-1.6
Annual other removals of growing-stock trees (1,000 ft³/year)	16,660	26.1	-44.0

Note that changes in inventory design and definitions make it inappropriate to directly compare some previously published estimates with these current estimates. Sampling errors and error bars represent 68% confidence intervals.

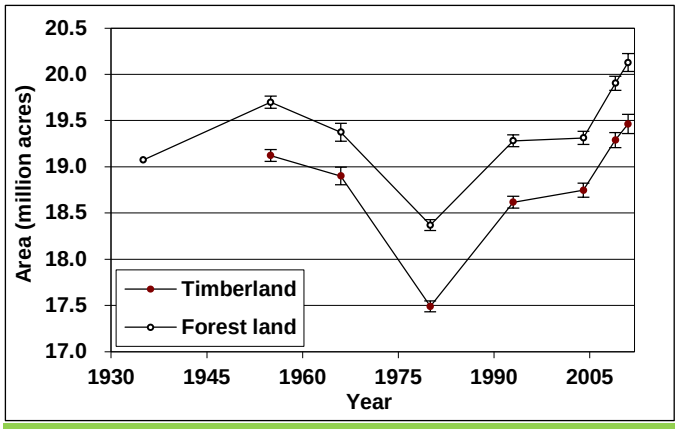

Figure 1. – Area of timberland and forest land by year.

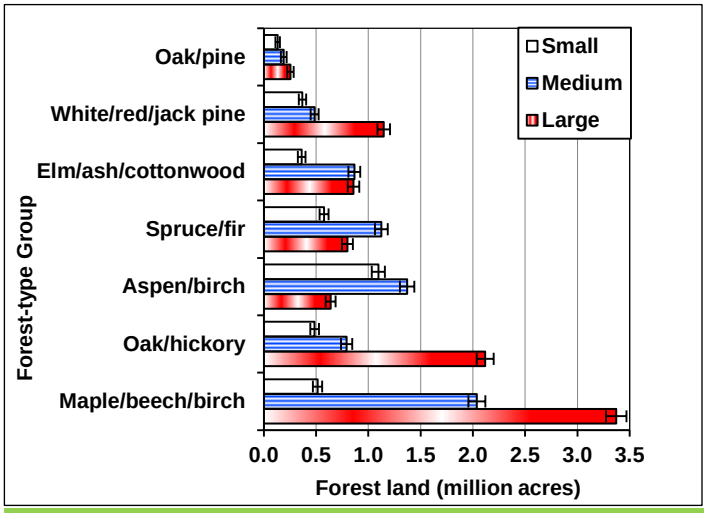

Figure 2. – Area of forest land by stand-size class (based on small, medium, and large trees) for top seven forest-type groups by acres, Michigan, 2011.

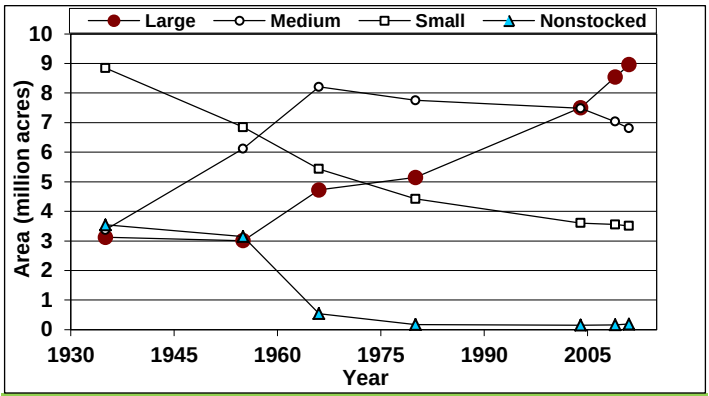

Figure 3. – Area of timberland by stand-size class (based on small, medium, and large trees) and year.

Table 2. – Top 10 species by statewide volume estimates, 2011.

Rank	Species	Volume of live trees 5-inch diameter and larger 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	Sugar maple	4,895	2.9	6.2	11,961	3.8	14.9
2	Red maple	4,380	2.7	15.6	9,558	4.1	25.3
3	Northern white-cedar	2,717	4.3	0.4	7,020	5.4	-5.6
4	Red pine	2,221	5.3	13.2	8,825	5.7	18.5
5	Northern red oak	1,686	5.1	13.8	5,925	5.7	21.6
6	Quaking aspen	1,671	4.1	4.7	3,585	6.0	7.7
7	Eastern white pine	1,500	5.7	14.5	6,459	6.5	18.1
8	Bigtooth aspen	1,294	6.0	4.0	3,571	7.8	11.2
9	Eastern hemlock	1,028	6.4	7.7	4,095	7.3	2.9
10	Black cherry	899	5.4	9.7	1,985	8.3	16.0
	Other softwoods	2,713	2.9	-0.6	5,899	4.1	-1.7
	Other hardwoods	8,328	2.1	5.7	22,315	3.0	10.6
	All Species	33,331	0.9	7.2	91,198	1.4	11.7

Table 3. – Area and percent of forest and timberland by owner, Michigan, 2011. Change in forest and timberland by owner, Michigan, 2006 to 2011. State includes state-owned forest and timberland. Corporate includes real estate investment trusts and timber management organizations. Other private includes nongovernmental conservation and natural resource organizations; unincorporated local partnerships, associations, and clubs; and Native Americans. Other federal includes U.S. Fish and Wildlife Service, U.S. Department of Defense, U.S. Department of Energy, and other Federal agencies. Nonfederal public includes local governments such as counties or townships. All National Park Service forest land is reserved by law prohibiting management for the production of wood products.

Forest land estimates	Estimate (1,000 acres)	Estimate (%)	Sampling error (%)	Change since 2006 (%)
Owner				
Family or individual	9,146	45.4	1.3	2.1
State	4,166	20.7	1.5	1.5
Corporate	2,753	13.7	3.2	3.5
U.S. Forest Service	2,702	13.4	0.8	1.6
Other private	578	2.9	8.7	15.2
Nonfederal public	422	2.1	9.8	20.2
National Park Service	247	1.2	11.9	7.9
Other federal	113	0.6	19.0	38.9
Total	20,127	100.0	0.5	3.0
Timberland estimates				
Owner				
Family or individual	9,060	46.6	1.4	1.8
State	4,050	20.8	1.6	1.0
Corporate	2,722	14.0	3.3	3.5
U.S. Forest Service	2,544	13.1	1.1	1.3
Other private	578	3.0	8.7	15.9
Nonfederal public	417	2.1	9.8	21.6
National Park Service	NA	NA	NA	NA
Other federal	91	0.5	21.1	31.8
Total	19,463	100.0	0.5	2.7

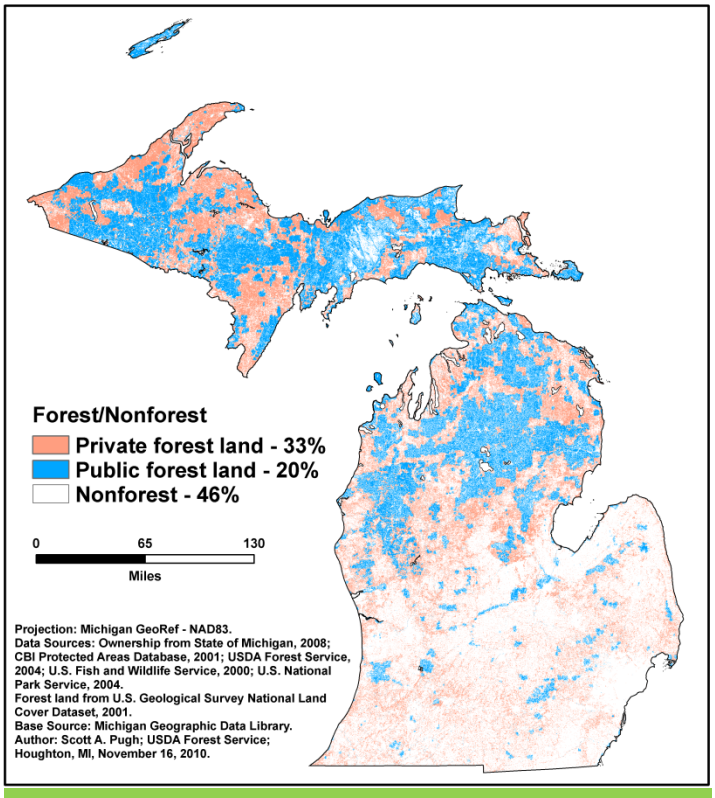

Figure 4. – Area of forest/nonforest with forest identified by major ownership group, Michigan, 2011.

Issue Update – Land Use Changing but Total Forest Land Increasing

Nearly the entire land area of Michigan was forested upon entering the 19th century (Sparhawk and Brush 1929). Almost all of this forest land was cut and/or burned during European settlement (Sparhawk and Brush 1929, Dickmann and Leefers 2003). Since the 1920s, the forests have been recovering. FIA has inventoried these forests since 1935 (Fig. 1). Forest land increased from 19.1 million acres in 1935 to 19.7 million acres in 1955. After 1955, forest land decreased to a low of 18.4 million acres in 1980 (Fig. 5). During the 1980s and early 1990s forest land increased with abandoned cropland and pasture reverting to forest (Schmidt et al. 1997).

From 1993 to 2004, even though there were reversions (from nonforest to forest) and diversions (from forest to nonforest), we found no significant change in total forest land. Starting in 2005, reversions continually surpassed diversions and increased total forest land. In the 2011 inventory, the increase in total forest land was 3 percent (change from 2002-2006 to 2007-2011). Figure 6 shows diversions by current land use and reversions by previous land use for the 2011 inventory. Approximately 1.2 percent of forest land (243.2 thousand acres) diverted to nonforest land and 4.1 percent (726.3 thousand acres) of nonforest land reverted to forest. Michigan now has the highest estimate of total forest land since European settlement at 20.1 million acres.

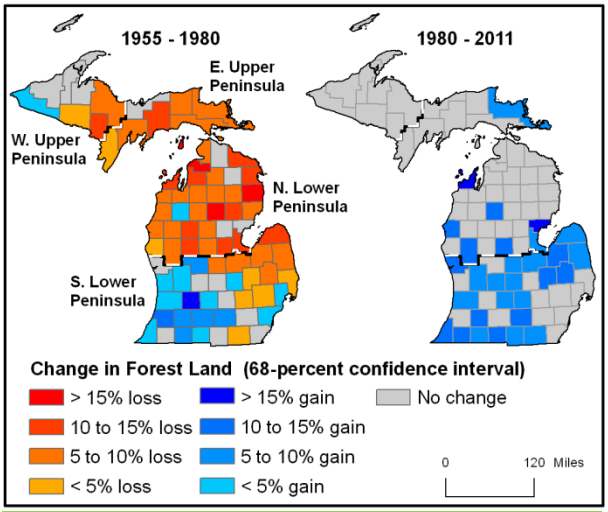

Figure 5. – Change in forest land as a percentage of total land by county, Michigan, 1955-2011.

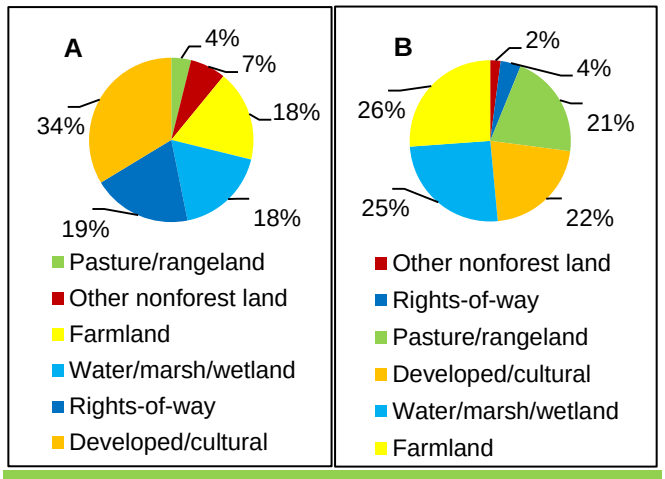

Figure 6. – Percentage of forest-land diversion by current land use (A) and forest-land reversion by previous land use (B), Michigan 2011.

A review of forest land estimates and delineation identified some reversion that occurred in the late 1990s to early 2000s that was not identified until 2005 and later. Contrary to earlier estimates, the review indicates an increase in total forest land from the 1993 to 2004 inventory and a lower rate of increase in total forest land than reported since 2005.

We initially identify forest and nonforest land categories from interpreting aerial imagery. All plots currently identified as forest land from imagery are inventoried on the ground and any previously forested plots are also visited on the ground. Plots that do not appear to be currently forested and were not previously forested are not visited on the ground.

Since 2005 we have utilized superior digital aerial imagery compared to available imagery from 2000-2004. The new imagery from the National Agriculture Imagery Program is color, leaf-on, often larger scale, and up-to-date (USDA Farm Service Agency 2009). In addition, upgraded technology in geographic information systems and global positioning systems have improved our ability to use this digital imagery for identifying reversions.

We have seen a high reversion rate (approximately 4 to 5 percent) since 2005. For the 2010 inventory, we estimated that approximately half of the reversion rate of 4.7 percent was due to recently identified reversions that occurred in the late 1990s to early 2000s. However, there is still less diversion than reversion. Diversion has been 2 percent or less since the 1993 inventory.

With this new information, it is evident that reversion has out-paced diversion since the 1980 inventory resulting in the current estimate of 20.1 million acres of total forest land.

Since 1980, most reversion has been happening in the southern Lower Peninsula followed by the northern Lower Peninsula and most has been associated with private ownership. For the 2011 inventory, estimates of forest land increased by 1.6 and 11.5 percent for the northern Lower and southern Lower Peninsula, respectively.

Reversions come from a variety of sources. Over half of the reversion was from farm and pasture/rangeland combined in the southern (53 percent) and northern (60 percent) Lower Peninsula. Marsh was the source of 62 percent of reversion in the Upper Peninsula.

Citation for this Publication

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