



# FORESTS OF South Carolina, 2017

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 (SRS) 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 2017 with comparisons made to data reported in 2016 and prior years.

Data collection in 2017 consisted of 727 plots out of 3,644, or about 20 percent of the sample population from a 5-year cycle. Data from the remaining 80 percent were collected from 2013 through 2016. The plots collected in 2017 were the first sub-cycle of Cycle 12, with the other remaining plots in sub-cycles from Cycle 11.

The data used in this publication were accessed from the FIA database in October of 2018 unless otherwise indicated (<https://fia.fs.fed.us/tools-data/>).

## Overview

This resource update shows continued decrease in both forest land and timberland acres, also identified in RU-134 (Brandeis and others 2017). Table 1 shows the amount of decrease from 2016 to 2017. But the data shows that net volume on both forest land and timberland has increased from 2016, while the total number of trees decreased. These are structural changes characteristic of the increasing number of larger trees in more fully stocked stands across South Carolina as shown in previous updates (Brandeis and others 2017). Also, net annual growth has decreased, while both removals and mortality have increased since 2016.

Nearly 99 percent of all forested land in South Carolina are not specifically reserved by law and is therefore potentially available for timber production and harvest.

The remainder of this resource update examines land use change trends, highlighting the currently low rates of change.

Table 1—South Carolina forest statistics, change between 2016 and 2017

Forest statistics	2016 estimate	Sampling error (percent)	2017 estimate	Sampling error (percent)	Change since 2016
<b>Forest land</b>					
Area (thousand acres)	12,915.1	0.72	12,858.3	0.74	-56.8
Number of live trees ≥ 1.0 inch d.b.h. (million trees)	9,480.1	1.75	9,284.4	1.82	-195.7
Net volume of live trees ≥ 5.0 inches d.b.h. (million cubic feet)	26,040.8	1.51	26,205.1	1.54	164.3
Live tree aboveground biomass (thousand oven-dry tons)	635,699.9	1.36	637,646.7	1.4	1,946.8
Net annual growth of live trees ≥ 5.0 inches d.b.h. (million cubic feet per year)	1309.0	1.91	1278.5	1.91	-30.5
Annual removals of live trees ≥ 5.0 inches d.b.h. (million cubic feet per year)	887.7	5.19	927.0	5.12	39.3
Annual mortality of live trees ≥ 5.0 inches d.b.h. (million cubic feet per year)	205.0	4.97	206.5	4.63	1.5
<b>Timberland</b>					
Area (thousand acres)	12,737.7	0.76	12,681.4	0.77	-56.3
Number of live trees ≥ 1.0 inch d.b.h. (million trees)	9,378.5	1.77	9,185.3	1.85	-193.2
Net volume of live trees ≥ 5.0 inches d.b.h. (million cubic feet)	25,507.1	1.53	25,670.2	1.56	163.1
Live tree aboveground biomass (thousand oven-dry tons)	623,017.8	1.38	624,984.3	1.42	1,966.5
Net annual growth of live trees ≥ 5.0 inches d.b.h. (million cubic feet per year)	1304.3	1.92	1275.3	1.92	-29.0
Annual removals of live trees ≥ 5.0 inches d.b.h. (million cubic feet per year)	886.9	5.19	927.0	5.12	40.1
Annual mortality of live trees ≥ 5.0 inches d.b.h. (million cubic feet per year)	199.2	5.03	200.3	4.69	1.1



## Forest Area

Total land area of South Carolina is 19.3 million acres, not including census water. Of this, 12.9 million acres (67 percent) was forested in 2017 (table 1).

South Carolina is divided into three survey units (fig. 1). Each of the three units was between 65 percent and 69 percent forested (fig. 2).

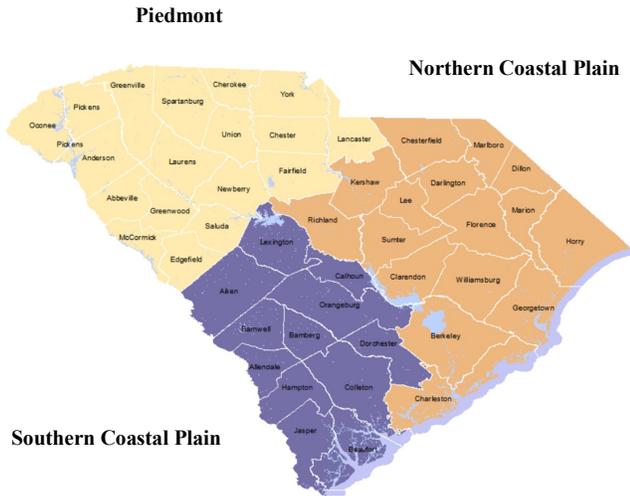


Figure 1—Counties and forest survey units, South Carolina, 2017.

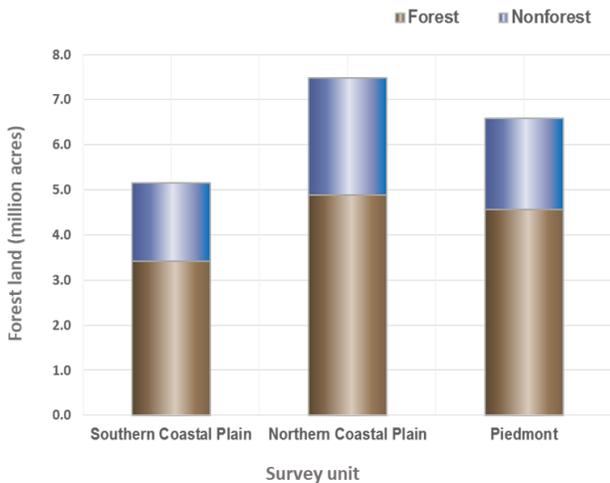


Figure 2—Area of forest land by survey unit, South Carolina, 2017.

FIA identifies forest land ownership into four major groups: Forest Service, other federal, State and local, (classified as public), and private, which is nonindustrial private forest land (NIPF), and forest industry.

The majority of South Carolina forest land in 2017 (fig. 3), was in NIPF, with over 11.2 million acres (85 percent). Forest Service ownership ranked second with 613,000 acres (5 percent), followed by state and local at 610,000

acres (5 percent), other federal at 440,000 acres (3 percent), and forest industry at 291,000 acres (2 percent). Important to note again, NIPF and forest industry are combined (considered sensitive) and reported as private.

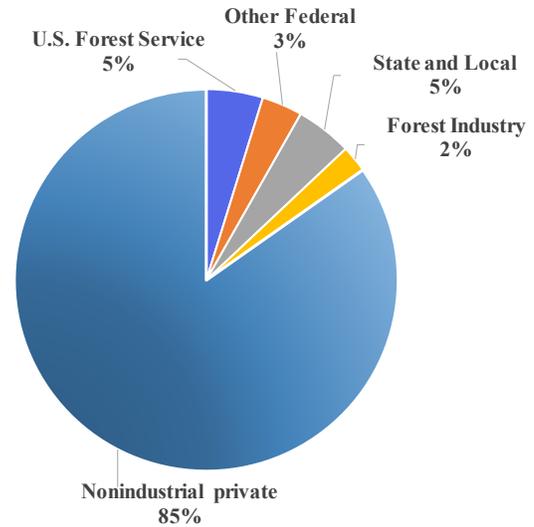


Figure 3—Forest land ownership group, South Carolina 2017.

The variation in South Carolina’s forest type groups is shown in figure 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 2017, representing over one-fifth of the forest land base. Oak-gum-cypress, oak-pine, longleaf-slash pine, and elm-ash-cottonwood account for 15 percent, 12 percent, 5 percent, and 3 percent, respectively. Nonstocked forests, lands under forest land use but < 10 percent stocked with live trees, are included in figure 4. In 2017, nonstocked forests account for 1 percent of the total forest land for the State.

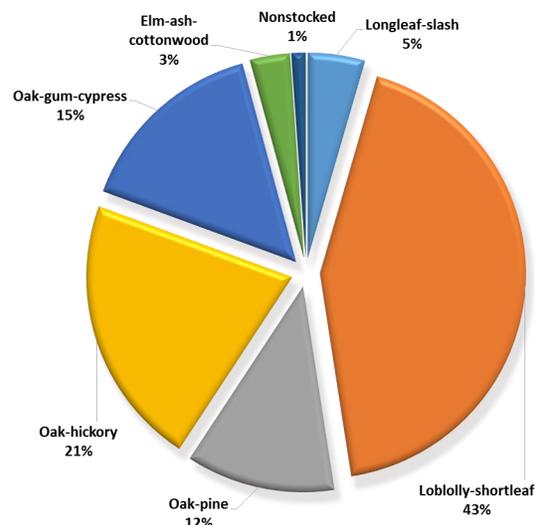


Figure 4—Area of forest land by forest-type group, South Carolina, 2017.

## Volume, Biomass, and Trends

South Carolina’s 2017 forest inventory shows live tree aboveground biomass on forest land changing slightly over 1 percent from that reported in 2016, to an estimated 638 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 2017 was slightly over 26 billion cubic feet, as shown in table 2. Loblolly pine was the State’s most common tree species, with 50 percent of all live trees  $\geq$  5 inches d.b.h. and 42 percent of all volume. Sweetgum was second, accounting for 10 percent of all-live trees  $\geq$  5 inches 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, 2017**

Species	Number		Volume <i>million cubic feet</i>
	d.b.h $\geq$ 1 inch	d.b.h $\geq$ 5 inches	
	<i>million trees</i>	<i>million trees</i>	
Loblolly pine	2,113	832	11,008
Sweetgum	1,698	175	2,349
Yellow-poplar	152	41	1,133
Water oak	649	66	104
Red maple	788	60	972
White oak	138	35	954
Swamp tupelo	174	46	827
Longleaf pine	209	65	699
Laurel oak	174	26	676
Water tupelo	33	14	413
Other	3,156	313	7,070
<b>Total</b>	<b>9,284</b>	<b>1,673</b>	<b>26,205</b>

The majority of the standing volume, for both softwoods and hardwoods, is in the large diameter stand-size class which trended upwards during the 2008-2017 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 figure 6. During 2008-2017 softwood annual net growth trended upwards, with 2017 values over 13 percent higher than 2008 estimates. In contrast, annual net growth estimates for hardwoods were close to 16 percent lower in 2017 compared to 2008.

Growth-to-removals ratio, is a measure used to assess resource sustainability, back in 2008 the ratio was 1.44 for

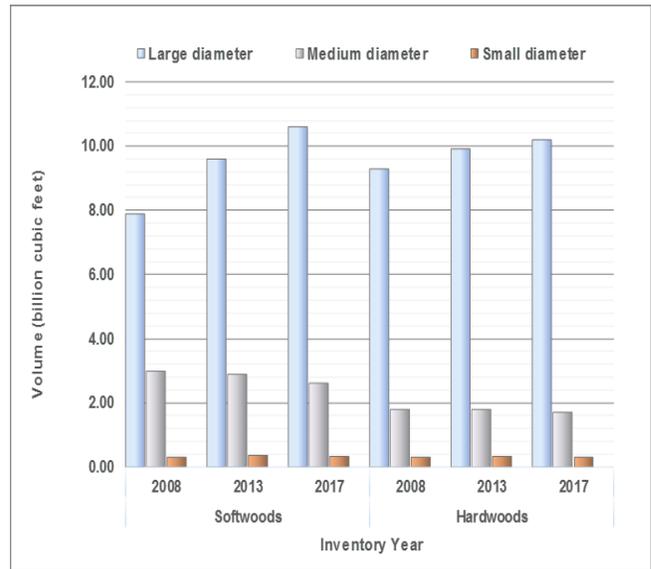


Figure 5—Volume of all-live trees on forest land by stand size class and major species group, South Carolina 2008-2017.

softwood, and in 2017 the ratio was 1.28. For hardwoods in 2008 the ratio was 1.64, and in 2017 the ratio was 1.71. A growth-to-removals ratio  $>$  1 suggests sustainable resources use, with growth exceeding removals. For 2017 these rates indicate annual growth is surpassing removals by approximately 29 percent for softwoods and 72 percent for hardwoods.

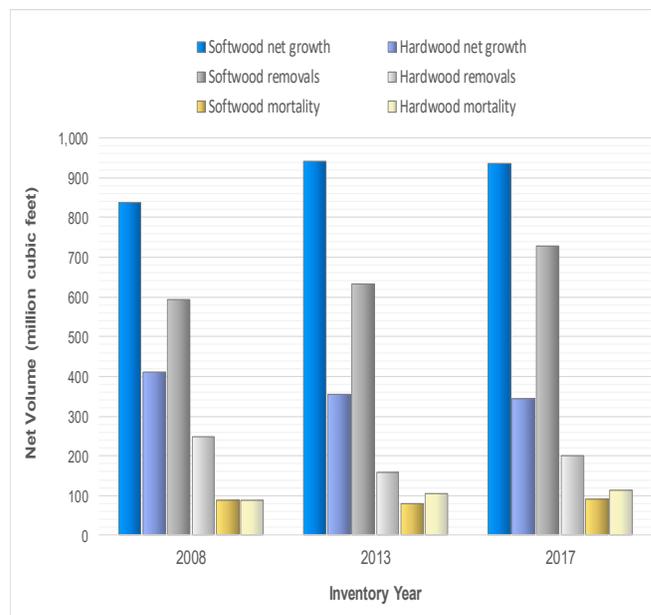


Figure 6—Average annual net growth, removals, and mortality of live trees on forest land by major species group, South Carolina, 2008-2017.

## South Carolina's Private Land Ownership

For more than 50 years, SRS-FIA has reported ownership into 4 major groups: (1) Forest Service, (2) other federal, (3) State and local which collectively represent public ownership, and (4) private ownership which is composed of NIPF and forest industry lands. Because SRS-FIA is mandated by Congress to protect private land ownership, these two categories are combined under one group, private.

In the last decade, NIPF and forest industry acreage have changed. While forest industry has divested much of its acres in South Carolina, from a peak in 1986 of 2.6 million acres, to a low of 137,000 acres in 2014 (fig. 7).

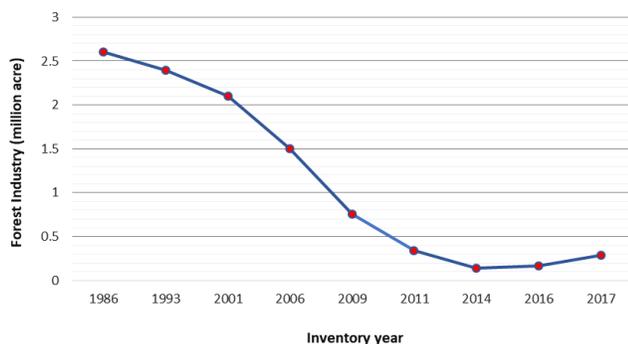


Figure 7—Forest industry acres in South Carolina, 1986-2017.

However, in the last 3 years (2014-2017) forest industry holdings have more than doubled. A leading factor is the merger of Plum Creek Timber and Weyerhaeuser in 2016. Plum Creek is considered NIPF as it does not operate a mill, while Weyerhaeuser, which does have milling operations, is considered forest industry.

Given that both NIPF acres (fig. 8), and forest industry have changed considerably, there exists an increased possibility that other factors may be contributing to these changes. Since the late 1990's, two specific investment organizations have taken a leading role in land ownership; the timberland investment management organization (TIMO), and the real estate investment trusts (REIT). Currently, some of the TIMO and REIT acreage may still be in either the NIPF or forest industry categories, as a forest industry entity may retain its ownership designation

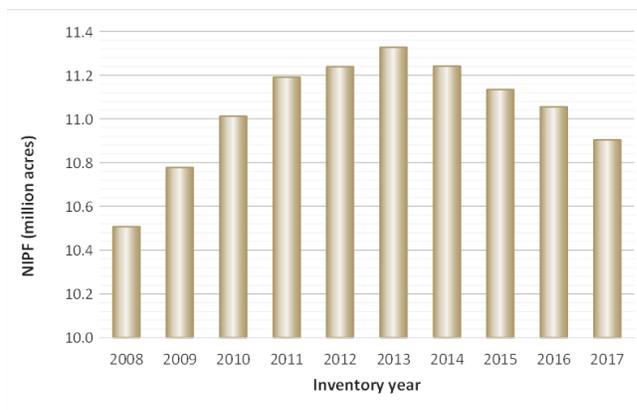


Figure 8— NIPF acres in South Carolina, 2008-2017.

even when under a REIT structure (Hickman 2007).

In order to track the impact of these changes of ownerships on forest resources, it is essential that all ownerships are identified to their correct private category. During data collection for SRS-FIA surveys, the TIMO and REIT investment groups have not been specifically identified as an ownership class and therefore are not listed and reported in the tables as an ownership category.

Due to the many different ways that ownership information is recorded and stored in courthouses across the State, these types of ownerships are often not readily identifiable in available public courthouse records and further complicates this process. Hopefully, future refinements in the collection of FIA ownership information will differentiate these two important categories and provide more insight into their role in forest ownership (Rosson and Rose 2015).

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