

West Virginia's Forest Resources, 2011

Research Note NRS-148

This publication provides an overview of forest resource attributes for West Virginia 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.

	Estimate 2011	Sampling error (%)	Change since 2008 (%)
Forest Land Estimates			
Area (1,000 acres)	12,154	0.7	1.5
Number of live trees 1-inch diameter or larger (million trees)	6,325	1.7	2.1
Dry biomass of live trees 1-inch diameter or larger (1,000 tons)	806,958	1.1	2.7
Net volume in live trees (1,000,000 ft ³)	27,823	1.2	2.7
Annual net growth of live trees (1,000 ft ³ /year)	638,510	4.9	NA
Annual mortality of live trees (1,000 ft ³ /year)	246,598	9.5	NA
Annual harvest removals of live trees (1,000 ft ³ /year)	250,169	15.9	NA
Annual other removals of live trees (1,000 ft ³ /year)	8,360	73.7	NA
Timberland Estimates			
Area (1,000 acres)	11,862	0.7	1.2
Number of live trees 1-inch diameter or larger (million trees)	6,178	1.7	1.9
Dry biomass of live trees 1-inch diameter or larger (1,000 tons)	784,624	1.2	2.4
Net volume in live trees (1,000,000 ft ³)	27,008	1.2	2.3
Net volume of growing-stock trees (1,000,000 ft ³)	25,281	1.3	1.0
Annual net growth of growing-stock trees (1,000 ft ³ /year)	571,676	4.5	NA
Annual mortality of growing-stock trees (1,000 ft ³ /year)	179,619	7.7	NA
Annual harvest removals of growing-stock trees (1,000 ft ³ /year)	214,849	16.1	NA
Annual other removals of growing-stock trees (1,000 ft ³ /year)	48,315	33.1	NA

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

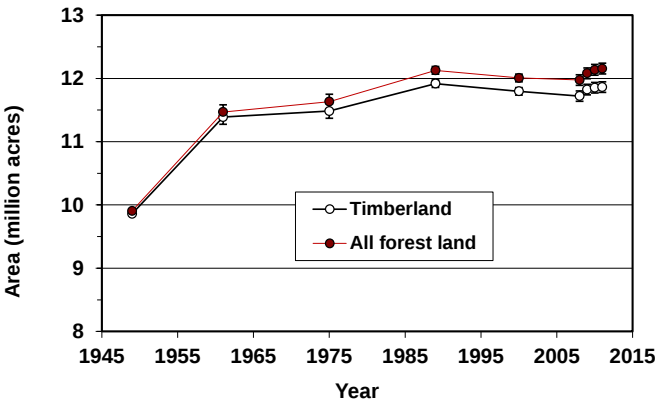


Figure 1. – Area of timberland and forest land by year.

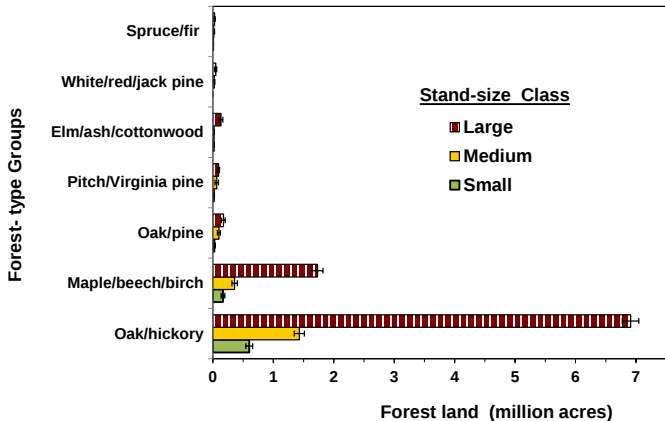


Figure 2. – Forest land area by stand-size class* for most common forest-type groups, 2011.

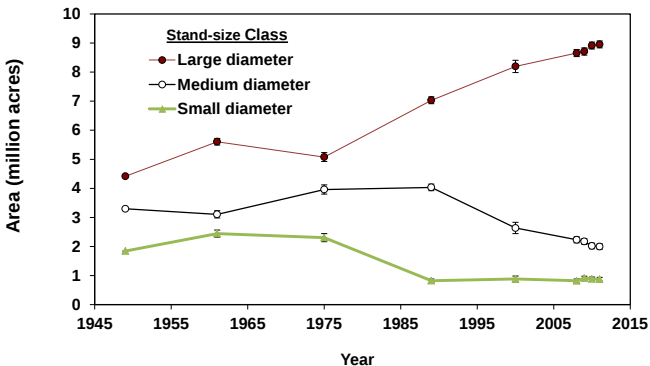


Figure 3. – Area of timberland by stand-size class* and year.

* Small: dominated by trees less than 5.0 inches d.b.h.; Medium: 5.0 to 8.9 inches d.b.h. for softwoods and 5.0 to 10.9 inches d.b.h. for hardwoods; Large: ≥ 9.0 inches for softwoods and 11.0 d.b.h. for hardwoods.

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

Rank	Species	Volume of live trees on forest land (million ft ³)	Sampling error (%)	Change since 2008 (%)	Volume of sawtimber trees on timberland (million bdft)	Sampling error (%)	Change since 2008 (%)
1	Yellow-poplar	4,019	4.2	3.2	16,171	4.7	2.8
2	Red maple	2,534	3.7	3.8	6,163	5.2	5.8
3	Chestnut oak	2,504	4.6	4.0	8,106	5.3	6.5
4	White oak	2,423	4.5	3.1	8,876	5.3	4.0
5	Northern red oak	2,203	5.0	3.0	9,404	5.9	2.7
6	Sugar maple	1,933	4.5	2.1	5,147	6.3	-0.2
7	Black oak	1,187	5.7	-4.9	4,658	6.9	-7.4
8	American beech	1,091	6.4	2.7	3,564	8.6	3.0
9	Black cherry	1,055	7.3	3.2	3,318	9.8	1.5
10	Pignut hickory	798	6.1	1.2	2,378	7.7	1.6
	Other softwoods	1,525	2.3	7.9	4,494	7.6	7.7
	Other hardwoods	6,550	2.1	1.7	17,844	3.4	1.1
	All Species	27,823	1.2	2.7	90,121	1.7	2.5

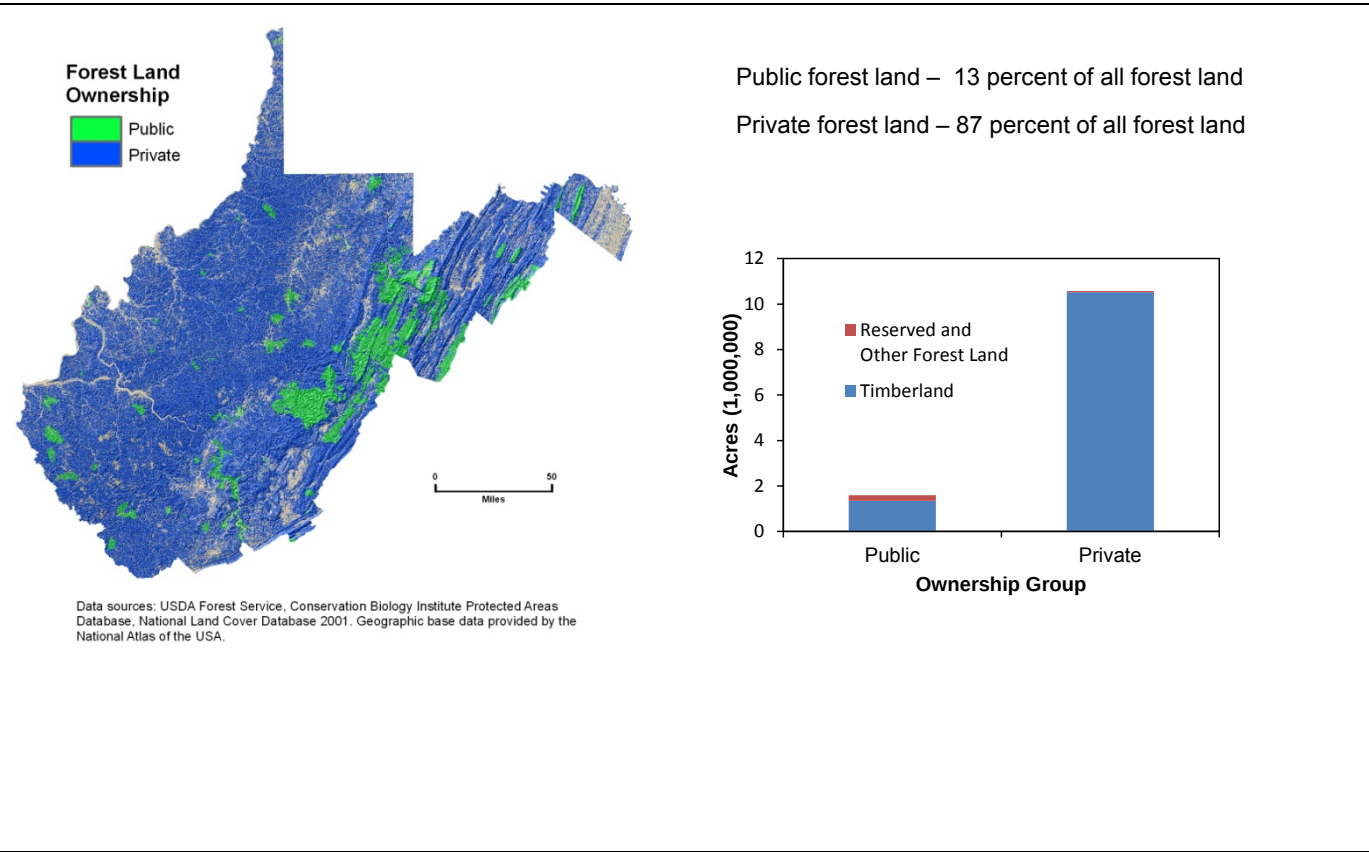


Figure 4. – Area of forest land by major owner group, West Virginia, 2011.

Tree Mortality in West Virginia

The volume of trees that die from natural causes such as insects, diseases, fire, wind, and suppression from other trees is reported as mortality; harvested trees are not included (harvested trees and trees lost due to land use change are included in removals). Tree mortality is a natural process that occurs in a functioning ecosystem although dramatic increases in mortality can indicate problems in forest health. In West Virginia, mortality of growing-stock trees has averaged 180 million cubic feet since 2008, a rate of 0.7 percent of inventory volume (Fig. 5). This is the same rate (0.7) as reported for the periods 2000-2008 and 1989-2000. By FIA unit, mortality rates were similar across the State (Fig. 6). Generally the species that lead in volume account for most of the mortality, though three relatively minor species in the State: black locust, elm, and Virginia pine account for 16 percent of mortality but only 3 percent of total volume. (Fig. 7). Looking at mortality as percentage of a species total volume, eleven of the top species by volume had mortality rates higher than the State average, with black locust, elm, and Virginia pine having the highest rates– 5.8, 4.4 and 1.8 percent respectively (Fig. 8).

Much of the mortality can be explained by insects and diseases that target specific species and by stand dynamics. The high mortality rate for elm can be attributed to Dutch elm disease, and hemlock mortality can likely be attributed to the hemlock woolly adelgid that has been active across much of the State. Other species with high mortality rates are mostly early successional species that are intolerant of shaded conditions that are becoming more prevalent as West Virginia’s forest matures. Black locust and scarlet oak are rated as very intolerant of shade, and Virginia pine is rated as intolerant (Burns1990).

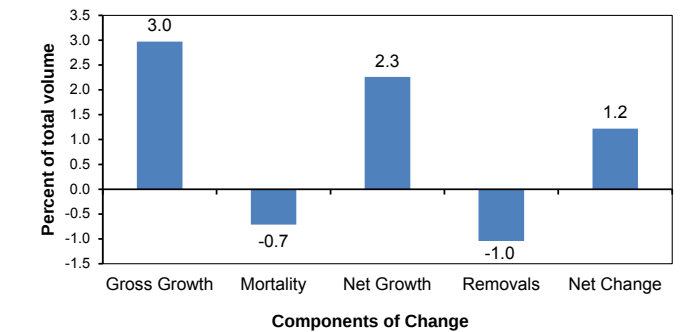


Figure 5. – Components of average annual change as a percentage of total growing-stock volume on timberland, West Virginia, 2009-2011.

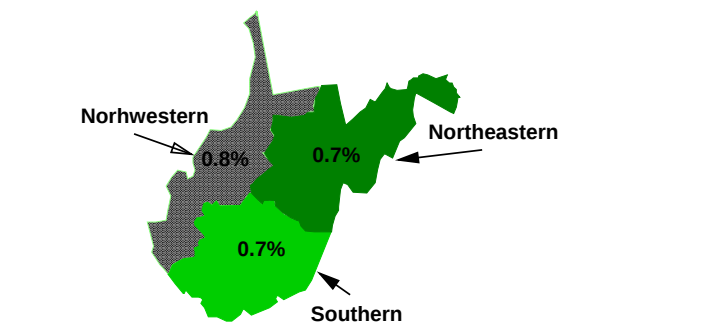


Figure 6. – Average annual mortality rate (percent of unit total growing-stock volume) on timberland, West Virginia, 2009-2011.

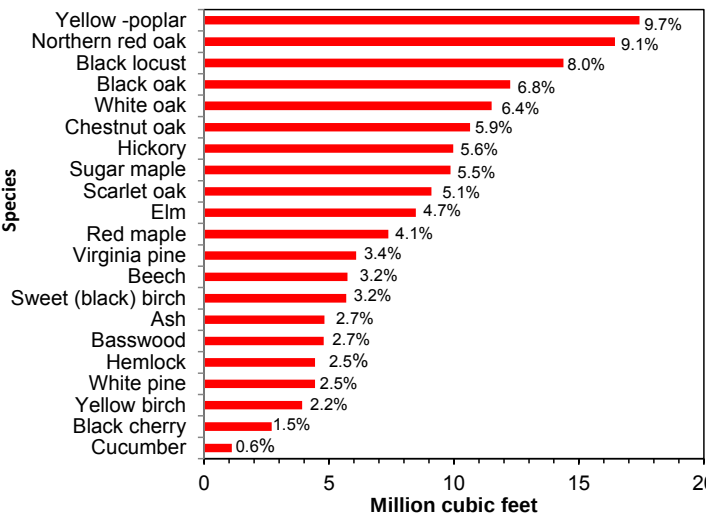


Figure 7. – Average annual mortality by major species and percent of total mortality, West Virginia, 2011.

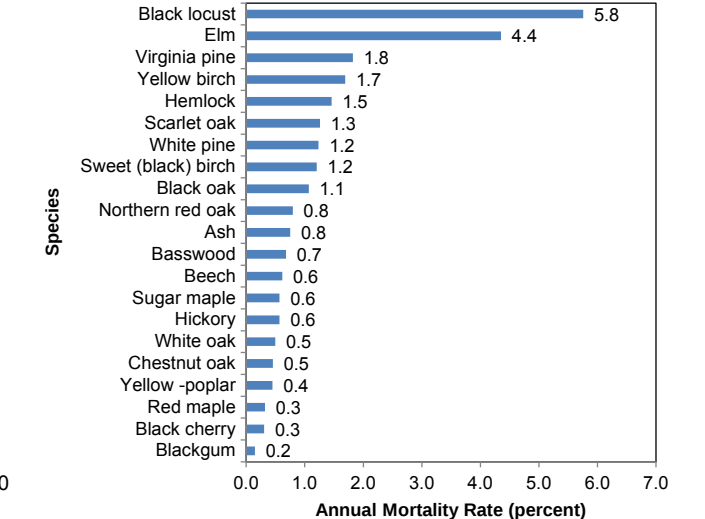


Figure 8. – Average annual mortality rate (percent of species total growing-stock volume) for major species on timberland, West Virginia, 2009-2011.

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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. 2011. **Forest Inventory and Analysis national core field guide, Vol. 1, field data collection procedures for phase 2 plots, Ver. 5.1**. Washington, DC: U.S. Department of Agriculture, Forest Service. Available at <http://www.fia.fs.fed.us/library/field-guides-methods-proc/> (verified June 1, 2012).

Additional West Virginia Inventory Information

Bones, J.T. 1978. **The forest resources of West Virginia**. Resour. Bull. NE-56. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 105 p.

DiGiovanni, D.M. 1990. **Forest statistics for West Virginia—1975 and 1989**, Resour. Bull. NE-114. Radnor, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 172 p.

Ferguson, R.H. 1964. **The timber resources of West Virginia**. Resour. Bull. NE-2. Upper Darby, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 123 p.

Griffith, D.M.; Widmann, R.H. 2003. **Forest statistics for West Virginia: 1989 and 2000**. Resour. Bull. NE-157. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 119 p.

Widmann, R.H.; Dye, C.R.; Cook, G.W. 2007. **Forests of the Mountain State**. Resour. Bull. NRS-17. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 28 p.

Literature Cited

Burns, R.M.; Honkala, B.H., tech. coords. 1990. **Silvics of North America: 1. Conifers; 2. Hardwoods**. Agriculture Handbook 654, U.S. Dept. of Agriculture, Forest Service, Washington, D.C. vol.1, 875 p.; vol.2, 877 p.

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

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