

Image credit: Terry Spivey, USDA Forest Service, Bugwood.org

Michigan's Forest Resources, 2009

Research Note NRS-81

This publication provides an overview of forest resource attributes for Michigan based on an annual inventory (2005-2009) 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 2004 (%)
Forest land estimates			
Area (1,000 acres)	19,903	0.4	3.1
Number of live trees 1-inch diameter or larger (1,000,000 trees)	13,899	0.9	0.6
Dry biomass of live trees 1-inch diameter or larger (1,000 tons)	805,549	0.7	5.5
Net volume in live trees (1,000,000 ft ³)	31,974	0.8	5.7
Annual net growth of live trees (1,000 ft ³ /year)	755,897	1.9	NA
Annual mortality of trees (1,000 ft ³ /year)	345,866	2.2	NA
Annual harvest removals of live trees (1,000 ft ³ /year)	351,650	4.6	NA
Annual other removals of live trees (1,000 ft ³ /year)	14,847	19.6	NA
Timberland estimates			
Area (1,000 acres)	19,289	0.4	3.0
Number of live trees 1-inch diameter or larger (1,000,000 trees)	13,485	1.0	0.5
Dry biomass of live trees 1-inch diameter or larger (1,000 tons)	781,644	0.7	5.6
Net volume in live trees (1,000,000 ft ³)	30,987	0.8	5.9
Net volume of growing-stock trees (1,000,000 ft ³)	28,674	0.8	5.1
Annual net growth of growing-stock trees (1,000 ft ³ /year)	698,516	1.9	-11.2
Annual mortality of growing-stock trees (1,000 ft ³ /year)	272,383	2.4	21.3
Annual harvest removals of growing-stock trees (1,000 ft ³ /year)	311,206	4.6	19.4
Annual other removals of growing-stock trees (1,000 ft ³ /year)	23,594	19.2	-22.9

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.

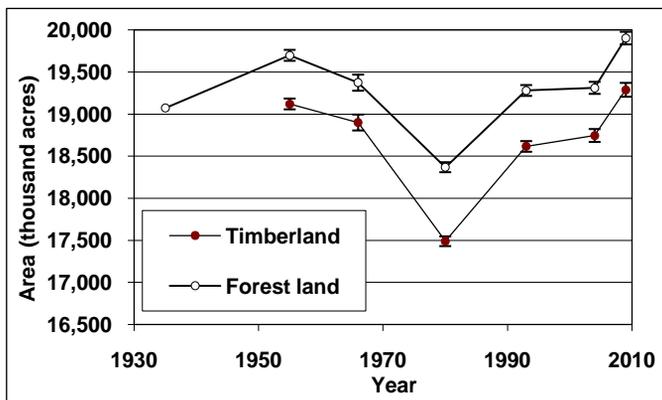


Figure 1. – Area of timberland and forest land by year.

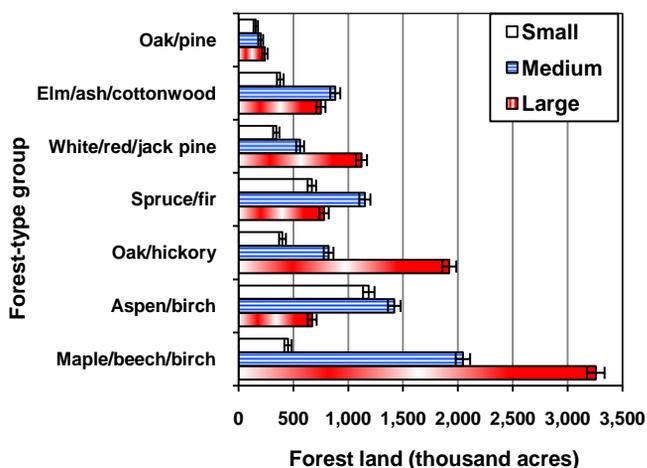


Figure 2. – Area of forest land for top seven forest-type groups by stand-size class (based on tree size), Michigan, 2009.

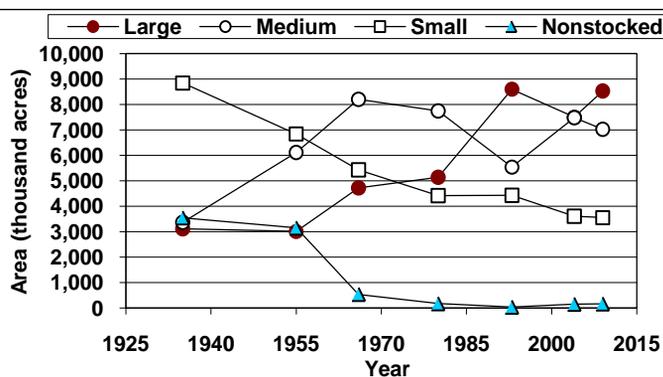


Figure 3. – Area of timberland by stand-size class (based on tree size) and year.

Image credit: Terry Spivey, USDA Forest Service, Bugwood.org

Table 2. – Top 10 species by statewide volume estimates, 2009.

Rank	Species	Volume of live trees 5-inch diameter and larger on forest land (1,000,000 ft ³)	Sampling error (%)	Change since 2004 (%)	Volume of sawtimber trees on timberland (1,000,000 board feet)	Sampling error (%)	Change since 2004 (%)
1	Sugar maple	4,691	2.4	3.4	11,196	3.2	9.7
2	Red maple	4,107	2.2	12.8	8,500	3.3	17.6
3	Northern white-cedar	2,619	3.6	1.4	6,977	4.4	0.1
4	Red pine	2,211	4.5	11.4	8,544	4.9	16.9
5	Quaking aspen	1,671	3.3	2.4	3,652	4.8	6.2
6	Northern red oak	1,633	4.2	8.6	5,740	4.8	14.2
7	Eastern white pine	1,430	4.7	10.7	6,035	5.4	10.4
8	Bigtooth aspen	1,238	4.8	0.3	3,238	6.3	3.3
9	Eastern hemlock	923	5.6	2.0	3,760	6.2	0.1
10	American basswood	848	5.0	0.9	2,577	6.0	7.9
	Other softwoods	2,717	2.3	0.0	5,926	3.3	0.0
	Other hardwoods	7,886	1.6	6.9	19,884	2.4	10.7
	All Species	31,974	0.8	5.7	86,029	1.2	9.1

Table 3. – Area and percent of forest and timberland by owner, Michigan, 2009. Change in forest and timberland by owner, Michigan, 2004 to 2009. 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 forestland is reserved by law prohibiting management for the production of wood products.

Forest land estimates	Estimate (1,000 acres)	Percent	Error (%)	Change since 2004 (%)
Owner				
Family or individual	9,038	45.4	1.1	2.9
State	4,228	21.2	1.1	1.4
Corporate	2,797	14.1	2.5	6.2
U.S. Forest Service	2,654	13.3	0.8	0.4
Other private	518	2.6	7.3	8.6
Nonfederal public	372	1.9	8.3	12.2
National Park Service	206	1.0	10.5	1.8
Other federal	90	0.5	16.8	23.2
Total	19,903	100.0	0.4	3.1
Timberland estimates				
	Estimate (1,000 acres)	Percent	Error (%)	Change since 2004 (%)
Owner				
Family or individual	8,965	46.5	1.1	2.9
State	4,110	21.3	1.2	1.4
Corporate	2,755	14.3	2.6	6.4
U.S. Forest Service	2,504	13.0	1.1	0.0
Other private	518	2.7	7.3	9.5
Nonfederal public	364	1.9	8.4	13.2
National Park Service	NA	NA	NA	NA
Other federal	73	0.4	18.8	14.4
Total	19,289	100.0	0.4	3.0

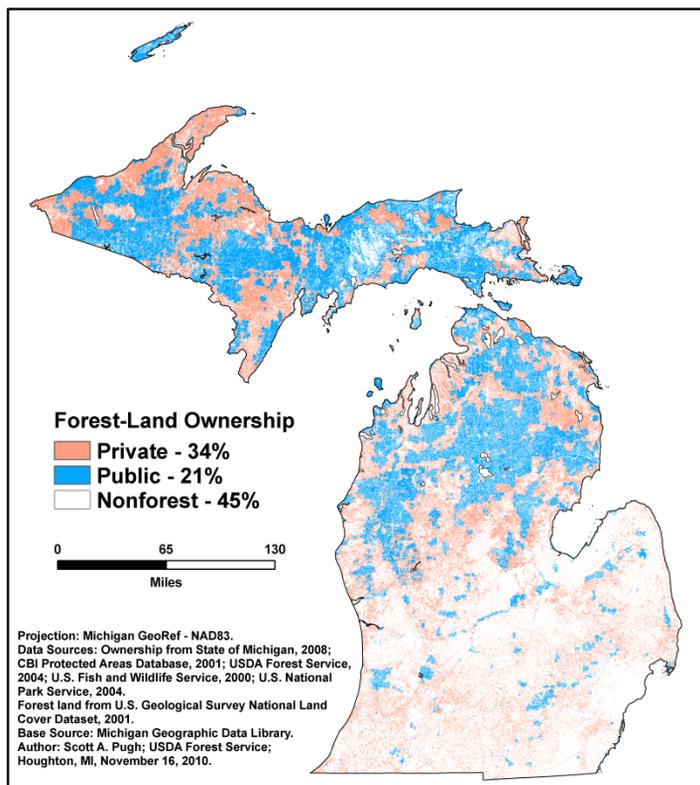


Figure 4. – Area of forest land by major ownership group.

Image credit: Terry Spivey, USDA Forest Service, Bugwood.org

Issue Update – Tree Mortality in Michigan, Wisconsin, and Minnesota

Mortality is a natural part of forest stand development. A number of biotic (e.g., disease, insects, animals, and competing plants) and abiotic factors (e.g., wind, fire, drought, floods, and air pollution) contribute to mortality. Mortality can be the result of numerous factors over many years, so it is difficult to identify the one or more causes that result in death. Drought can weaken trees and make them susceptible to pests years later. Mortality is a concern when it surpasses the capacity of the forest to respond (growth and regeneration) or it creates potential dangers like fire.

Here, average annual mortality is compared to current volume (ratio in percent) for growing-stock trees on timberland. Lower mortality rates are indicated with values less than or equal to 1. Moderate rates of mortality are about 1 to 3; high mortality rates exceed 3. These are guides and vary somewhat by species. Since the 1980s, tree mortality has risen in many parts of the Nation (Smith et al. 2009). Nationally, the rates are still less than 1 percent of growing-stock volume. Among other things, invasive pests have added to mortality (Gandhi and Herms 2010) and some suspect climate change is a contributor (Allen et al. 2010). In addition, many of our Nation's forests are growing older and experiencing natural patterns of stand development and succession.

At the state level, Michigan (1.0 percent) and Wisconsin (1.0) have lower rates of mortality than Minnesota (1.7) (Fig. 5 and 6). Ash mortality caused by the emerald ash borer (*Agrilus planipennis* Fairmaire) contributed the most to the high mortality rate near Detroit, MI. Some of the moderate and high mortality in northern Minnesota is from a blowdown event that occurred in 1999. Mortality rates for Michigan and Wisconsin have remained steady since the 1980s but rates have risen slightly for Minnesota.

Michigan and Wisconsin have more northern and central hardwood species (e.g., sugar maple and oak) with historically lower mortality rates. Minnesota has more spruce/fir, aspen/cottonwood, and birch than Michigan and Wisconsin. These species groups have had historically higher mortality rates.

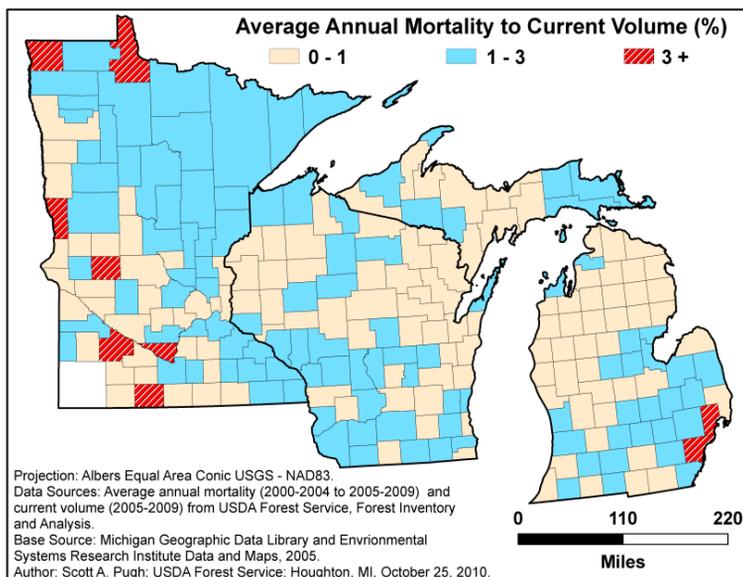


Figure 5. – Ratio of average annual mortality to current volume (percent) for growing-stock trees on timberland in Michigan (2009), Wisconsin (2008), and Minnesota (2009).

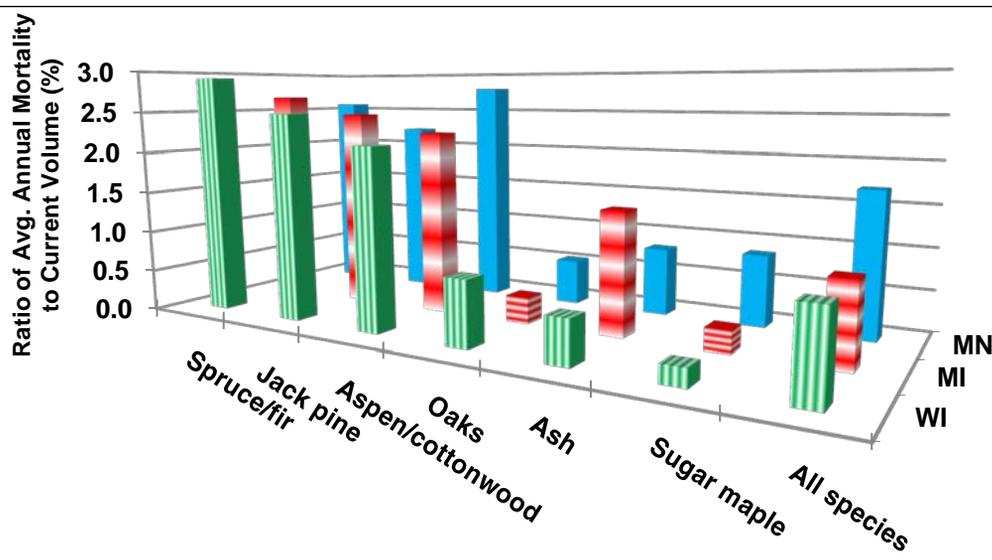


Figure 6. – Comparison of average annual mortality to current volume (percent) for growing-stock trees of select species in Michigan (2009), Wisconsin (2008), and Minnesota (2009).



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Estimates, tabular data, and maps from report may be generated at: <http://www.fia.fs.fed.us/tools-data/default.asp>

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