USDA

United States Department of Agriculture

Forests of West Virginia, 2014
Overview

This publication provides an overview of forest resources in West Virginia based on inventories conducted by the U.S. Forest Service, Forest Inventory and Analysis (FIA) program of the Northern Research Station. For annual inventory years 2002-2013, the sample length was equal to 5 years. Beginning in 2014, the cycle length was changed to 7 years. For the 2014 inventory, estimates for current variables such as area, volume, and biomass are based on 2,369 plot samples collected from 2009-2014. Change variables, such as net growth, removals, and mortality, are based on 2,035 samples collected in 2004-2009 and resampled in 2009-2014. Estimates from earlier annual and periodic inventories are shown for comparison. See Bechtold and Patterson (2005) and O'Connell et al. (2013) for definitions and technical details.

Currently, West Virginia is home to over 12 million acres of forest land (Table 1). Since the 1989 inventory, the estimate of forest land has been relatively stable (Fig. 1). However, the volume and biomass of trees has risen (Table 1). Average annual net growth, mortality, and removals have higher sampling errors, indicating higher uncertainty in trend estimates; however, the latest inventory shows a notable 33 percent decrease in average annual harvest removals on forest land since 2008 which highlights the impacts of the economic recession on timber harvesting (Table 1). During that same period, average annual mortality on forest land increased by 27 percent.

Note that net volume is defined as gross volume in cubic feet less deductions for rot, roughness, and poor form from a 1-foot stump to a minimum 4.0-inch top diameter. Biomass is defined as the aboveground weight of wood and bark in live trees 1.0 inch diameter and larger from the ground to the tip of the tree, excluding all foliage.

Table 1.—West Virginia forest statistics, 2014 and 2008. Volumes are for trees 5.0-inch and larger in diameter. Number of trees and biomass are for trees 1.0-inch and larger in diameter. Sampling errors and error bars shown in tables and figures in this report represent 68 percent confidence intervals.

	2014 Estimate	Sampling error (percent)	2008 Estimate	Sampling error (percent)	Change since 2008 (percent)
Forest Land					
Area (thousand acres)	12,119	0.6	11,974	0.7	1.2
Number of live trees (million trees)	6,286	1.6	6,196	1.6	1.5
Aboveground biomass of live trees (thousand oven-dry tons)	826,179	1.1	785,496	1.1	5.2
Net volume of live trees (million ft^3)	28,539	1.1	27,103	1.2	5.3
Annual net growth of live trees (thousand ft^3/yr)	527,311	4.1	700,273	2.4	-24.7
Annual mortality of trees (thousand ft^3/yr)	286,509	5	225,756	4.5	26.9
Annual harvest removals of live trees (thousand ft^3/yr)	226,556	12.2	337,487	8.5	-32.9
Timberland					
Area (thousand acres)	11,750	0.7	11,633	0.8	1
Number of live trees (million trees)	6,088	1.7	6,005	1.7	1.4
Aboveground biomass of live trees (thousand oven-dry tons)	796,426	1.2	759,259	1.2	4.9
Net volume of live trees (million ft^3)	27,447	1.2	26,166	1.3	4.9
Net volume of growing stock trees (million ft^3)	25,410	1.3	24,816	1.3	2.4
Annual net growth of growing stock trees (thousand ft^3/yr)	470,450	3.6	607,132	2.3	-22.5
Annual mortality of growing stock trees (thousand ft^3/yr)	209,219	5.6	168,871	4.8	23.9
Annual harvest removals of growing stock trees (thousand ft^3/yr)	192,967	12.4	286,969	8.6	-32.8

Forest Area

West Virginia's area of forest land has been relatively stable since the late 1980s (Fig. 1). Timberland accounts for 97 percent of this forest land or 11.8 million acres. Less than 0.25 percent of forest land is reserved from timber production and less than 0.1 percent is other forest land identified as not being able to meet minimum productivity standards. West Virginia's total area is 15.5 million acres.

The northeastern unit of West Virginia has the highest area of forest land at 4.6 million acres, and all units have a proportion of land in forest over 75 percent (Fig. 2). The northeastern unit has more than triple the proportion of forest land in public ownership (24 percent) than the southern unit (8 percent) and more than six times than the northwestern unit (4 percent).

Oak/hickory is the dominant forest-type group, covering 74 percent of the forest land (Fig. 3). In fact, the oak/hickory type group makes up over 50 percent of the forest land area in all but five counties in the State.

Pitch/Virginia pine is the most abundant softwood forest-type group. It accounts for nearly 2 percent of the forest land in the State.

The maple/beech/birch forest-type group, which is more widely distributed in the northeastern unit, has the highest proportion of area in public ownership of all forest-type groups. Families and individuals, corporations, and other private entities own the majority of forest land (52, 33, and 1 percent, respectively). The U.S. Forest Service, state of West Virginia, and other public entities own the remainder (3, 9, and 2 percent, respectively).

West Virginia's forests have been maturing as illustrated in the distribution of timberland by stand-size classes (Fig. 4). Since the 1975 inventory, the acreage of large-diameter stands has been steadily increasing. Until the 1989 inventory, the acreage in small-diameter stands was declining and has since been stable. The acreage of medium-diameter stands has been declining since the 1989 inventory.
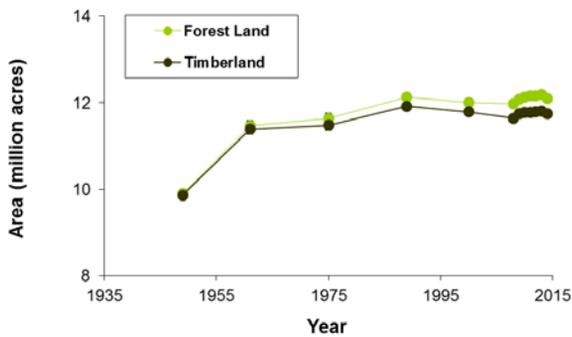

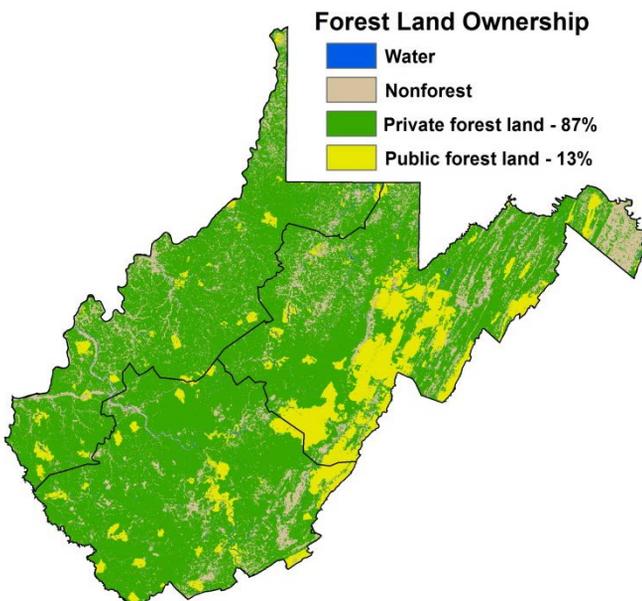Figure 1.—Forest land and timberland by year, West Virginia.

Figure 2.—FIA unit boundary and area of forest/nonforest with forest identified by major ownership group, West Virginia, 2014.
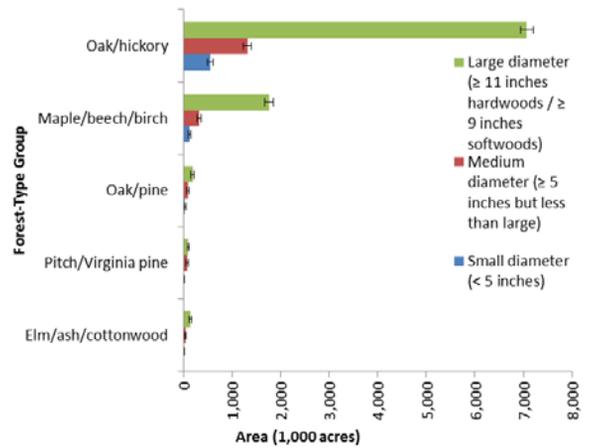

Figure 3.—Forest land by stand-size class (based on small, medium, and large trees) for top five forest-type groups by acres, West Virginia, 2014.
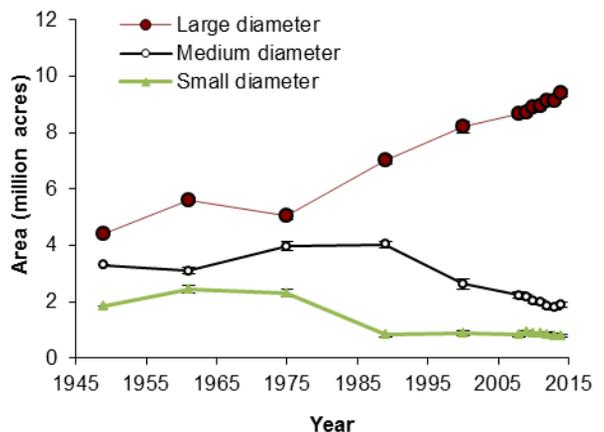

Figure 4.—Timberland by stand-size class and year, West Virginia.

Volume, Biomass, and Trends

Increases in volume, biomass, and number of large-diameter trees have accompanied the increase in area of large-diameter stands in West Virginia.

There are approximately 1.8 billion live trees (at least 5-inch diameter) on forest land accounting for approximately 29 billion ft^3 of volume and 786 million oven-dry tons of aboveground biomass. Volume increased 5.3 percent and biomass increased by 5.2 percent since the 2008 inventory (Table 1).

Contributing to this increase are the notable gains in volume for black cherry (*Prunus serotina*), chestnut oak (*Quercus prinus*), red maple (*Acer rubrum*) yellow-poplar (*Liriodendron tulipifera*), northern red oak (*Q. rubra*), and sugar maple (*A. saccharum*) at 17, 11, 9, 9, 7, and 5 percent, respectively. By contrast, black birch (*Betula lenta*) decreased by 3 percent (Fig. 5).
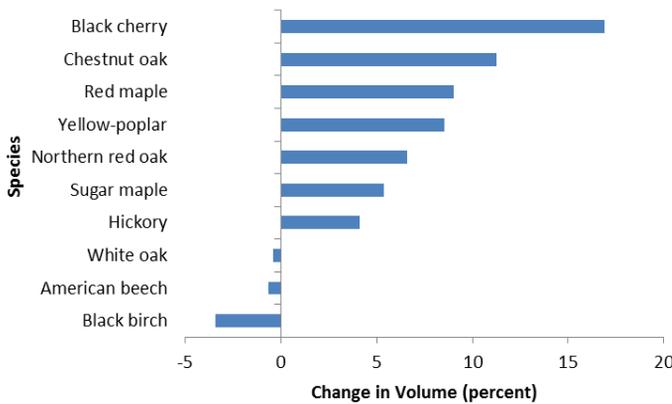
The growth-to-harvest removal ratio (G:R) for all species across the State is 2.3:1, but this ratio varies substantially by species. Red maple and the hickories (*Carya* spp.) have G:R ratios above 4:1. By contrast, American beech (*Fagus grandifolia*), black birch, and white oak (*Q. alba*) have G:R ratios below 2:1 (Table 2).

Figure 5.—Percent change in inventory volume by species, West Virginia, 2008 to 2014.
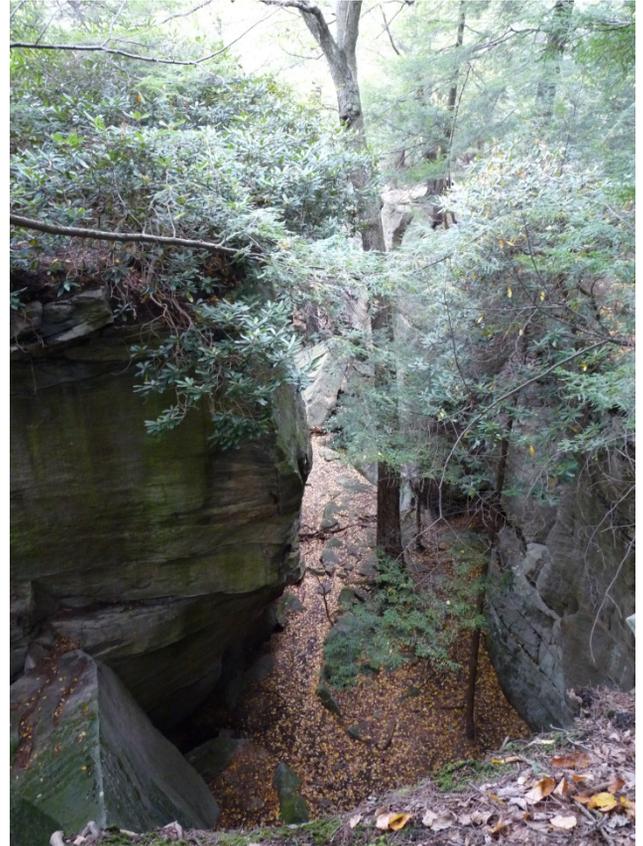
Rock outcrops in Coopers Rock State Forest. Photo by Randall Morin, U.S. Forest Service.

Table 2.—Number, net volume, oven-dry biomass, net growth, mortality, and harvest removals of live trees on forest land, West Virginia, 2014 (selected prominent species)

Species	Trees[a] (million trees)	Net volume[a] (million ft^3)	Aboveground biomass[b] (thousand tons)	Net growth[a] (thousand ft^3/yr)	Mortality[a] (thousand ft^3/yr)	Harvest removals[a] (thousand ft^3/yr)
Red maple	241	2,661	68,171	62,584	15,790	13,669
Sugar maple	164	1,995	60,700	51,543	16,155	18,147
Chestnut oak	150	2,679	86,009	45,585	14,162	11,592
Yellow-poplar	148	4,228	86,463	114,876	22,457	52,766
White oak	116	2,339	74,802	42,340	17,788	24,017
Hickory spp.	100	1,485	62,983	37,968	11,089	8,154
American beech	74	1,055	30,692	-4,175	17,548	8,406
Northern red oak	70	2,281	72,183	46,013	23,731	12,547
Black cherry	60	1,196	29,662	33,874	3,951	9,788
Black birch	49	504	15,534	5,457	7,025	4,886

[a] Trees at least 5-inch diameter. [b] Trees at least 1-inch diameter.

Flowering Dogwoods are Rapidly Declining

Flowering dogwood (*Cornus florida*) is a shade tolerant, native tree that grows in the forest understory from Maine to the Gulf of Mexico. It is valued for its spectacular flowering in the spring, the high quality of its fruit as food for wildlife, and its red and purple fall foliage. Dogwoods also play an important role in the calcium cycle in eastern forests. Since the 1970s, a fungal disease of unknown origin with no known cure has been eliminating dogwood from the landscape. This disease, known as dogwood anthracnose, is caused by the fungus *Discula destructiva*. It was first identified in New York and has since caused extensive mortality of dogwoods throughout the eastern hardwood forest. Previous to this disease, dogwoods were one of the most numerous trees in the understory of eastern hardwood forests.

In the last 6 years the numbers of dogwood trees, 1-inch and larger in diameter, have undergone large decreases in many states (Fig. 6). In West Virginia the average number of dogwood trees per acre of timberland has decreased from 43.9 in 1989 to 8.5 in 2014 (Fig.7). Although the recent decline indicates that few trees are resistant to the disease, there are still an estimated 102 million dogwoods in West Virginia. A tree on Catoctin Mountain in Maryland that showed resistance to the disease was discovered, and a cultivar was cloned and is now sold by tree nurseries. Hopefully more trees resistant to dogwood anthracnose will appear within wild populations, otherwise forests will be significantly altered aesthetically and ecologically.
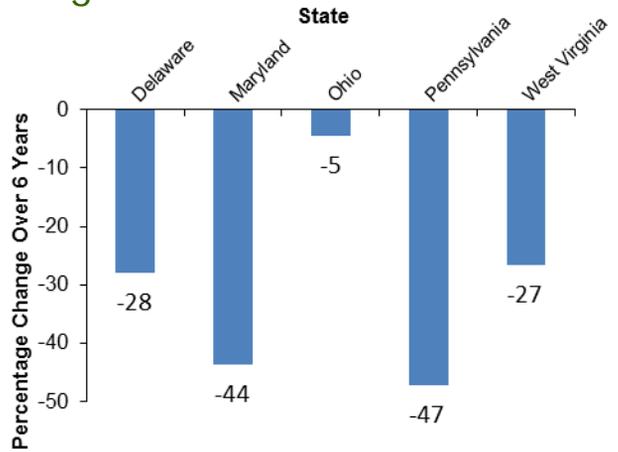

Figure 6.—Percentage change over the most recent 6-year period in the number of dogwood trees, by state, trees 1-inch d.b.h and larger.

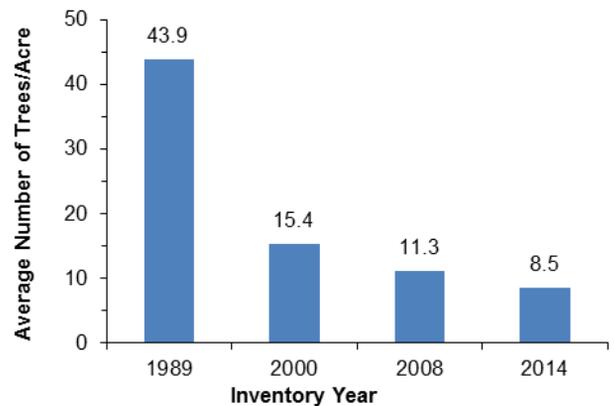Figure 7.—Average number of dogwood trees per acre of timberland, trees 1-inch d.b.h. and larger, by inventory year, West Virginia.

References

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.

O'Connell, B.M.; LaPoint, E.B.; Turner, J.A. [et al.]. 2014. **The Forest Inventory and Analysis database: database description and user guide version 6.0.1 for Phase 2**. U.S. Department of Agriculture, Forest Service. 748 p. (http://www.fia.fs.fed.us/library/database-documentation/)

Widmann, R.H. 2014. **Forests of West Virginia, 2013**. Resour. Update FS-22. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 4 p.

Widmann, R.H.; Cook, G.W.; C.J. Barnett, C.J.; Butler, B.J.; Griffith, D.M. [et al.]. 2012. **West Virginia's Forests 2008**. Resour. Bull. NRS-61. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 64 p. [DVD included].