



FORESTS OF South Carolina, 2016

This resource update provides an overview of forest resources in South Carolina 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 South Carolina Forestry Commission.

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 2016 with comparisons made to data reported previously.

Data collection in 2016 consisted of 725 plots out of 3,652, or about 20 percent of the sample population. Data from the remaining 80 percent were collected from 2012 through 2015. The data used in this publication were accessed from the FIA database in May of 2017 unless otherwise indicated (<https://fia.fs.fed.us/tools-data/>).

Overview

Notable in this current resource update is a continuing, gradual decrease in forest land and timberland from 2011 to 2015 documented in previous publications (Rose 2015a, Rose 2015b, Brandeis and others 2016) and the continued decrease from 2015 to 2016 seen in table 1. The data show that net volume on both forest land and timberland, however, has been increasing while the total number of trees decreases, structural changes indicative of the increasing prevalence of larger trees in more fully stocked stands across South Carolina as shown in Rose (2015b). Softwood net growth has increased as has mortality, while removals have increased since the economic downturn years of 2007 to 2009 (Harper and Rominger 2013, Rose 2015a, Rose 2015b, Brandeis and others 2016). Finally, this resource update examines land use change trends, highlighting the currently low rates of change.

Table 1—South Carolina forest statistics, change between 2015 and 2016

Forest statistics	2015 estimate	Sampling error (percent)	2016 estimate	Sampling error (percent)	Change since 2015
Forest land					
Area (thousand acres)	12,931.38	0.72	12,915.06	0.72	-16.32
Number of live trees ≥ 1.0 inch d.b.h. (million trees)	9,587.49	1.69	9,480.14	1.75	-107.35
Net volume of live trees ≥ 5.0 inches d.b.h. (million cubic feet)	25,719.31	1.51	26,040.84	1.51	321.54
Live tree aboveground biomass (thousand oven-dry tons)	629,029.82	1.35	635,699.93	1.36	6,670.12
Net annual growth of live trees ≥ 5.0 inches d.b.h. (million cubic feet per year)	1,306.77	1.89	1,308.92	1.91	2.15
Annual removals of live trees ≥ 5.0 inches d.b.h. (million cubic feet per year)	868.19	5.26	887.74	5.19	19.55
Annual mortality of live trees ≥ 5.0 inches d.b.h. (million cubic feet per year)	191.64	4.78	204.96	4.97	13.33
Timberland					
Area (thousand acres)	12,750.20	0.76	12,737.65	0.76	-12.55
Number of live trees ≥ 1.0 inch d.b.h. (million trees)	9,468.85	1.71	9,378.50	1.77	-90.35
Net volume of live trees ≥ 5.0 inches d.b.h. (million cubic feet)	25,198.73	1.53	25,507.12	1.53	308.39
Live tree aboveground biomass (thousand oven-dry tons)	616,608.48	1.37	623,017.78	1.38	6,409.30
Net annual growth of live trees ≥ 5.0 inches d.b.h. (million cubic feet per year)	1,303.16	1.91	1,304.26	1.92	1.10
Annual removals of live trees ≥ 5.0 inches d.b.h. (million cubic feet per year)	867.30	5.27	886.85	5.19	19.55
Annual mortality of live trees ≥ 5.0 inches d.b.h. (million cubic feet per year)	187.51	4.83	199.18	5.03	11.67



Forest Area

Total land area of South Carolina is 20.5 million acres, not including census water. Of this, 12.9 million acres (63 percent) was forested in 2016 (table 1). South Carolina is divided into three survey units (fig. 1). Each of the three units was between 60 percent and 67 percent forested (fig. 2).

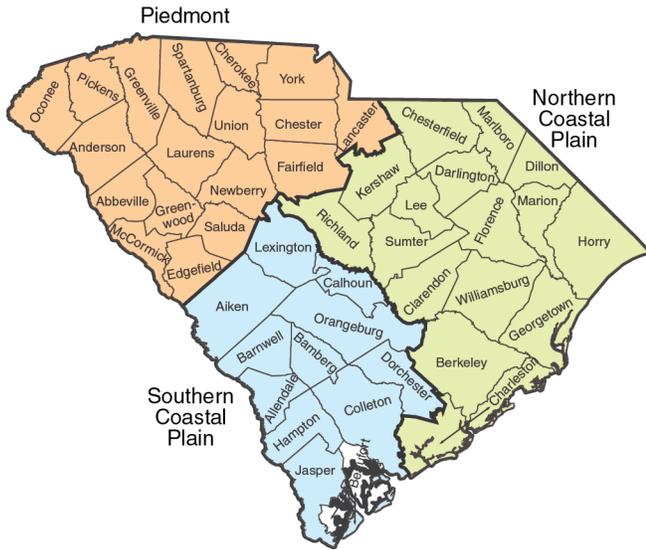


Figure 1—Forest survey units in South Carolina.

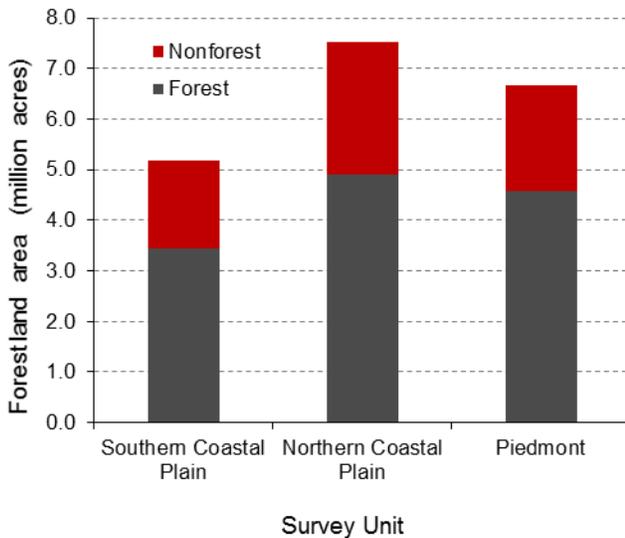


Figure 2—Area of forest land by survey unit, South Carolina, 2016.

FIA tracks changes in forest ownership in South Carolina (fig. 3). The most notable trend has been the divestiture of forest industry of its forest land and its acquisition by nonindustrial corporate entities, primarily Timber Investment Management Organizations (TIMOs) and Real Estate Investment Trusts (REITs). In 2001, forest industry owned just over 2.1 million acres of forest land (Harper and Rominger 2013).

By 2016, that number dropped by 92 percent to 169.6 thousand acres.

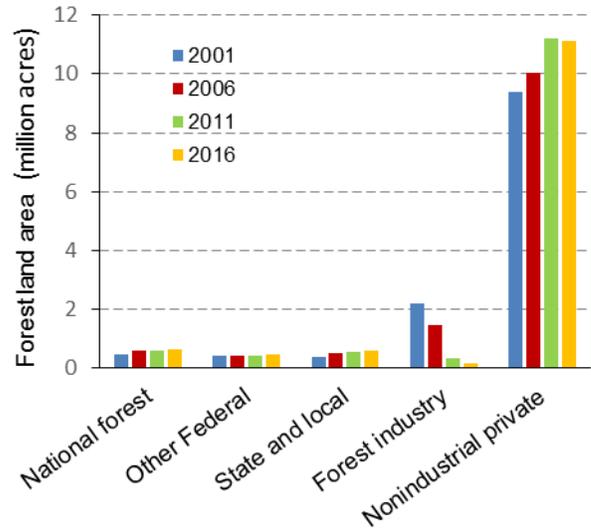


Figure 3—Area of forest land by ownership group and survey,

The variation in South Carolina’s forest types is shown in fig. 4. Loblolly-shortleaf pine is the predominant type, accounting for over 43 percent of all forests. Oak-hickory is the second most recorded forest type in 2016, representing 22 percent of the forest land base. Oak-gum-cypress, oak-pine, longleaf-slash pine, and elm-ash-cottonwood account for 15 percent, 12 percent, 4 percent, and 3 percent, respectively. Nonstocked forests, lands under forest land use but less than 10 percent stocked with live trees, are not included in this figure. However, in 2016, nonstocked forests account for less than 1 percent of the total forest land for the State.

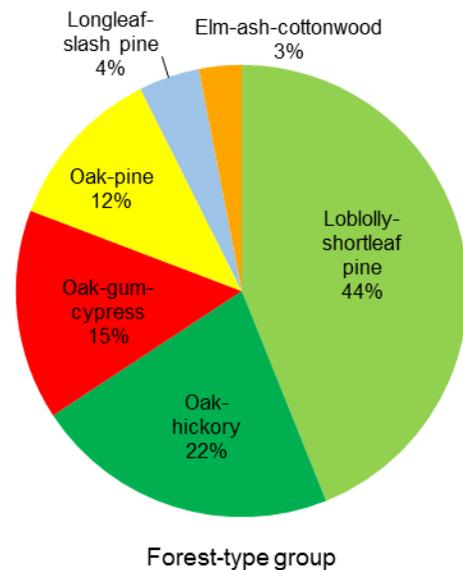


Figure 4—Area of forest land by forest-type group, South Carolina, 2016.

Volume, Biomass, and Trends

South Carolina’s 2016 forest inventory shows live tree aboveground biomass on forest land changing slightly, about 1 percent from that reported in 2015, to an estimated 636 million oven-dry tons (table 1). Volume of all-live trees with a diameter at breast height (d.b.h.) \geq 5 inches on forest land in 2016 was slightly over 26 billion cubic feet. As shown in table 2, loblolly pine was the State’s most common tree species, leading both in number of trees (44 percent of all-live trees with d.b.h. \geq 5 inches) and in total volume (42 percent of all volume). Sweetgum followed second, accounting for 10 percent of all-live trees and 9 percent of all volume.

Table 2—Number of live trees \geq 1.0 inch and \geq 5.0 inches d.b.h. and volume of live trees \geq 5.0 inches d.b.h. (top 10 species for volume) on forest land, South Carolina, 2016

Species	Number		Volume <i>million cubic feet</i>
	d.b.h. \geq 1 inch	d.b.h. \geq 5 inches	
	<i>-----million trees-----</i>		
Loblolly pine	2,181	908	11,002
Sweetgum	1,658	205	2,344
Yellow-poplar	165	45	1,106
Water oak	675	98	1,015
Red maple	830	103	971
White oak	141	41	947
Swamp tupelo	185	60	818
Longleaf pine	207	67	685
Laurel oak	177	36	674
Water tupelo	33	21	410
Other	3,229	486	6,071
Total	9,480	2,070	26,041

Close to 52 percent of the State’s volume is found in softwoods. The majority of the standing volume, for both softwoods and hardwoods, is in the large diameter stand-size class which trended upwards during the 2006-2016 period (fig. 5). Overall, volume in the medium diameter stand-size class decreased slightly, in contrast to small diameter stand-size volume which has remained stable.

Inventory change, trends represented by net annual growth, removals, and mortality, are presented in fig. 6. During 2006-2016 softwood annual net growth and removals trended upwards, with 2016 values over 25 percent higher than 2006 estimates. In contrast, annual net growth and removals estimates for hardwoods were close to 8 percent lower in 2016 compared to 2006. Annual mortality declined in softwoods and increased in hardwoods.

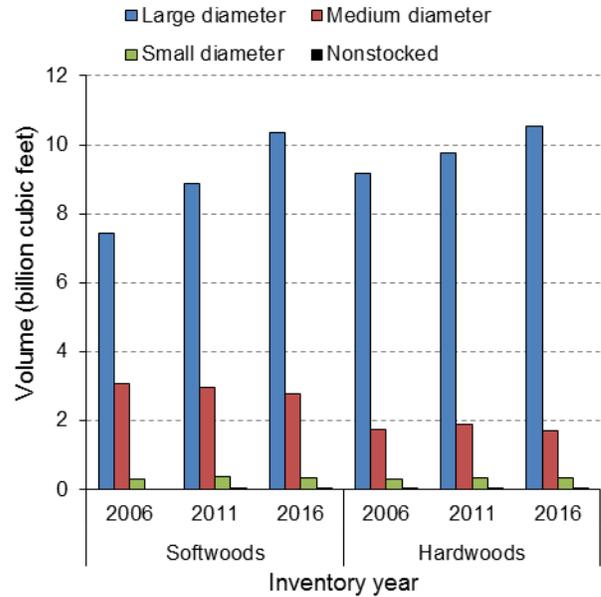


Figure 5—Volume of all-live trees on forest land by stand-size class and major species group, South Carolina, 2006-2016.

Growth-to-removals ratio, a measure used to assess resource sustainability, remained stable during the 2006-2016 period with an average rate of 1.4 in softwoods and 1.8 in hardwoods. A growth-to-removals ratio $>$ 1 suggests sustainable resources use, with growth exceeding removals. The above rates indicate annual growth is surpassing removals by approximately 40 percent in softwoods and 80 percent in hardwoods.

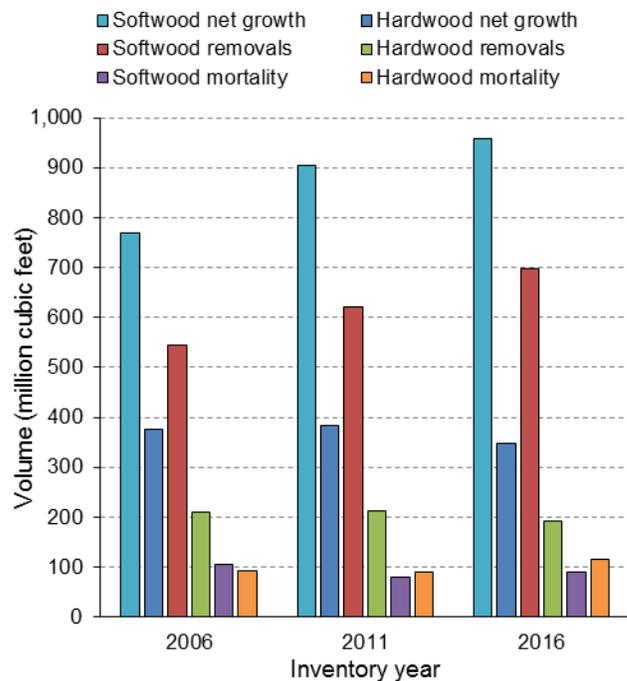


Figure 6—Average annual net growth, removals, and mortality of live trees on forest land by major species group, South Carolina, 2006-2016.

Land Use Change

Annual area change in South Carolina from 2005 to 2016 was estimated from the same plots used to calculate annualized rates of tree-level growth, removals, and mortality. 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 five years, then the annual area estimate

been on the decline as well, with only 13,102 acres on average annually as recorded in 2016. Forest land clearing for development fluctuated prior to reaching its current low annual average value of 24,790 acres per year. Overall, the current averages show the least amount of land use change during the study period, with a high of 168,536 acres changing land use annually in 2005 to a low of only 83,379 changing land uses in 2016.

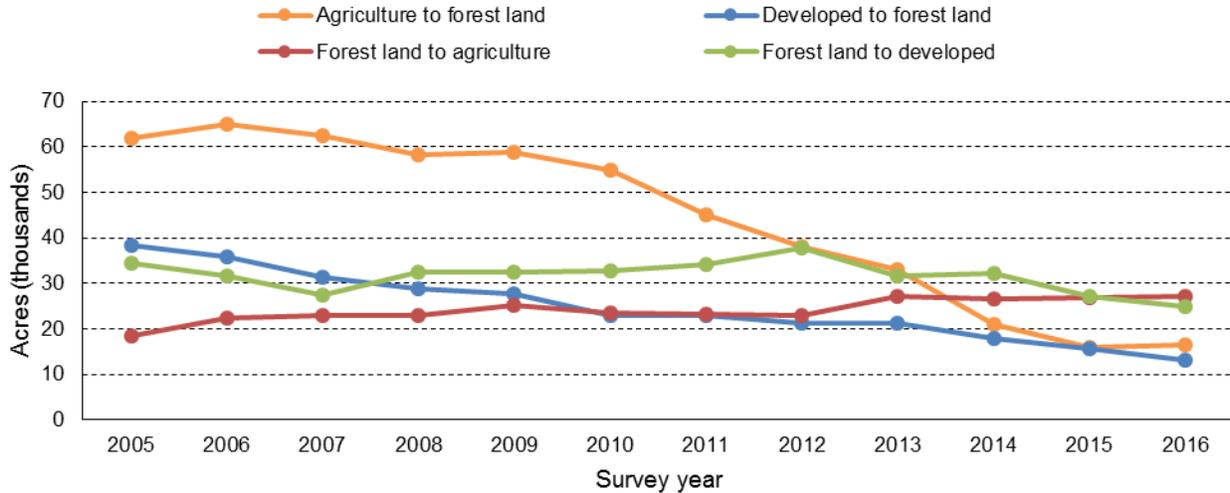


Figure 7—Average annual land use change, South Carolina, 2005 to 2016.

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.

The most notable trend over the surveyed time period is the decrease in the average annual number of agricultural acres reverting to forest land, from a high of 64,898 acres annually in 2006 to a low of 15,815 in 2015 (fig. 7). This decline became particularly steep after 2009. The opposite trend, forest land being cleared for agriculture, has shown only relatively small increases, surpassing forest land reversion in 2014. Developed land reverting to forest has

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