



Minnesota's Forest Resources, 2012

Research Note NRS-175

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

Table 1. – Annual estimates, uncertainty, and change

	Estimate 2012	Sampling error (%)	Change since 2007 (%)
Forest Land Estimates			
Area (1,000 acres)	17,433.4	0.5	4.2
Number of live trees 1-inch diameter or larger (million trees)	14,008.1	1.2	8.7
Dry biomass of live trees 1-inch diameter or larger (1,000 tons)	478,837.2	1	5.7
Net volume of live trees (1,000,000 ft ³)	18,802.8	1.2	4.8
Annual net growth of live trees (1,000 ft ³ /year)	391,692.4	3.5	-10.0
Annual mortality of live trees (1,000 ft ³ /year)	365,300.4	2.7	9.7
Annual harvest removals of live trees (1,000 ft ³ /year)	213,510.5	6.5	-24.8
Annual other removals of live trees (1,000 ft ³ /year)	7,389.1	28.2	-6.8
Timberland Estimates			
Area (1,000 acres)	15,989.6	0.6	4.0
Number of live trees 1-inch diameter or larger (million trees)	12,809.0	1.2	7.3
Biomass of live trees 1-inch diameter or larger (1,000 tons)	447,428.1	1.1	5.3
Net volume of live trees (1,000,000 ft ³)	17,501.0	1.2	4.4
Net volume of growing-stock trees (1,000,000 ft ³)	15,004.8	1.3	1.7
Annual net growth of growing-stock trees (1,000 ft ³ /year)	370,199.1	2.8	-15.4
Annual mortality of growing-stock trees (1,000 ft ³ /year)	252,743.1	2.7	7.0
Annual harvest removals of growing-stock trees (1,000 ft ³ /year)	186,467.4	6.6	-28.3
Annual other removals of growing-stock trees (1,000 ft ³ /year)	28,025.0	21.2	-22.9

Note: When available, sampling errors/bars provided in figures and tables represent 68 percent confidence intervals

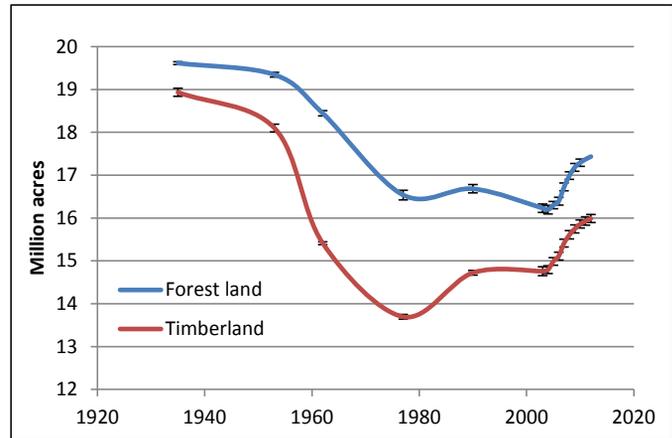


Figure 1.– Area of timberland and forest land by year, Minnesota

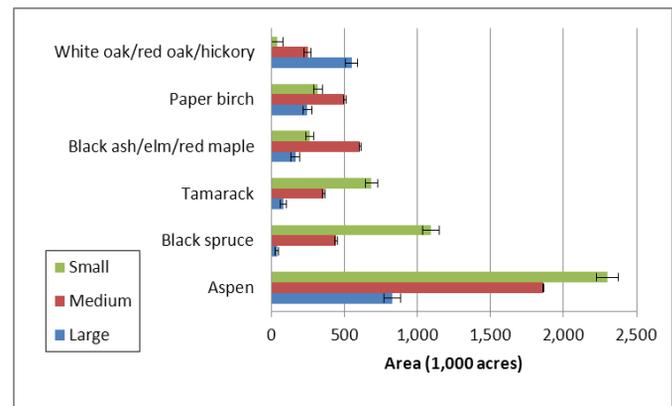


Figure 2.– Area of forest land by top six forest types and stand size class, Minnesota, 2012.

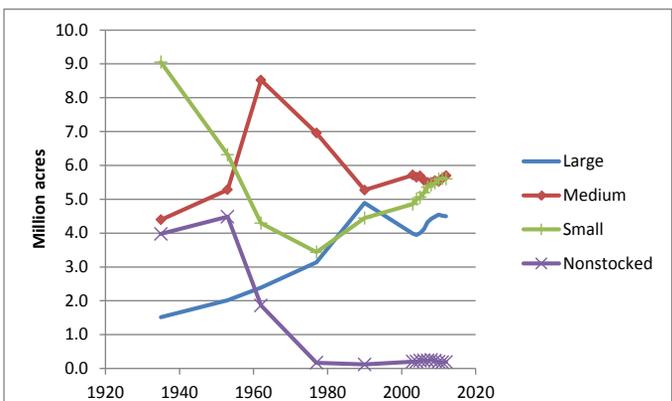


Figure 3.– Area of timberland by stand-size class and year, Minnesota.

Table 2. – Top 10 tree species by statewide volume estimates, Minnesota 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 bdf)	Sampling error (%)	Change since 2007 (%)
1	quaking aspen	3,442.0	2.6	-1.0	6,191.3	4.1	-11.1
2	red pine	1,191.2	6.7	22.9	4,645.9	7.4	25.0
3	northern white-cedar	1,156.7	6.0	9.2	2,934.2	7.5	1.1
4	paper birch	1,141.1	3.4	-9.0	1,217.0	6.0	-13.5
5	bur oak	1,051.9	4.5	3.7	2,121.2	6.6	0.2
6	black ash	1,031.4	4.5	8.6	1,469.6	6.9	9.9
7	American basswood	989.3	4.9	4.9	2,639.2	6.2	17.1
8	northern red oak	951.5	5.3	-0.1	2,897.7	6.4	4.2
9	black spruce	923.9	4.8	4.6	880.3	7.9	4.2
10	balsam fir	713.4	3.4	6.3	1,173.5	5.5	1.2
	Other softwood species	2,203.0	3.7	7.5	5,721.6	4.7	2.4
	Other hardwood species	4,007.5	2.7	7.6	6,631.3	4.6	8.7
	All species	18,802.8	1.2	4.8	38,522.7	1.9	3.6

Table 3.– Area and percent of forest and timberland by owner, Minnesota, 2012. Change in forest and timberland by owner, Minnesota, 2007 to 2012. 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 public includes local governments such as counties or townships and other federal such as U.S. Fish and Wildlife Service, U.S. Department of Defense, and U.S. Department of Energy. All National Park Service forest land is reserved by law prohibiting management for the production of wood products.

	Estimate (1,000 acres)	Estimate (%)	Sampling error (%)	Change since 2007 (%)
Forest land estimates				
Owner				
U.S. Forest Service	2,615	15.0	1.2	3.3
National Park Service	111	0.6	5.6	8.2
Other federal	191	1.1	12.2	-14.8
State	4,022	23.1	2.0	4.4
County and local govt	2,700	15.5	2.8	3.8
Corporate	1,060	6.1	4.8	-14.1
Other private	699	4.0	6.1	25.3
Family or individual	6,036	34.6	1.5	7.4
Total	17,433	100.0	0.5	4.2
Timberland estimates				
Owner				
U.S. Forest Service	1,815	11.4	1.6	0.2
Other federal	184	1.2	12.4	-14.6
State	3,782	23.7	2.1	5.2
County and local govt	2,601	16.3	2.8	4.3
Corporate	1,019	6.4	4.9	-15.1
Other private	680	4.2	6.2	25.3
Family or individual	5,909	37.0	1.5	7.1
Total	15,990	100.0	0.6	4.0

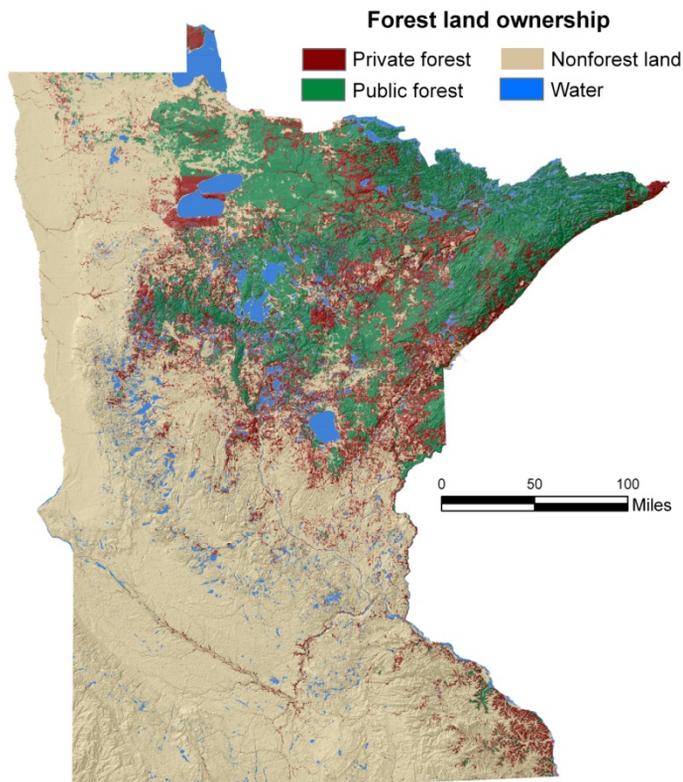


Figure 4.– Area of forest land by ownership, Minnesota, 2012.

Minnesota Issue Update – Net Growth by Component

Net growth represents the change in volume of trees between two points in time, accounting for gains in growth and losses from mortality but not for removal of volume due to cutting or land-use change (Pugh 2013). To help understand these changes in volume, net growth is broken down into a number of components (Fig. 5).

- Survivor growth — change in live tree volume between inventories on land identified as forest in both inventories.
- Mortality — volume lost due to death of trees that were alive and on forest land during the previous inventory
- Ingrowth — volume of trees that grew into a merchantable size (e.g., 5-inch diameter) since the previous inventory on land identified as forest in both inventories.
- Reversion — volume of live trees on land that is now forest but was previously nonforest.
- Diversion — change in volume of live trees between inventories on land that changed from forest to nonforest. Diversion only counts trees that remained present and alive.
- Cut growth — increase in volume of live trees from the previous inventory that were cut before the current inventory. The land was forest in the previous inventory.

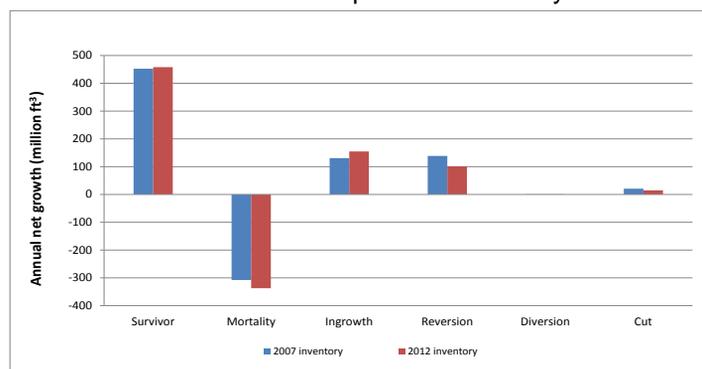


Figure 5.— Annual net growth by component, Minnesota, 2007 and 2012.

Most of the 10 percent decrease in annual net growth of live trees on forest land between the 2007 and 2012 inventories can be attributed to the 9.7 percent increase in annual mortality over the same period (Table 1). Four-fifths of mortality occurred in just 10 species (Table 4). Average annual mortality as a percent of current volume is greatest for balsam poplar (6.1 percent) and American elm (5.6 percent).

Table 4.— Annual mortality on forest land by species, Minnesota, 2007 and 2012

Species	Inventory		Mortality as a percent of current volume
	2007	2012	
quaking aspen	105.2	119.7	3.5
paper birch	34.2	40.5	3.6
balsam fir	31.8	28.0	3.9
tamarack (native)	11.9	21.8	3.1
balsam poplar	23.3	20.6	6.1
black spruce	20.1	16.5	1.8
American elm	9.6	14.0	5.6
black ash	6.9	12.6	1.2
northern red oak	8.3	10.9	1.1
jack pine	13.3	9.7	2.3
Other species	68.4	70.9	0.8
All species	332.9	365.3	1.9

Improved digital and aerial imagery and advancements in geographic systems led to slight increases in forest area estimates over the 5 years from 2005 to 2009, as previously unidentified forest land was properly classified as forest land (Pugh 2012).

These small changes in forest area have a larger impact on growth estimates because the total tree volume on reverted lands is counted as growth. Growth as a result of reversions increase the entire set of d over the 5 years it took to measure plots using these improved techniques (Fig. 6).

Estimates of reversions are expected to decrease back to the underlying reversion rate over the following 5 years, from 2010 to 2014, as the new techniques are merely repeated. By 2015, estimates of reversions will no longer be affected by these improvements in identifying forest land.

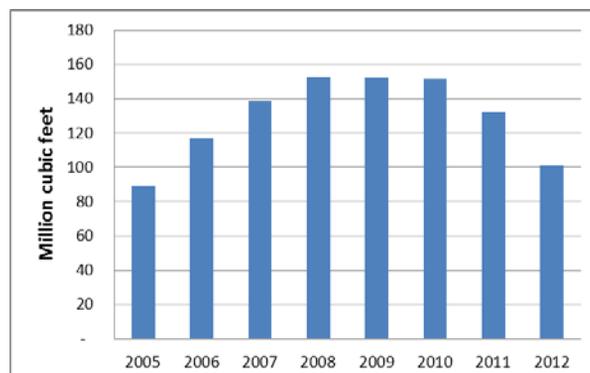


Figure 6.— Reversion growth by inventory year, Minnesota, 2005 through 2012.



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FIA Program Information

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Woudenberg, Sharon W.; Conkling, Barbara L.; O'Connell, Barbara M.; LaPoint, Elizabeth B.; Turner, Jeffery A.; Waddell, Karen L. 2010. **The Forest Inventory and Analysis Database: Database description and users manual version 4.0 for Phase 2**. Gen. Tech. Rep. RMRS-GTR-245. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 336 p.

Additional Minnesota Inventory Information

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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.

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Estimates and tabular data from this report may be generated at: <http://apps.fs.fed.us/Evalidator/evaluator.jsp>
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