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North Dakota's Forest Resources, 2011

Research Note NRS-142

This publication provides an overview of forest resource attributes for North Dakota 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 2011	Sampling error (%)	Change since 2009 (%)
Forest Land Estimates			
Area (1,000 acres)	760.0	6.2	2.5
Number of live trees 1-inch diameter or larger (million trees)	347.6	9.3	4.3
Dry biomass of live trees 1-inch diameter or larger (1,000 tons)	18,519.0	8.5	4.7
Net volume in live trees (1,000,000 ft ³)	715.6	10.0	5.4
Annual net growth of live trees (1,000 ft ³ /year)	17,799.5	17.1	69.8
Annual mortality of live trees (1,000 ft ³ /year)	10,145.8	15.8	-22.3
Annual harvest removals of live trees (1,000 ft ³ /year)	1,147.5	76.4	-7.5
Annual other removals of live trees (1,000 ft ³ /year)	1,179.1	77.5	-53.2
Timberland Estimates			
Area (1,000 acres)	517.8	7.9	1.0
Number of live trees 1-inch diameter or larger (million trees)	225.0	11.2	1.9
Dry biomass of live trees 1-inch diameter or larger (1,000 tons)	14,819.7	10.6	3.5
Net volume in live trees (1,000,000 ft ³)	590.9	12.1	4.3
Net volume of growing-stock trees (1,000,000 ft ³)	326.4	16.7	0.1
Annual net growth of growing-stock trees (1,000 ft ³ /year)	7,664.3	23.8	65.1
Annual mortality of growing-stock trees (1,000 ft ³ /year)	5,018.5	22.2	-22.5
Annual harvest removals of growing-stock trees (1,000 ft ³ /year)	600.2	80.4	1.4
Annual other removals of growing-stock trees (1,000 ft ³ /year)	255.0	75.3	-90.0

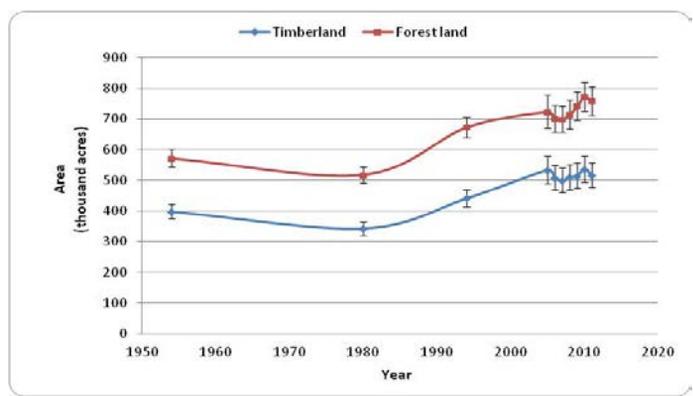


Figure 1. – Area of timberland and forest land by year.

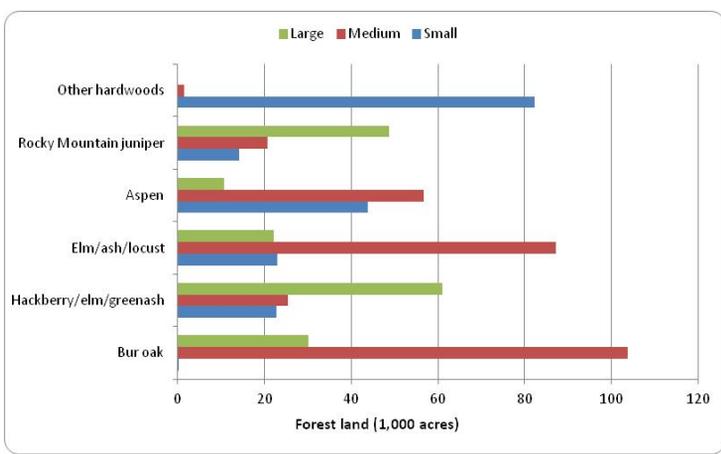


Figure 2. – Area of forest land area by top six forest types and stand size class, 2007-2011.

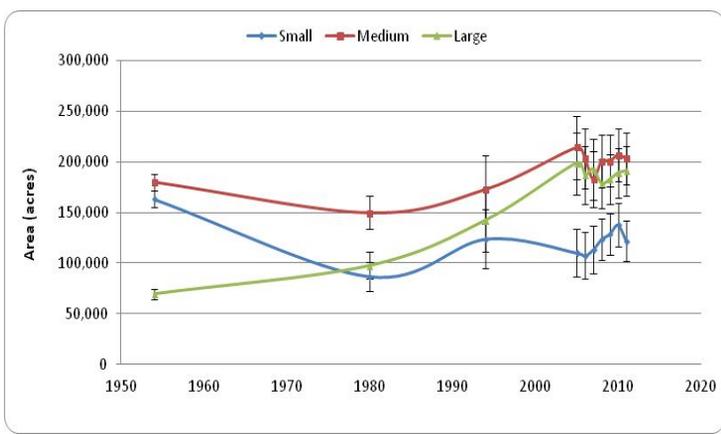


Figure 3. – Area of timberland by stand size class and year.

NA: Percent change estimates are not available for growth, mortality and removals.

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

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

Table 2. – Top ten tree species by statewide volume estimates, 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 bdft)	Sampling error (%)	Change since 2006 (%)
1	Bur oak	172.7	16.0	0.5	240.8	36.1	-20.2
2	Cottonwood	167.7	32.8	12.6	539.2	42.3	17.5
3	Green ash	129.2	12.4	3.4	147.5	26.3	-5.7
4	Quaking aspen	78.1	21.2	-13.6	110.9	37.6	-12.7
5	Boxelder	49.9	18.8	6.6	15.9	71.6	-25.4
6	Rocky Mountain juniper	42.4	27.5	26.2	0.0	0.0	0.0
7	American elm	33.5	36.9	14.7	53.4	53.0	12.2
8	American basswood	19.1	52.4	30.8	34.2	67.1	108.5
9	Peachleaf willow	6.0	78.9	500.0	0.0	0.0	0.0
10	Balsam poplar	5.7	36.1	-32.9	2.9	106.9	-79.6
	Other softwoods	4.4	78.8	450.0	0.0	0.0	-100.0
	Other hardwoods	6.8	41.0	-50.0	4.3	72.3	-72.6
	All Species	715.6	10.0	4.5	1,147.3	22.7	-0.9

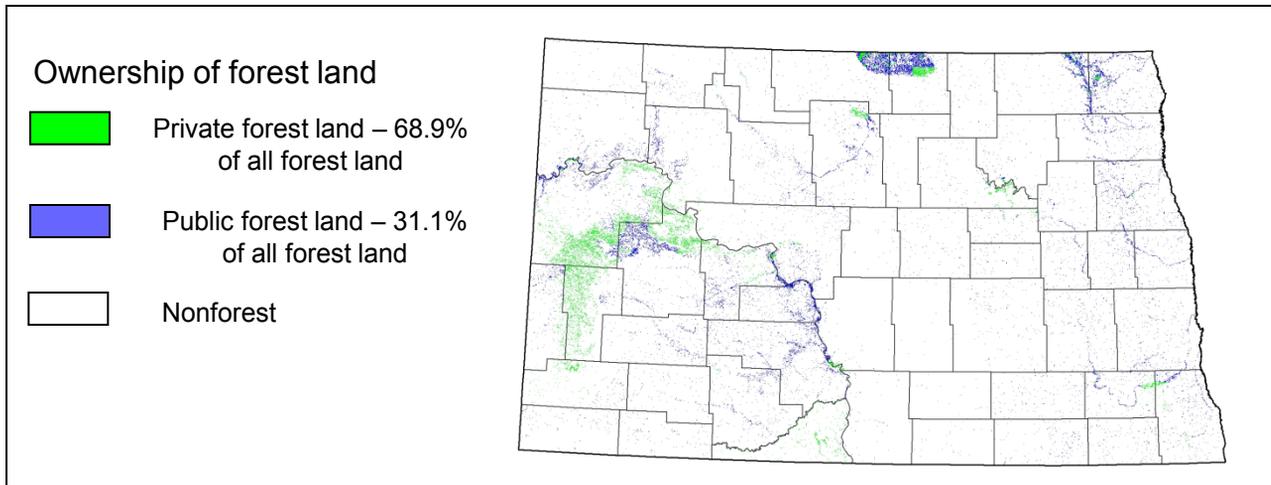


Figure 4. – Area of forest land by major owner group, 2007-2011 (1.6% of North Dakota is forested).

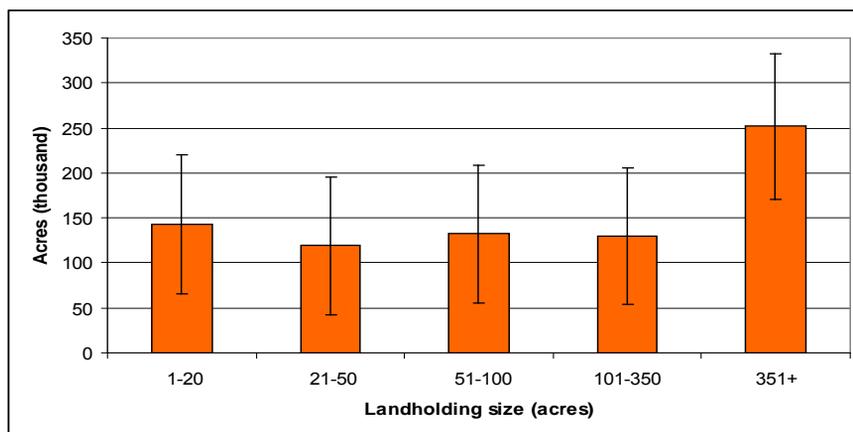


Figure 5. – Area of forest land by major owner group and size of private forest landholding in North and South Dakota, 2006.

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

North Dakota Issue Update —The 2011 Flood

In 2011, record flooding occurred across the entire state of North Dakota. Floodwaters severely impacted riparian and community forests along the Red River of the North, James, Sheyenne, Souris (Mouse), and Missouri River's and the Devils Lake basin. State foresters estimate 33,518 acres of riparian forests on the Missouri and Souris Rivers, and 3,028 acres of inundated community forests are at risk due to flood damage and tree mortality (North Dakota Forest Service 2011). The total effects of the 2011 floods on trees growing in riparian and community forests may not be known for quite some time. The North Dakota Forest Service, along with local, state and Federal agencies, will continue to monitor the damage caused by flooding over the next few years.

Riparian forest have evolved over time to handle periodic flooding. Many trees in the flooded areas will survive the floods of 2011. That being said, the floods were prolonged and occurred over the growing season, leading to increased stress on trees. Flooding also heavily impacted community forests. Trees growing in community forest are not well adapted to flooding, which can have a negative impact on tree growth and outright survival.

Trees stressed by flooding often exhibit a variety of symptoms which include: leaf chlorosis (yellowing), defoliation, smaller leaf size, reduced shoot growth, basal sprouting, and crown dieback. Trees may also exhibit an increase in the production of seed crop (mast), early fall coloration, and leaf drop. These symptoms can persist over several growing seasons. Trees exhibiting stress-related symptoms brought on by flooding over multiple growing seasons may never recover. Flood stressed trees are also vulnerable to attack by insects and/or diseases which can also further weaken trees and lead to their death.



Figure 6. – The Souris River flooding Minot, North Dakota, 2011.



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FIA Program and North Dakota Forest Service 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.

North Dakota Forest Service. 2010. **North Dakota statewide assessment of forest resources and forest resource strategy**. Available at <http://www.ndsu.edu/ndfs/> (verified March 3, 2011).

Smith, W.B. 2002. **Forest inventory and analysis: a national inventory and monitoring program**. Environmental Pollution. 116: 233-242.

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, DC: U.S. Department of Agriculture, Forest Service. Available at <http://www.fia.fs.fed.us/library/field-guides-methods-proc/> (verified March 25, 2010).

North Dakota Forest Service. 2011. **A view from the top of the tree**. Bottineau, ND: North Dakota Forest Service. The Prairie Forester. 25(3): 2.

Additional North Dakota Inventory Information

Haugen, David E.; Kangas, Michael; Crocker, Susan J.; Perry, Charles H.; Woodall, Christopher W.; Butler, Brett J.; Wilson, Barry T.; Kaisershot, Dan J. 2009. **North Dakota's forests 2005**. Resour. Bull. NRS-31 Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 82 p.

Haugen, D.E.; Harsel, R.A. 2005. **North Dakota timber industry—an assessment of timber product output and use, 2003**. Resour. Bull. NC-252. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. 18 p.

Haugen, D.E.; Piva, R.J.; Kingsley, N.P.; Harsel, R.A. 1999. **North Dakota's forest resources, 1994**. Res. Pap. NC-336. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. 101 p.

Jakes, P.J.; Smith, W.B. 1982. **A second look at North Dakota's timberland, 1980**. Resour. Bull. NC-56. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 86 p.

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Estimates, tabular data, and maps from report may be generated at: fiatools.fs.fed.us

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