

Vermont's Forest Resources, 2009

Research Note NRS-85

This publication provides an overview of forest resource attributes for Vermont 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 and uncertainty

	2009 estimate	Sampling error (%)
Forest Land Estimates		
Area (1,000 acres)	4,611	1
Number of live trees 1-inch diameter or larger (1,000,000 trees)	3,523	2.6
Biomass of live trees 1-inch diameter or larger (1,000 tons)	278,417	1.6
Net volume in live trees 5-inch diameter or larger (1,000,000 ft ³)	10,324	1.8
Annual net growth of live trees 5-inch diameter or larger (1,000 ft ³ /year)	193,817	9.4
Annual mortality of live trees 5-inch diameter or larger (1,000 ft ³ /year)	110,238	8.7
Annual harvest removals of live trees 5-inch diameter or larger (1,000 ft ³ /year)	90,258	22.6
Annual other removals of live trees 5-inch diameter or larger (1,000 ft ³ /year)	359	115.2
Timberland Estimates		
Area (1,000 acres)	4,506	1.1
Number of live trees 1-inch diameter or larger (1,000,000 trees)	3,437	2.7
Biomass of live trees 1-inch diameter or larger (1,000 tons)	273,338	1.7
Net volume in live trees 5-inch diameter or larger (1,000,000 ft ³)	10,147	1.9
Net volume of growing-stock trees (1,000,000 ft ³)	9,136	2
Annual net growth of growing-stock trees (1,000 ft ³)	193,671	7.1
Annual mortality of growing-stock trees (1,000 ft ³ /year)	70,873	10.2
Annual harvest removals of growing-stock trees (1,000 ft ³ /year)	79,441	22.4
Annual other removals of growing-stock trees (1,000 ft ³ /year)	7,353	66.3

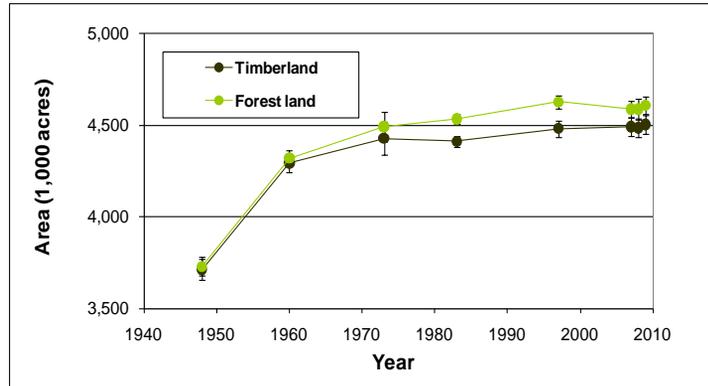


Figure 1. – Area of timberland and forest land by year.

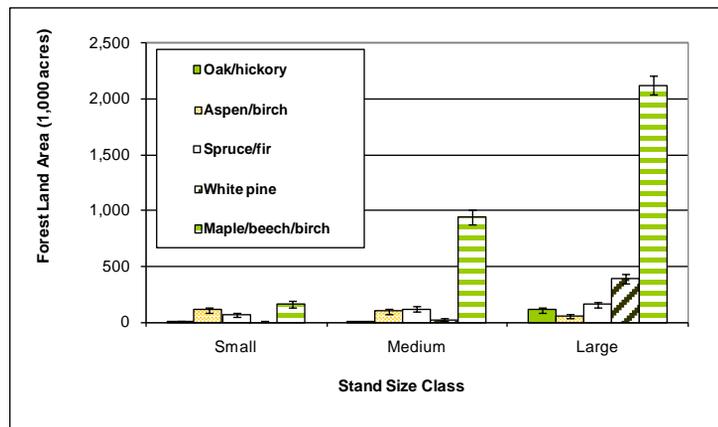


Figure 2. – Area of forest land area by top six forest types and stand size class, 2005-2009.

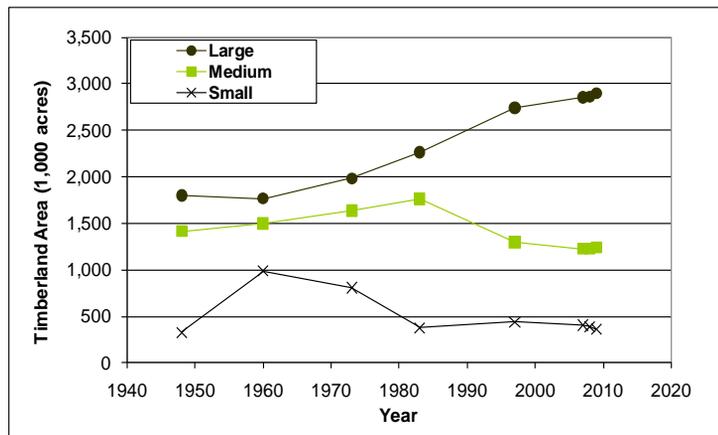


Figure 3. – Area of timberland by stand size class and year.

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

Table 2. – Top 10 tree species by statewide volume estimates (5-inch diameter and larger), 2005-2009

Rank	Species	Volume of live trees on forest land (1,000,000 ft ³)	Sampling error (%)	Volume of sawtimber trees on timberland (1,000,000 bdf)	Sampling error (%)
1	Sugar maple	2,388	4.8	6,705	6.3
2	Red maple	1,287	5.7	2,982	7.7
3	Eastern hemlock	1,098	8.7	3,144	10.0
4	Eastern white pine	962	9.6	4,008	10.4
5	Yellow birch	750	6.1	1,792	8.8
6	American beech	599	7.0	1,116	11.4
7	White ash	509	8.5	1,456	11.3
8	Red spruce	508	8.6	1,401	10.5
9	Paper birch	432	8.7	860	12.1
10	Balsam fir	393	9.3	738	10.7
	Other softwoods	234	15.3	594	19.0
	Other hardwoods	1,164	5.9	3,265	8.6
	All Species	10,324	1.8	28,062	2.8

*Data may not add to totals due to rounding

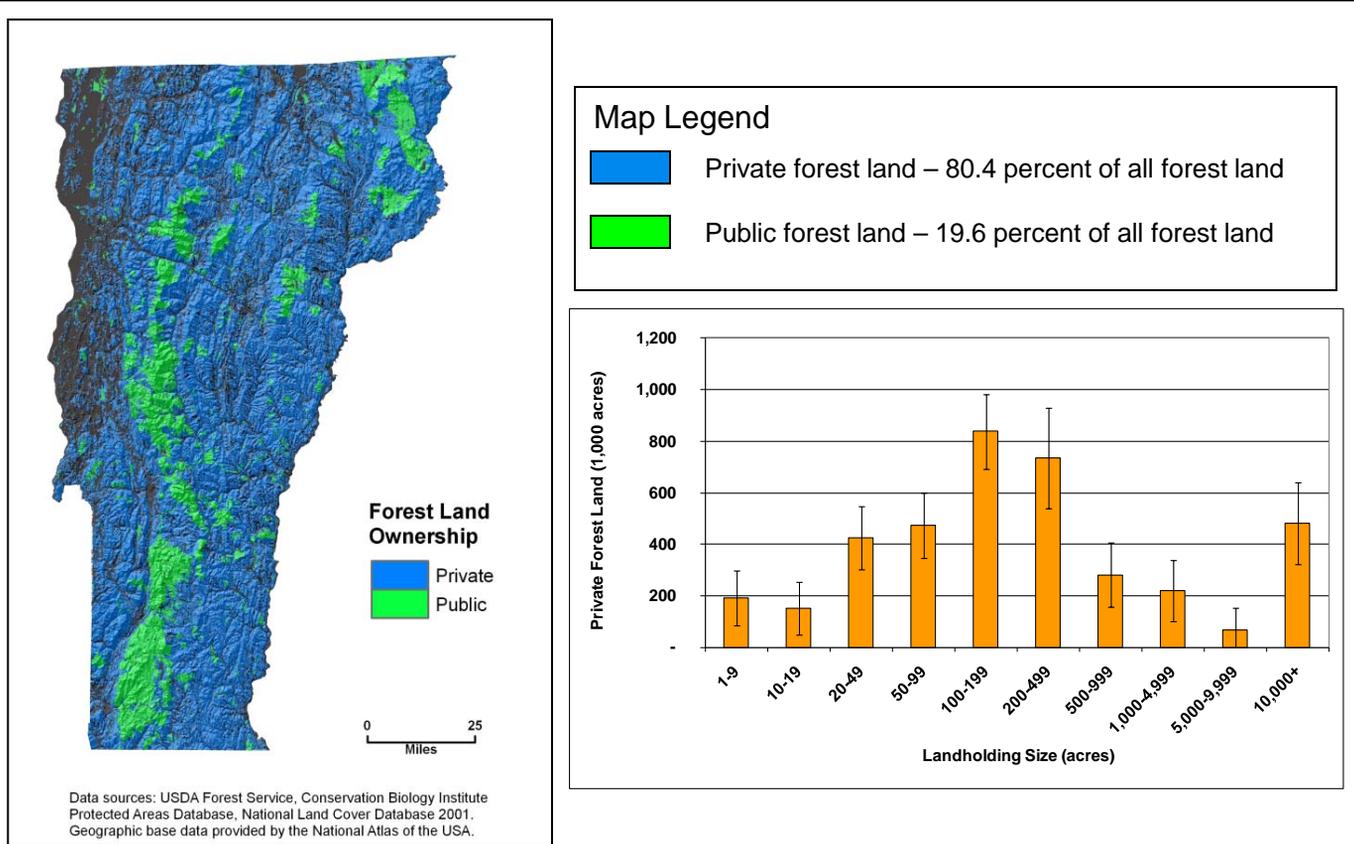


Figure 4. – Area of forest land by major owner group (2009) and size of private family forest landholding (2006).

Use of Damage Surveys and FIA Data in Vermont

Mortality of growing-stock volume per acre of timberland shows an increase of 28 percent from the 1997 inventory to the 2008 inventory (Fig. 5; Wilmot et al. 2010). One source of available data to help explain this apparent increasing trend is Vermont's rich database of aerial and ground damage surveys. An intersection of the FIA plot locations with Vermont's damage surveys reveals that approximately 45percent of Vermont's forest land was damaged at least once between 1997 and 2005 (Figs. 6 and 7). Those plots that were damaged have higher annual mortality rates than those that were undamaged (Fig. 8). This relationship holds across all forest-type groups in Vermont except for the white pine forest-type group. The association is strongest in the spruce/fir and oak/hickory forest-type groups.

Additional analyses are under way using other spatial data layers (e.g., soil depth and dryness) to contribute to understanding the increase in mortality. Species specific probable causes are also being investigated.

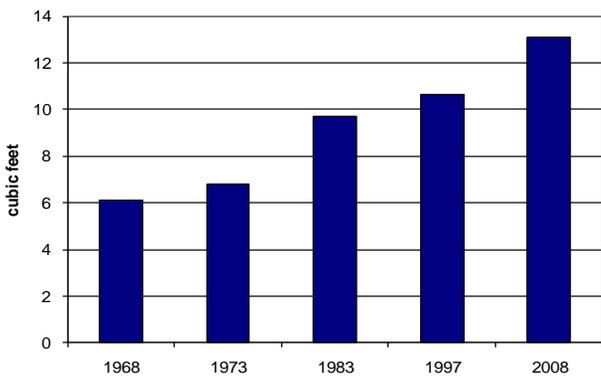


Figure 5. – Mortality of growing-stock volume per acre of timberland, Vermont 1968, 1973, 1997, and 2004-2008.

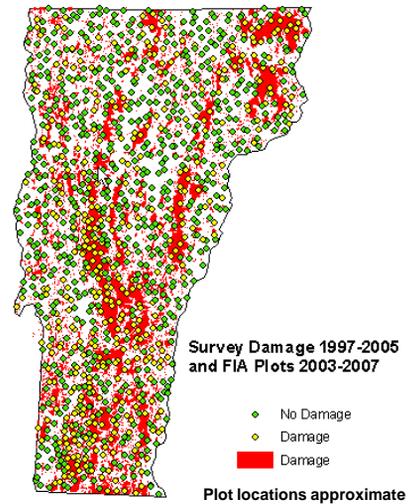


Figure 6. – Survey damage from Vermont damage surveys, 1997-2005 and FIA plots, 2003-2007.

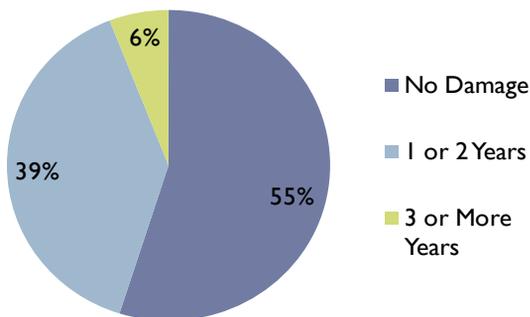


Figure 7. – Percent of forest land by years of damage from Vermont damage surveys.

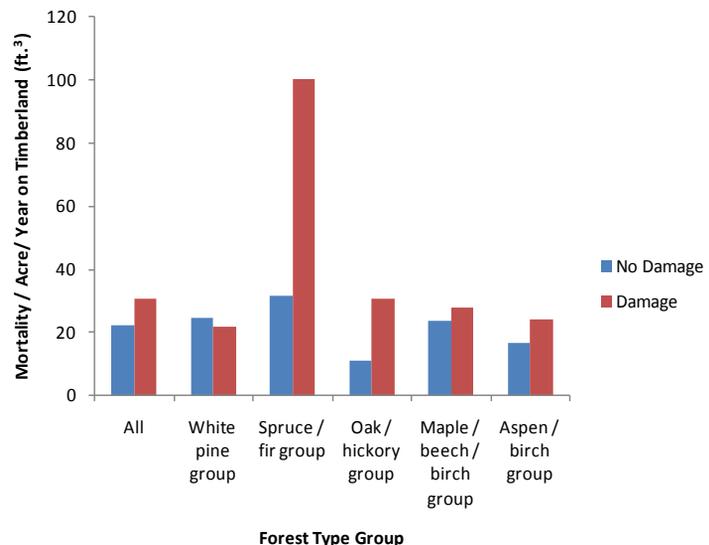


Figure 8. – Mortality per acre on damaged and undamaged plots, Vermont 2003-2007.



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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.

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

USDA Forest Service. 2005. **Forest inventory and analysis national core field guide, Vol. 1, field data collection procedures for phase 2 plots, Ver. 3.0**. Available at <http://www.fia.fs.fed.us/library/field-guides-methods-proc/> (verified Aug. 1, 2008).

Additional Information

Wilmot, S.; De Geus, R.; Morin, R.S. 2010. **Increased tree mortality in Vermont**. Vermont Monitoring Cooperative 2010 Meeting, Burlington, VT, October 25, 2010. Information on file at U.S. Forest Service, Northern Research Station, Newtown Square, PA.

Additional Vermont Inventory Information

Frieswyk, T.S.; Malley, A.M. 1985. **Forest statistics for Vermont, 1973 and 1983**. Resour. Bull. NE-87. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 102 p.

Frieswyk, T.; Widmann, R. 2000. **Forest statistics for Vermont, 1983 and 1997**. Resour. Bull. NE-145. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 130 p.

Kingsley, N.P. 1977. **The forest resources of Vermont**. Resour. Bull. NE-46. Upper Darby, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 58 p.

Kingsley, N.P.; Barnard, J.E. 1968. **The timber resources of Vermont**. Resour. Bull. NE-12. Upper Darby, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 117 p.

McGuire, J.R.; Wray, R.D. 1952. **Forest statistics for Vermont**. Upper Darby, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 47 p.

Contact Information

Lead analyst: Randall Morin, (610) 557-4054, rsmorin@fs.fed.us
 Data processing/access: Carol Alerich, (610) 557-4068, calerich@fs.fed.us; Charles Barnett, (610) 557-4031, cjbarnett@fs.fed.us; Barbara O'Connell, (610) 557-4037, boconnell@fs.fed.us
 Field data collection: Aaron Clark, (412) 849-6651, aaronclark@fs.fed.us; Robert Gregory, (412) 965-3119, rgregory@fs.fed.us; John Higham, (412) 523-1466, jhigham@fs.fed.us; Jason Morrison, (603) 868-7681, jwmorrison@fs.fed.us; Bryan Tirrell, (413) 534-7862, btirrell@fs.fed.us; Ashley Zickefoose, (412) 527-3182, azickefoose@fs.fed.us

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

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