



# FORESTS OF Virginia, 2015

This resource update provides an overview of forest resources in Virginia based on an inventory conducted by the U.S. Forest Service, Forest Inventory and Analysis (FIA) program at the Southern Research Station in cooperation with the Virginia Department of Forestry. Estimates are based on field data collected using the FIA annualized sample design and are updated yearly. The estimates presented in this update are for the measurement year 2015 with comparisons made to data reported in 2014 and prior years.

Data collection in 2015 consisted of 980 plots out of over 4,858 forest plots, or about 20 percent of the sample population. The remaining 80 percent come from data collected from 2011 through 2014. Collection of the 2015 plots represents completion of 4/5 of the tenth forest inventory of the State of Virginia conducted by the FIA program. The data used in this publication were accessed

from the FIA database in May, 2017 (<http://fia.fs.fed.us/tools-data/>).

## Overview

Overall, the forests of Virginia in 2015 showed stable conditions and continuation of trends previously observed in Rose (2015) and Rose (2016) which showed gradual increases in area and volume since 2011. In 2015 forest land and timberland increased very slightly since 2014, just over one-tenth of 1 percent. While the numbers of live trees decreased very slightly (< 1 percent) both aboveground biomass and volume in those trees increased 2 to 3 percent. Average annual growth increased 5.8 percent on forest land as annual removals and mortality decreased slightly (-1.6 percent and -0.7 percent, respectively). Timberland trends were similar to those observed on all forest lands.

Table 1—Virginia forest statistics, change between 2014 and 2015

Forest statistics	2014 estimate	Sampling error (percent)	2015 estimate	Sampling error (percent)	Change since 2014
<b>Forest land</b>					
Area (thousand acres)	16,042.8	0.61	16,059.7	0.61	16.86
Number of live trees ≥ 1.0 inch d.b.h. (million trees)	11,496.4	1.58	11,444.7	1.60	-51.65
Net volume of live trees ≥ 5.0 inches d.b.h. (million cubic feet)	37,229.9	1.20	38,364.9	1.19	1,134.99
Live tree aboveground biomass (thousand oven-dry tons)	940,417.4	1.07	964,590.6	1.06	24,173.2
Net annual growth of live trees ≥ 5.0 inches d.b.h. (million cubic feet per year)	1,136.3	2.29	1,206.6	2.14	70.38
Annual removals of live trees ≥ 5.0 inches d.b.h. (million cubic feet per year)	493.0	7.10	485.4	6.99	-7.58
Annual mortality of live trees ≥ 5.0 inches d.b.h. (million cubic feet per year)	304.9	4.12	302.7	4.07	-2.17
<b>Timberland</b>					
Area (thousand acres)	15,373.7	0.72	15,389.8	0.71	16.15
Number of live trees ≥ 1.0 inch d.b.h. (million trees)	11,145.5	1.66	11,096.1	1.67	-49.35
Net volume of live trees ≥ 5.0 inches d.b.h. (million cubic feet)	35,514.5	1.28	36,625.1	1.27	1,110.55
Live tree aboveground biomass (thousand oven-dry tons)	896,592.5	1.16	920,151.7	1.14	23,559.1
Net annual growth of live trees ≥ 5.0 inches d.b.h. (million cubic feet per year)	1,112.8	2.33	1,186.8	2.18	73.96
Annual removals of live trees ≥ 5.0 inches d.b.h. (million cubic feet per year)	518.4	7.06	503.0	6.90	-15.42
Annual mortality of live trees ≥ 5.0 inches d.b.h. (million cubic feet per year)	293.0	4.22	290.3	4.18	-2.76



## Forest Area

Virginia is divided into five survey units (fig. 1). In 2015, the Coastal Plain and Southern Piedmont units hold the most forest land, while the Northern Piedmont contains the least (fig. 2).



Figure 1—Counties and forest survey units in Virginia.

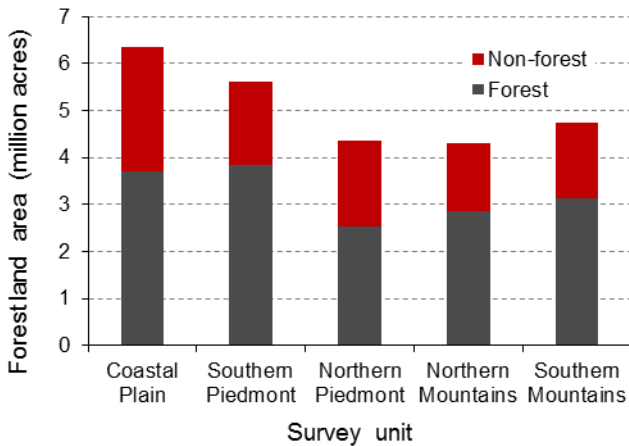


Figure 2—Area of forest land area (minus census water) in Virginia, by land use and survey unit, 2015.

The variation in Virginia’s forest types is shown in figure 3. Oak-hickory is the predominant forest type in the State, accounting for over 60 percent of all forests (fig. 3). Loblolly-shortleaf pine is the second most recorded forest type in 2015.

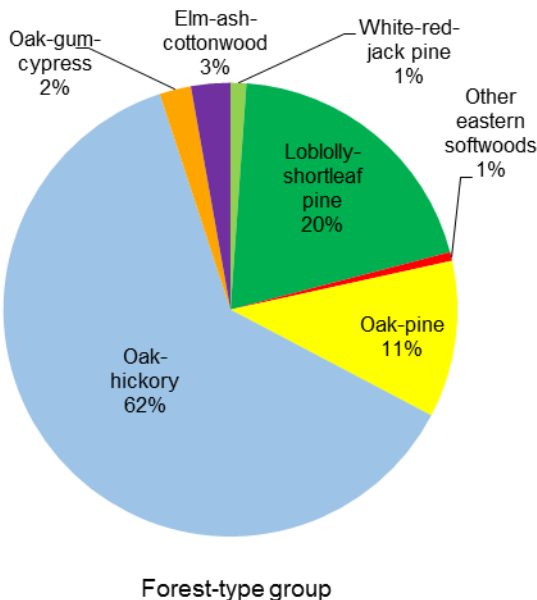


Figure 3—Area of forest land by forest-type group, Virginia 2015.

The most notable trend in forest ownership has been the divestiture of forest industry of its timberland and its acquisition by non-industrial corporate entities, primarily Timber Investment Management Organizations (TIMOs) and Real Estate Investment Trusts (REITs) (fig. 4). The forest acreage held by public land management agencies has remained fairly stable, while nonindustrial private landowner holdings have increased over time.

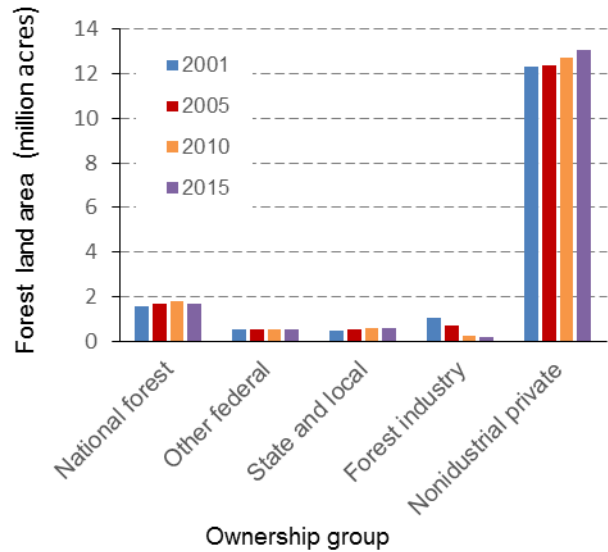


Figure 4—Area of forest land by inventory year and ownership group in Virginia, 2001-2015.

Stands of larger-sized trees make up a greater percentage of forest land (41 percent) while the percentage of medium- and small-diameter stands has been decreasing (fig. 5). Since 2000, forest land area in large-diameter stands increased by 25 percent. This is in contrast to 25 percent decreases in small-diameter stands over the same time period. This may have multiple causes that include harvest deferral during the economic downturn, planting history in relation to Conservation Reserve Programs, and in some areas post-hurricane recovery.

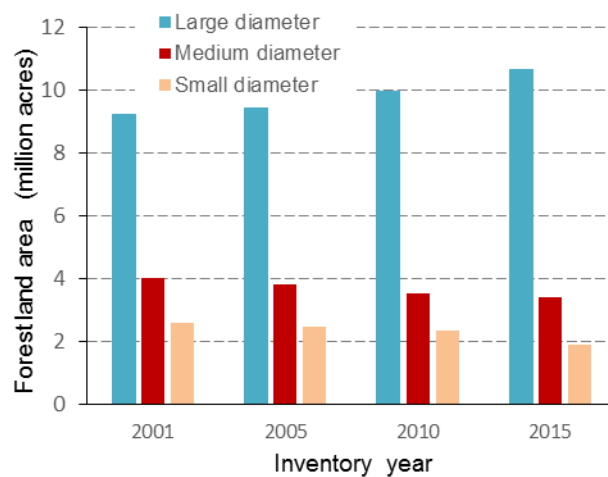


Figure 5—Area of forest land by inventory year and stand-size in Virginia, 2001-2015.

## Volume, Biomass and Trends

Aboveground live-tree biomass on forest land increased nearly 3 percent between 2014 and 2015 to approximately 965 million dry tons (table 1). Based on total number of trees with diameter at breast height (d.b.h.) ≥ 1 inch, red maple proved the most frequent tree species in 2015, representing 12 percent of all live trees on forest land. Loblolly pine and yellow-poplar followed, accounting for 11 and 8 percent of all live trees, respectively (table 2).

Table 2—Number of live trees ≥ 1.0 inch d.b.h. and volume of live trees ≥ 5.0 inches d.b.h. (top 10 species for volume) on forest land, Virginia 2015

Species	Number	Volume
	<i>million trees</i>	<i>million cubic feet</i>
Yellow-poplar	897	6,262
Loblolly pine	1,262	5,941
Chestnut oak	328	3,493
White oak	408	3,305
Red maple	1,412	2,450
Northern red oak	143	1,871
Virginia pine	453	1,301
Sweetgum	768	1,279
Scarlet oak	160	1,122
Black oak	109	999
Other	5,503	10,344
<b>Total</b>	<b>11,445</b>	<b>38,365</b>

Yellow-poplar ranked first in terms of standing volume (live trees with d.b.h ≥ 5 inches), followed closely by loblolly pine. Chestnut oak and white oak ranked third and fourth, respectively.

Hardwood forests predominate in Virginia, with more than two-thirds of the State’s forest land net volume of live trees found in hardwood tree species (fig. 6). As shown in figure 6, net volume in large-diameter stands trended upwards from 2005 to 2015 for both species groups, contrary to volume in medium-diameter stands which trended downwards. Softwood volume in small-diameter stands, while still under 2 percent of the total volume for the species group, trended upwards during this period, with volume in 2015 over 21 percent higher than that found in 2005. Conversely, hardwood volume in small-diameter stands displayed a 36 percent drop, from 397 million cubic feet in 2005 to 253 million cubic feet in 2015.

Average net annual growth, removals, and mortality are shown in figure 7. Considering average annual net growth, we observe an overall upwards trend. However, softwoods

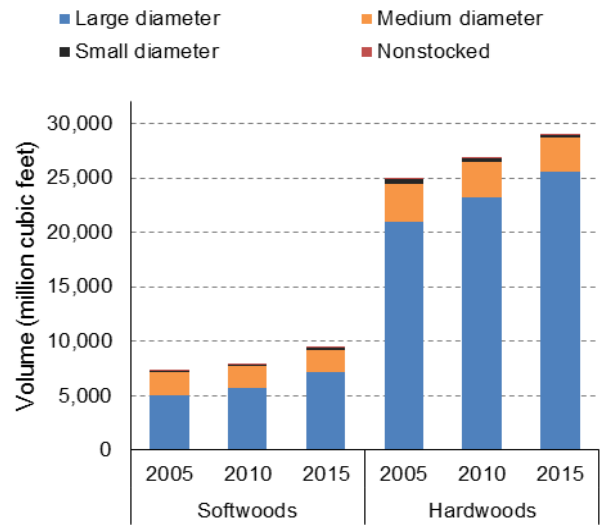


Figure 6—Net volume of live trees on forest land by major species group and stand size class, Virginia 2005 to 2015.

displayed a drop in annual growth from 2005 to 2010 and a significant increase over the 2010-2015 period.

Conversely, average annual removals decreased for both species groups. Annual mortality of softwoods was slightly lower in 2015 compared to 2005, while hardwoods annual mortality trended consistently upwards. The latest inventory shows hardwoods annual mortality almost matching the volume of annual removals on forest land, a result of increased mortality and significant decrease in annual removals.

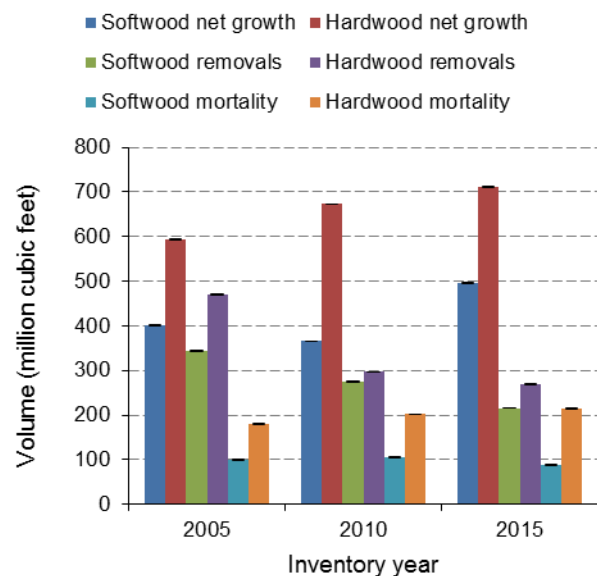


Figure 7—All-live average annual volume growth, removals and mortality on timberland by survey year, Virginia 2005 to 2015.

## Annual land use change

Annual area change in Virginia from 2005 to 2015 was estimated from the same plots used to calculate tree level growth, removals and mortality annualized rates. The acres that the condition represents were divided by the plot remeasurement period for an annualized acreage estimate. An entire plot on average represents 6,000 acres. If the elapsed time period between plot measurements was 5 years, then the annual area estimate is 1,200 acres. If a plot was converted from forest land to a developed land use, then that would represent 1,200 acres per year of forest land area that changed to a developed land use. All of these annually changed acres were then summed for statewide annual change totals. Note that there are other minor land

While this might seem like considerable acreage is changing land use each year, the total forest land acres that changed annually (161,648 acres) according to the 2015 estimates was only 0.6 percent of Virginia’s total area (27.4 million acres) and 1.0 percent of its total forest land (16.1 million acres). The loss of forest land to development slowed from 2005 to 2010 such that by 2013 more forest land was gained than lost to the land use. By 2015 gain and loss were essentially equal. Virginia has been gaining more forest annually from formerly agricultural lands that it has been losing since 2006, and those losses showed a sharp decrease in 2009. In recent years, land use change trends have been relatively stable.

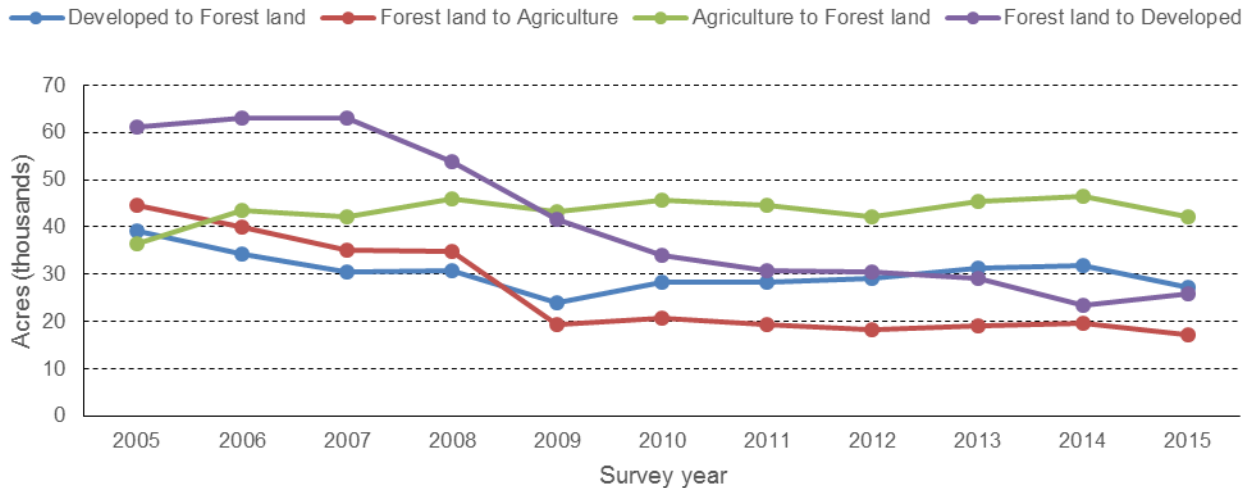


Figure 8—Average annual land use change, Virginia, 2005 to 2015.

use changes that did not involve forest land which are not presented here.

For example, annually an average of 44,710 acres of agricultural land reverted to forest land from 2007 to 2011, 42,065 acres reverted annually from 2008 to 2012, 42,255 acres reverted from 2009 to 2013, etc. (fig. 8).

## Literature Cited

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Rose, A.K. 2016. Forests of Virginia, 2014. Resour. Update. SRS-94. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 4 p.

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