USDA
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RESOURCE UPDATE FS-37

FORESTS OF Virginia, 2013

This resource update provides an overview of forest resources in Virginia. Information for this factsheet was updated by means of the Forest Inventory and Analysis (FIA) annualized sample design. Each year, 20 percent of the sample plots (one panel) in Virginia are measured by field crews, the data compiled, and new estimates produced. After 5 years of measurements, the full sample complement (a cycle) is complete and a new survey cycle begins. The most reliable trend information (especially that concerning magnitude of change) comes from comparing two full cycles of data. Estimates presented here are for the measurement year 2013 with comparisons made to 2011, which means that only 40 percent of the data are new. Generally speaking, for the 2013 inventory, estimates for variables such as area and volume are based on 4,613 plots measured between 2009 and 2013. Growth, removals, and mortality estimates for the 2013 inventory are based on plots collected between 2002 and 2008, and remeasured between 2009 and 2013.

This update is based on data processed and posted on the FIA database (FIADB) on January 9, 2015 (http://fia.fs.fed.us/tools-data/). Definitions can be found in the FIADB user's manual at http://fia.fs.fed.us/tools-data/docs/default.asp. Additional information can be found in the report Virginia's Forests, 2011 (Rose 2013).

Overview

Overall, area of forest land in Virginia remained stable between 2011 and 2013 (table 1). Number of live trees on forest land decreased by 0.4 percent between 2011 and 2013. Volume increased by 2.7 percent. There was a 2.5-percent increase in growth, a 5.4-percent decrease in annual removals, and a 1.1-percent decrease in annual mortality.

Table 1—Virginia forest statistics, change between 2011 and 2013

Forest statistics	2011 estimate	Sampling error (percent)	2013 estimate	Sampling error (percent)	Change since 2011 (percent)
Forest land					
Area *(thousand acres)*	15,907.0	0.65	15,915.3	0.63	0.05
Number of live trees ≥1.0 inch d.b.h. *(million trees)*	11,483.5	1.62	11,433.9	1.63	-0.43
Net volume of live trees ≥5.0 inches d.b.h. *(million cubic feet)*	35,167.5	1.29	36,102.6	1.28	2.66
Live trees aboveground biomass *(thousand oven-dry tons)*	897,289.5	1.15	915,936.1	1.14	2.08
Net growth of live trees ≥5.0 inches d.b.h. *(million cubic feet per year)*	1,037.4	2.49	1,063.8	2.40	2.54
Annual removals of live trees ≥5.0 inches d.b.h. *(million cubic feet per year)*	544.9	7.12	515.7	6.89	-5.35
Annual mortality of live trees ≥5.0 inches d.b.h. *(million cubic feet per year)*	302.1	4.16	298.8	4.27	-1.10
Timberland					
Area *(thousand acres)*	15,315.8	0.75	15,308.8	0.73	-0.05
Number of live trees ≥1.0 inch d.b.h. *(million trees)*	11,190.2	1.68	11,122.2	1.69	-0.61
Net volume of live trees ≥5.0 inches d.b.h. *(million cubic feet)*	33,702.5	1.37	34,567.5	1.36	2.57
Live trees aboveground biomass *(thousand oven-dry tons)*	860,311.9	1.23	876,854.7	1.23	1.92
Net growth of live trees ≥5.0 inches d.b.h. *(million cubic feet per year)*	1,042.0	2.54	1,051.4	2.44	0.90
Annual removals of live trees ≥5.0 inches d.b.h. *(million cubic feet per year)*	561.8	7.04	540.7	6.78	-3.76
Annual mortality of live trees ≥5.0 inches d.b.h. *(million cubic feet per year)*	281.2	4.21	282.0	4.33	0.27

Forest Area

Total land area of Virginia is 25.4 million acres, not including census water. Of this, 15.9 million acres (63 percent) was forested in 2013, an increase of 0.05 percent from 2011 (table 1). Virginia is divided into five survey units (fig. 1). Each of the five units was between 58 percent and 68 percent forested. There were slight increases in forest land in the Northern Piedmont and Northern Mountains, while there were slight decreases in the other three units (table 2).

Across the Commonwealth, approximately 82 percent of the forest land in Virginia is privately owned, a number which has remained consistent over the years. One noticeable change in ownership in Virginia has been that of forest industry owned land. In 2001, forest industry owned just over 1.0 million acres of timberland. In 2011, forest industry owned just under 196,000 acres of timberland. By 2013, that number had dropped to 188,400 acres. This continues a trend going back to the 1990s in the Commonwealth as well as in the South.

The oak-hickory forest-type group occupied the largest proportion of forest land in Virginia at 9.7 million acres (61 percent of forest land) (fig. 2). The next most predominate forest-type group was loblolly-shortleaf pine at 3.0 million acres (19 percent of forest land), 70 percent of which was in stands with evidence of artificial regeneration. Overall, about 83 percent of the forest land in Virginia was naturally regenerated and about 17 percent artificially regenerated. This ratio has remained consistent over the last few years. The small amount of planted oak-hickory and oak-pine are likely pine plantation failures rather than true hardwood plantings.

Forest land in Virginia is maturing (fig. 3). Area of large-diameter sized stands has been increasing, while that of medium-and small-diameter stands has been decreasing. Large-diameter stands now account for 64 percent of the forest land in Virginia. Since 2001, forest land area in large-diameter stands increased by 11 percent. This is in contrast to decreases in medium- and small-diameter stands. By forest-type group, 46 percent of loblolly-shortleaf pine was in large-diameter stands, as was 71 percent of oak-hickory.

Figure 1—Counties and forest survey units in Virginia.

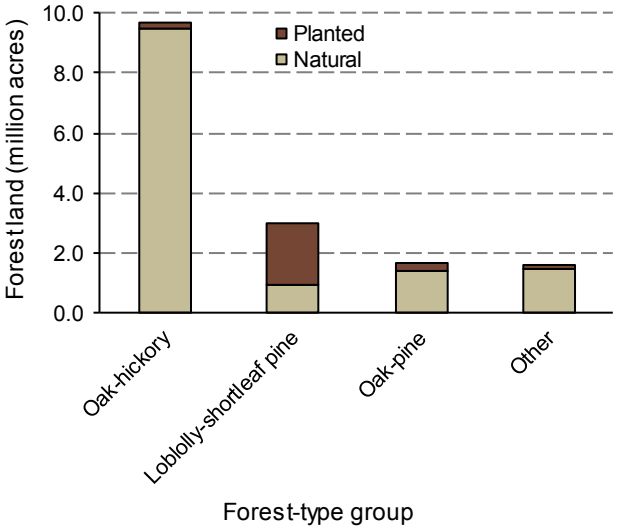

Figure 2—Area of forest land by forest-type group and stand origin, Virginia, 2013.

Table 2—Area of forest land by survey unit and year, Virginia

Survey unit	2007	2011	2013	Change since 2011
	thousand acres			*percent*
Coastal Plain	3,784.1	3,704.0	3,682.5	-0.58
Southern Piedmont	3,759.7	3,791.3	3,784.3	-0.18
Northern Piedmont	2,518.9	2,518.0	2,526.8	0.35
Northern Mountains	2,729.2	2,778.4	2,810.0	1.14
Southern Mountains	3,076.6	3,115.3	3,111.7	-0.12
All units	15,868.5	15,907.0	15,915.3	0.05

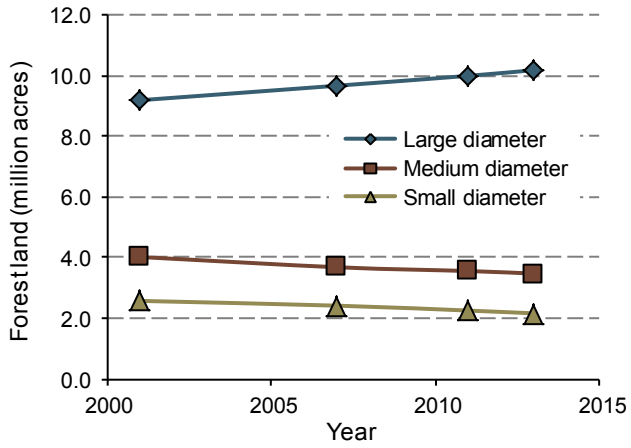

Figure 3—Area of forest land by year and stand-size class, Virginia.

Volume, Biomass, and Trends

Volume of all-live trees ≥5.0 inches diameter at breast height (d.b.h.) on forest land in 2013 totaled 36.1 billion cubic feet (fig. 4). Hardwoods accounted for 76 percent of this volume and softwoods 24 percent. This was an increase of 2.7 percent since 2011. Analysis of volume by diameter class showed relatively small increases in most classes.

Crews recorded 121 species (not including unknowns) of live trees on forest land in Virginia. Yellow-poplar, loblolly pine, and chestnut oak were the most voluminous species (table 3). Between 2011 and 2013, volume of yellow-poplar increased by 3.3 percent and that of loblolly pine increased by 8.5 percent.

Virginia had 915.9 million oven-dry tons of live-tree biomass on forest land (table 1). This was an increase of 2.1 percent since 2011. This change mirrored the increase in volume, which was up by 2.7 percent.

Overall, net growth of live trees on timberland remained stable at 1.1 billion cubic feet per year (table 4). Removals declined by 3.8 percent, but actually increased in three of the five units. Softwood removals accounted for nearly half of the total. Mortality was about the same overall, but did increase in two units.

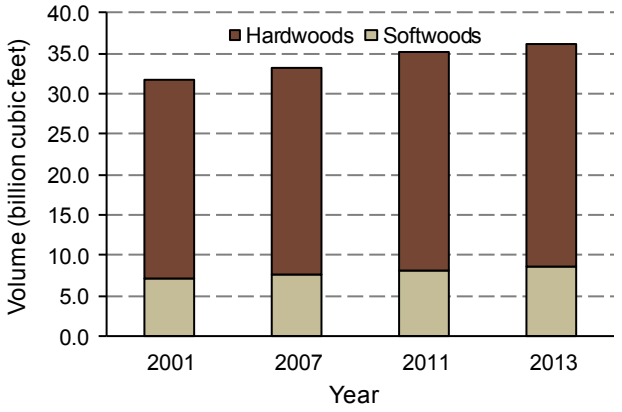

Figure 4—Volume of live trees ≥5.0 inches d.b.h. on forest land by year and major species group, Virginia.

Table 3—Number of live trees ≥1.0 inch d.b.h. and volume of live trees ≥5.0 inches d.b.h. (top 15 species for volume) on forest land, Virginia, 2013

Species	Number	Volume
	million trees	*million cubic feet*
Yellow-poplar	890.5	5,753.9
Loblolly pine	1,309.2	5,215.1
Chestnut oak	336.0	3,339.4
White oak	409.5	3,147.1
Red maple	1,403.6	2,395.6
Northern red oak	147.8	1,792.2
Virginia pine	441.4	1,290.7
Sweetgum	771.3	1,218.9
Scarlet oak	154.2	1,110.4
Black oak	114.2	1,013.4
Eastern white pine	171.8	900.7
Pignut hickory	185.5	704.4
Mockernut hickory	203.2	652.7
American beech	255.8	629.8
Southern red oak	129.6	609.1

Table 4—Average annual net growth, removals, and mortality of live trees on timberland by survey year, survey unit, and major species group, Virginia

	Total			Softwoods			Hardwoods		
Survey year and unit	Net growth	Removals	Mortality	Net growth	Removals	Mortality	Net growth	Removals	Mortality
	million cubic feet per year								
2011									
Coastal Plain	311.0	176.2	83.6	184.8	113.5	34.7	126.3	62.7	48.9
Southern Piedmont	247.4	214.8	57.3	124.1	121.5	22.7	123.3	93.3	34.6
Northern Piedmont	146.2	72.8	56.6	38.1	21.4	18.7	108.0	51.4	37.9
Northern Mountains	142.1	37.2	38.5	14.4	3.5	13.6	127.6	33.7	24.9
Southern Mountains	195.4	60.9	45.2	23.8	14.0	7.5	171.5	46.9	37.8
All units	1,042.0	561.8	281.2	385.2	273.8	97.2	656.8	288.0	184.1
2013									
Coastal Plain	310.4	152.0	66.8	200.8	84.5	26.8	109.6	67.4	40.0
Southern Piedmont	309.4	193.2	56.9	147.3	102.2	22.3	162.1	91.0	34.6
Northern Piedmont	148.3	74.1	54.8	44.8	22.1	17.5	103.5	52.0	37.2
Northern Mountains	105.1	39.4	54.3	7.0	2.5	19.5	98.1	36.9	34.8
Southern Mountains	178.2	82.1	49.2	23.1	12.9	7.2	155.1	69.2	42.0
All units	1,051.4	540.7	282.0	423.0	224.2	93.4	628.4	316.6	188.6

Numbers in rows and columns may not sum to totals due to rounding.

Ash Resources of Virginia

The emerald ash borer (EAB), an insect native to Asia, was detected in Virginia in 2008. Since that time, the EAB has been detected in 23 counties (Asaro 2014). Ash trees are killed when larvae feed within the phloem, eventually girdling the tree. In 2013, there were a total of 185.3 million live ash trees ≥1.0 inch d.b.h. (table 5). This was a slight decrease from 2011 when there were 187.7 million ash trees. By unit, the Southern Piedmont had the highest number of ash trees and the Northern Mountains the least (table 5). All species of ash in the U.S. are killed by the EAB. White ash and green ash are the most predominate ash species in Virginia. Other species include blue ash, black ash, and Carolina ash. Number of white ash trees totaled 106.4 million and volume totaled 431.0 million cubic feet. Number of green ash trees totaled 77.7 million and volume totaled 205.4 million cubic feet. About one-half of the volume of both white and green ash was in trees 9.0–17.0 inches d.b.h. (fig. 5).

It should be noted that these numbers are regional in nature and do not reflect the considerable differences that exist in ash abundance locally. In addition, these data do not take into consideration ash trees that may be growing in areas that FIA considers nonforest. These results should be viewed with caution, as the sampling errors are quite high for ash at the survey unit level (table 5).

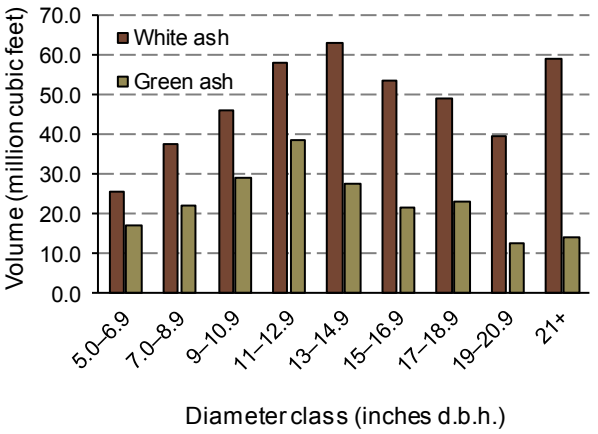

Figure 5—Volume of ash trees by diameter class and species, Virginia, 2013.

Adult emerald ash borer. (Photo by Debbie Miller, USDA Forest Service, Bugwood.org)

Table 5—Forest statistics for ash species, Virginia, 2013

Survey unit	Live trees	Sampling error	Mortality of trees	Sampling error
	number	*percent*	*n per year*	*percent*
Coastal Plain	37,506,529	21.79	117,734	30.70
Southern Piedmont	46,223,923	12.02	164,899	49.17
Northern Piedmont	42,950,909	15.96	153,415	25.27
Northern Mountains	24,989,581	18.07	88,035	35.55
Southern Mountains	33,669,447	13.66	116,632	25.44
Total	185,340,389	7.36	640,715	16.55

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