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Anita K. Rose

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About the Author

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All photos courtesy of Michelle Johnson, South Carolina Forestry Commission unless otherwise noted.

Front cover: top left, Isaquenna Falls near Stumphouse Tunnel in Oconee County, SC; top right, older slash pine stands are being converted to young longleaf pine stands on Manchester State Forest in Sumter and Clarendon Counties, SC; bottom, a cypress-tupelo swamp located within the 1,590 acre Woods Bay State Natural Area in Sumter and Clarendon Counties, SC. The park offers visitors a look at one of the last remaining large Carolina Bays on the Atlantic Coastal Plain. Back cover: top left, in 2009, the Highway 31 Fire in Horry County, SC, resulted in 19,130 acres being burned with a total forested woodland damage estimated at $17 million; top right, Isaquenna Falls near Stumphouse Tunnel in Oconee County, SC; bottom, longleaf pine stands on Sandhills State Forest in Chesterfield, Darlington, and Kershaw Counties, SC, provide revenue from timber and pine straw sales to allow the State forest to be entirely self-supporting.

The forested watershed along Chau Ram Falls in Oconee County, SC, yields clean water for recreational users downstream.

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SOUTH CAROLINA'S

Forests, 2011

Anita K. Rose

Cabbage Palmetto (*Sabal palmetto*) is South Carolina's State tree.

FOREWORD

The U.S. Department of Agriculture Forest Service, Southern Research Station's Forest Inventory and Analysis (FIA) research work unit and cooperating State forestry agencies conduct annual forest inventories of resources in the 13 Southern States (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia), the Commonwealth of Puerto Rico, and the U.S. Virgin Islands. In order to provide more frequent and nationally consistent information on America's forest resources, all research stations and their respective FIA work units conduct annual surveys with a common sample design. These surveys are mandated by law through the Agricultural Research Extension and Education Reform Act of 1998 (Farm Bill).

The primary objective in conducting these inventories is to gather the multi-resource information needed to formulate sound forest policies, provide information for economic development, develop forest programs, and provide a scientific basis to monitor forest ecosystems. These data are used to provide an overview of forest resources that may include, but are not limited to, forest area, forest ownership, forest type, stand structure, timber volume, growth, removals, mortality, management activity, down woody material, and invasive species. The information presented is applicable at the State and survey unit level; although it provides the background for more intensive studies of critical situations, it is not designed to reflect resource conditions at small scales.

More information about Forest Service resource inventories is available in "Forest Resource Inventories: An Overview" (U.S. Department of Agriculture Forest Service 1992). More detailed information about sampling methodologies used in the annual FIA inventories can be found in "The Enhanced Forest Inventory and Analysis Program–National Sampling Design and Estimation Procedures" (Bechtold and Patterson 2005).

Data tables included in FIA reports are designed to provide an array of forest resource estimates, but additional tables can be obtained at http://fia.fs.fed.us/tools-data/default.asp. Additional information about the FIA program can be obtained at http://fia.fs.fed.us/.

Additional information about any aspect of this or other FIA surveys may be obtained from:

Forest Inventory and Analysis
Research Work Unit
U.S. Department of Agriculture
Forest Service
Southern Research Station
4700 Old Kingston Pike
Knoxville, TN 37919
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Program Manager

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The following people made field measurements for this survey. FIA appreciates their hard work and their consistent efforts to obtain high-quality data.

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A South Carolina Forestry Commission Forest Inventory forester measures a tree on an FIA plot located in South Carolina.

Table Rock watershed in Pickens County, SC.

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An example of a maritime forest, which is an ocean coastal wooded habitat found on higher ground than dune areas that are within range of salt spray, located in Charleston County, SC.

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HIGHLIGHTS FROM THE TENTH FOREST INVENTORY OF SOUTH CAROLINA

• In 2011, about 13.1 million acres, or 68 percent, of South Carolina's land area was forested. This was a slight increase from the 2006 survey.

• The majority (71 percent) of the family-owned private forest land acreage is controlled by only 20 percent of private owners.

• The loblolly-shortleaf pine group was the predominant forest-type group in South Carolina. It covered an estimated 5.5 million acres (42 percent) of forest land, which was a 2.6-percent increase from 2006.

• Approximately one-half of the forest land in South Carolina was in large diameter stands (6.5 million acres), which was an increase of 8.3 percent since 2006.

• Despite a 7.0-percent decrease, loblolly pine continued to rank first for number of live trees ≥1.0 inch diameter at breast height with 2.4 billion stems, which represented 24 percent of the total.

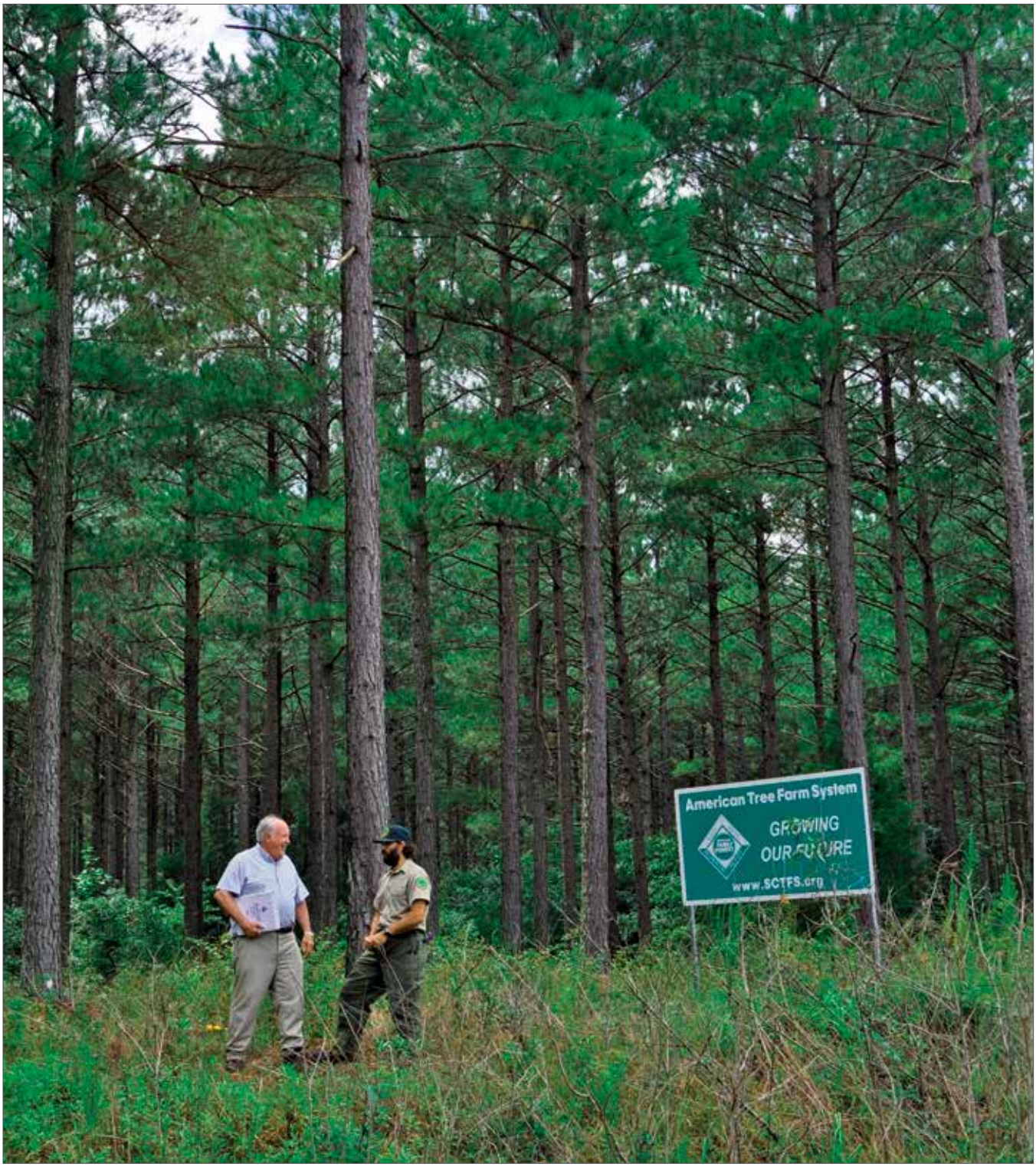
• As of 2011, total all-live volume on forest land was estimated to be 24.1 billion cubic feet, the most ever reported for the State. This was an increase of 10 percent over the 2006 survey.

Families enjoy the annual youth fishing rodeo at Piedmont Forestry Center, a former South Carolina Forestry Commission tree nursery near Tamassee, SC, in Oconee County.

• Annual net growth averaged 1,289.5 million cubic feet per year. Annual removals averaged 834.0 million cubic feet per year, and mortality averaged 171.3 million cubic feet per year.

• The growth-to-removals ratio averaged 1.5:1.0.

• Nonnative invasive plants occurred on 58 percent of forested plots. Japanese honeysuckle was the most common.



Dr. Walt McPhail, past National Tree Farmer of the Year, discusses management activities with South Carolina Forestry Commission forester Trey Cox. Besides providing ecosystem services, like clean air and water, Dr. McPhail manages this family land in Anderson County for timber products and wildlife habitat.

INTRODUCTION

Field measurements for the tenth inventory of South Carolina's forests began in January 2007 and were completed in November 2011. Even though measurements were spread over several years, the survey is dated 2011. Comparisons, unless otherwise noted, are based on estimates from the 2006 survey and the 2011 survey. The nine previous surveys were completed in 1936, 1947, 1958, 1968, 1978, 1986, 1993, 2001, and 2006. The 2011 survey is the third cycle completed in the new annual inventory design with a fixed plot. All previous surveys were done in a periodic fashion using a variable-radius plot. In this survey, 3,447 plots were sampled.

South Carolina comprises primarily two physiographic provinces—the coastal plain and the piedmont, with a small section of the Blue Ridge province in the extreme northwestern part of the State. For analytical and reporting purposes South Carolina has been divided into three units, the Northern Coastal Plain, the Southern Coastal Plain, and the Piedmont (fig. 1).

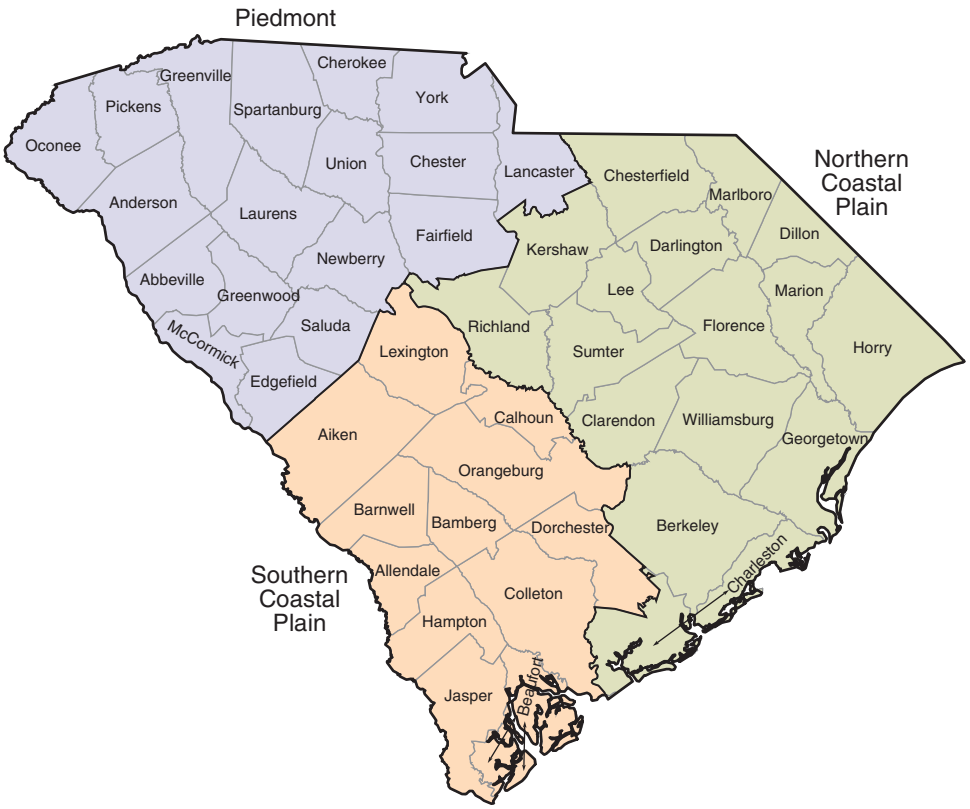


Figure 1—Counties and forest survey units in South Carolina.

FOREST AREA

Total land area of South Carolina, not including census water was 19.3 million acres. Of this, 68 percent was forested (13.1 million acres). Of the 13.1 million acres of forest land, 153,000 acres were considered reserved (protected from commercial harvesting). Generally speaking, forest area has been increasing slightly over the last decade (table 1). Between 2001 and 2006, forest land increased by 2.2 percent, and between 2006 and 2011, it increased by 0.6 percent. This did vary somewhat by survey unit. The change in forest area since 2006 represented both reversions from nonforest and diversions to nonforest. Just over 290,000 acres of forest land were diverted to a nonforest land use, and just over 367,000 acres of nonforest land reverted to forest land. Over one-half of the diversions were to developed land uses, and a little over one-half of the reversions were from agriculture.

Eighty-eight percent of South Carolina's forest land was held in private ownership. Changes within the category of private include the decline in forest industry owned land and the increase in nonindustrial private forest land (NIPF). Forest Inventory and Analysis (FIA) defines forest industry owners as those that are incorporated and own a primary wood processing mill. Ownership of forest land by forest industry peaked in 1986 at a little over 2.6 million acres (Conner and others 2009, Tansey and Hutchins 1988). It has fallen steadily since then. In 2006, there were 1.5 million acres of forest industry owned forest land. By 2011, this had dropped to just over 336,000 acres (see appendix table C.2). The net change in forest industry owned land was a loss of 0.7 million acres between 2001 and 2006 and a loss of 1.1 million acres between 2007 and 2011. In contrast, area of NIPF land increased by almost 0.4 million acres between 2001 and 2006 and by 1.3 million acres between 2006 and 2011 (fig. 2).

The remaining 12.1 percent of forest land was in public ownership. This consisted mainly of National Forest land (598,845 acres), State-owned land (381,235 acres), and U.S. Department of Defense/U.S. Department of Energy owned land (320,084 acres) (see appendix table C.2). National forests in South Carolina include Sumter National Forest and Frances Marion National Forest.

Because so much of the forest land in the United States is privately owned, the Forest Service initiated the National

Table 1—Area of forest land by survey unit and year, South Carolina

Survey unit	Survey year			Change since 2006
	2001	2006	2011	
	thousand acres			*percent*
Southern Coastal Plain	3,395.4	3,426.6	3,502.0	2.2
Northern Coastal Plain	4,800.7	4,936.9	4,955.7	0.4
Piedmont	4,575.9	4,684.0	4,662.8	-0.5
All units	12,772.0	13,047.6	13,120.5	0.6

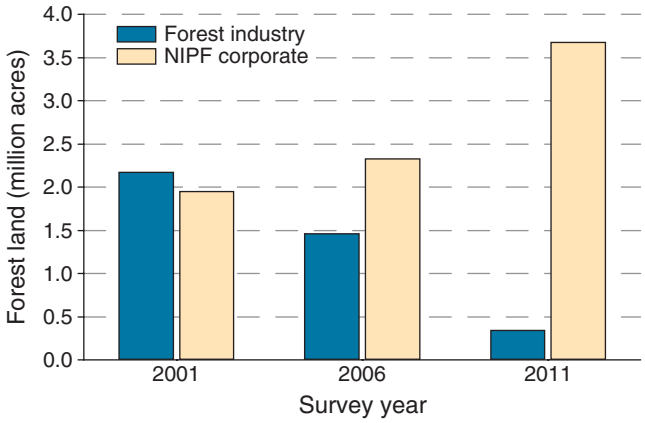


Figure 2—Area of forest land by private owner category and survey year, South Carolina. (NIPF = nonindustrial private forest)

Woodland Owner Survey (NWOS) in 2002. The primary goals of the NWOS are to determine who owns the forest land of the United States, why people own forest lands, and how these owners plan to use forest lands in the future (Butler and others 2005). Between 2011 and 2013, 236 private forest landowners in South Carolina responded to the NWOS. A very similar survey was also conducted 2002–06 (Butler 2008). An estimated 86,000 people (owning at least 10 acres of forest land) own 6.9 million acres of the 7.3 million acres of forest land categorized as individual owned within the nonindustrial private owner category (table 2, appendix table C.2).

Table 2—Estimated area and number of family forest and woodland ownerships (10+ acres) in South Carolina by size of forest/woodland holdings,[a] 2011–13

Size of forest/ woodland holdings	Totals				Percentages				
	Acres	SE	Owner-ships	SE	Acres	SE	Owner-ships	SE	n
acres	*- - - - - - thousands - - - - - -*				*- - - - - - - percent - - - - - - -*				
10–19	319	99	26	8	4.6	1.4	30.4	10.2	10
20–49	797	151	28	6	11.6	2.2	32.7	7.4	25
50–99	893	159	15	3	13.0	2.3	17.1	3.6	28
100–199	1,211	181	9	1	17.6	2.7	11.0	2.0	38
200–499	1,594	202	6	<1	23.1	3.0	6.6	1.1	50
500–999	733	146	1	<1	10.6	2.1	1.3	<1.0	23
1,000–4,999	1,211	181	<1	<1	17.6	2.7	<1.0	<1.0	38
5,000–9,999	96	55	<1	<1	1.4	<1.0	<1.0	<1.0	3
10,000+	32	32	<1	<1	<1.0	<1.0	<1.0	<1.0	1
No answer[b]	—	—	—	—	—	—	—	—	0
Total[c]	6,885	170	86.0	9	100.0	—	100.0	—	216

Note: Data may not add to totals due to rounding.

SE = standard error; n = number; — = no value for the cell.

[a] The average forest/woodland holding is 80.0 acres (SE = 8.8) for family forest and woodland ownerships with 10+ acres in South Carolina.

[b] Excluded from percentages.

[c] Totals may differ across tables and subtables.

Upland hardwood forests comprise 34 percent of South Carolina's forests.

While a majority (63.1 percent) of private forest landowners (owning at least 10 acres of forest land) have 10 to 50 acres, the majority (71 percent) of the family-owned private forest land acreage is controlled by only 20 percent of private owners (fig. 3). This means that a small number of private owners with large landholdings control the majority of privately owned family

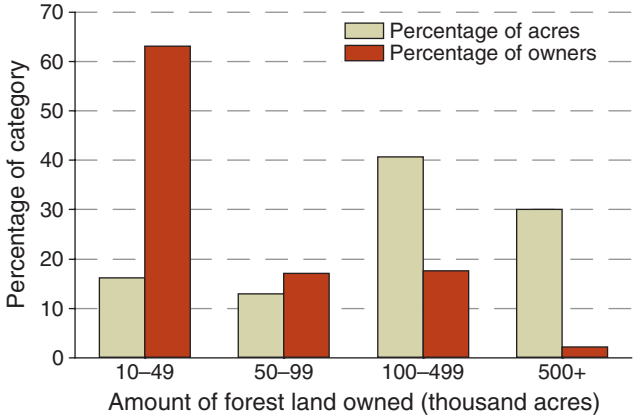


Figure 3—Distribution of the area and owners of family owned private forest land by amount of forest land owned, National Woodland Owner Survey, South Carolina, 2013.

forests that may potentially be available for timber harvesting. A large majority of family forest owners value forests for their aesthetic and biologic value, such as their ability to protect water resources (table 3). Almost half of the owners (owning over 60 percent of the family-owned forests) value the forests for their economic value (table 3). This is reflected in the fact that nearly 38 percent of owners cut or removed trees for sale or for their own use over the past 5 years (table 4), and 45 percent plan to in the next 5 years (table 5).

The loblolly-shortleaf pine group was the predominant forest-type group in South Carolina. It covered an estimated 5.5 million acres (42 percent) of forest land, which was a 2.6-percent increase

Table 3—Estimated area and number of family forest and woodland ownerships (10+ acres) in South Carolina by reason for owning forest and woodland, 2011–13[a]

	Totals				Percentages				
Reason[b]	Acres	SE	Owner-ships	SE	Acres	SE	Owner-ships	SE	n
	thousands				*percent*				
To enjoy beauty or scenery	5,164	240	65	9	77.1	4.2	82.7	15.2	162
To protect nature or biological diversity	4,813	246	53	7	72.2	4.2	66.1	12.0	151
To protect water resources	4,654	248	57	8	69.9	4.2	71.6	13.5	146
To protect or improve wildlife habitat	5,164	240	56	8	78.6	4.4	70.7	13.0	162
For land investment	4,463	250	39	6	66.4	4.1	48.0	9.1	140
Is part of my home site/primary residence	3,124	246	45	7	47.6	4.0	57.0	11.8	98
Is part of my cabin or vacation home site	1,275	185	11	3	19.9	3.0	14.4	4.4	40
Is part of my farm or ranch	2,741	240	35	7	42.2	3.9	44.1	10.2	86
For privacy	4,112	252	53	8	62.9	4.3	67.6	13.3	129
To raise my family	2,837	242	38	7	44.1	4.0	49.4	11.4	89
To pass land on to my children or other heirs	5,292	237	58	8	78.3	4.1	68.3	11.8	166
For firewood	669	140	5	2	10.2	2.2	6.5	2.4	21
For timber products	4,782	247	40	6	70.4	4.1	48.4	9.0	150
For nontimber forest products	669	140	7	3	10.3	2.2	8.6	3.6	21
For hunting	3,921	252	32	5	58.6	4.1	39.6	8.0	123
For recreation, other than hunting	2,582	236	24	5	39.1	3.8	30.5	7.6	81
Other	351	104	3	1	20.0	6.8	10.4	6.9	11
No answer[c]	—	—	—	—	—	—	—	—	0

SE = standard error; n = number; — = no value for the cell.

[a] Numbers include ownerships that rated an objective as very important or important on a five-point Likert scale.

[b] Categories are not mutually exclusive.

[c] Includes only ownerships that responded to none of the items above. Number of ownerships not responding varies for each item and they are excluded from the percentages accordingly.

Table 4—Estimated area and number of family forest and woodland ownerships (10+ acres) in South Carolina by recent (past 5 years) forestry activity,[a] 2011–13

Type of activity[b]	Totals				Percentages				
	Acres	SE	Owner-ships	SE	Acres	SE	Owner-ships	SE	n
	thousands				*percent*				
Cut and/or remove trees for sale	3,953	252	24	4	58.5	4.0	27.7	6.0	124
Cut and/or remove trees for own use	1,530	199	13	3	22.6	3.0	15.0	4.4	48
Cut and/or remove trees for sale or own use[c]	4,399	250	32	5	65.1	4.1	37.7	7.4	138
Collect nontimber forest products	893	159	6	2	13.2	2.4	7.3	2.6	28
Reduce fire hazard	1,976	218	11	3	29.2	3.3	12.5	3.5	62
Controlled burn/prescribed fire	2,104	222	5	<1	31.1	3.4	6.3	1.3	66
Eliminated or reduced invasive plants	1,753	209	21	6	25.9	3.2	24.5	7.3	55
Eliminated or reduced unwanted insects or diseases	924	162	8	3	13.7	2.4	9.4	3.8	29
Road construction or maintenance	1,817	212	7	2	26.9	3.2	7.7	2.4	57
Trail construction or maintenance	1,434	194	13	4	21.2	2.9	14.7	5.0	45
Road or trail construction or maintenance[c]	2,582	236	18	4	38.2	3.6	20.9	5.6	81
Improved wildlife habitat	2,933	243	15	3	43.4	3.8	18.1	3.9	92
Livestock grazing	638	137	6	3	9.4	2.0	7.6	3.7	20
None of the above	1,020	169	26	6	15.1	2.5	30.6	7.9	32
No answer[d]	128	63	<1	<1	—	—	—	—	4

SE = standard error; n = number; — = no value for the cell.

[a] The acre values represent the estimated amount of forest/woodland owned by people who have done the specific activity, not the total acres on which the activity occurred.

[b] Categories are not mutually exclusive.

[c] Includes ownerships that reported doing either of the two preceding activities. Included primarily for comparisons with the 2002–06 results.

[d] Excluded from percentages.

Paying attention to detail in site preparation, tree planting, and competition control resulted in this loblolly pine growing to 14 feet, 5 inches in height at 3 years of age. These Coastal Best Family seedlings were sourced from the South Carolina Forestry Commission's second generation orchard in Jasper County, SC. (photo courtesy of Scott Danskin, South Carolina Forestry Commission)

Table 5—Estimated area and number of family forest and woodland ownerships (10+ acres) in South Carolina by future (next 5 years) forestry activity,[a] 2011–13[b]

Type of activity[c]	Totals				Percentages				
	Acres	SE	Owner-ships	SE	Acres	SE	Owner-ships	SE	n
	thousands				*percent*				
Cut and/or remove trees for sale	3,831	275	25	6	57.2	4.4	31.7	8.4	99
Cut and/or remove trees for own use	1,548	220	15	4	26.8	4.0	21.1	6.6	40
Cut and/or remove trees for sale or own use[d]	4,411	273	36	7	65.9	4.5	44.8	10.1	114
Collect nontimber forest products	1,045	188	11	4	18.4	3.4	16.2	5.9	27
Reduce fire hazard	3,328	272	24	5	56.6	5.2	35.3	9.1	86
Controlled burn/prescribed fire	2,863	265	10	2	46.5	4.7	13.5	2.9	74
Eliminate or reduce invasive plants	2,167	247	22	6	36.8	4.5	30.9	9.4	56
Eliminate or reduce unwanted insects or diseases	1,703	228	18	5	28.8	4.0	25.6	8.4	44
Road construction or maintenance	2,360	253	12	4	40.9	4.8	17.1	5.8	61
Trail construction or maintenance	1,857	235	12	4	32.2	4.3	17.5	5.7	48
Road or trail construction or maintenance[d]	2,825	265	15	4	47.1	4.8	20.8	6.0	73
Improve wildlife habitat	4,295	274	35	6	70.3	5.3	48.3	11.1	111
Livestock grazing	697	157	10	4	12.4	2.9	14.1	6.2	18
None of the above	851	172	27	7	12.5	2.5	33.1	9.2	22
No answer[e]	155	77	1	<1	—	—	—	—	4

SE = standard error; n = number; — = no value for the cell.

[a] The acre values represent the estimated amount of forest/woodland owned by people who have done the specific activity, not the total acres on which the activity occurred.

[b] Numbers include ownerships that rated an activity as extremely likely or likely on a five-point Likert scale.

[c] Categories are not mutually exclusive.

[d] Includes ownerships that reported either of the two preceding activities were extremely likely or likely.

[e] Includes only ownerships that responded to none of the items above. Number of ownerships not responding varies for each item and they are excluded from the percentages accordingly.

from 2006 (fig. 4). This forest-type group occurred on 42 to 43 percent of the forest land in each unit (table 6). Likewise, the acreage of this forest-type group was fairly evenly split between the three units. The next most predominant forest-type group was the oak-hickory group (2.9 million acres). This group accounted for 37 percent of the forest land in the Piedmont unit, where 60 percent (1.7 million acres) of this group occurred (table 6). The third most dominant forest-type group was the oak-gum-cypress group (2.0 million acres). This group occurred primarily in the two Coastal Plain units. Fifty-nine percent of this group occurred in the Northern Coastal Plain. There were only modest changes within the various forest-type groups between 2006 and 2011 (fig. 4).

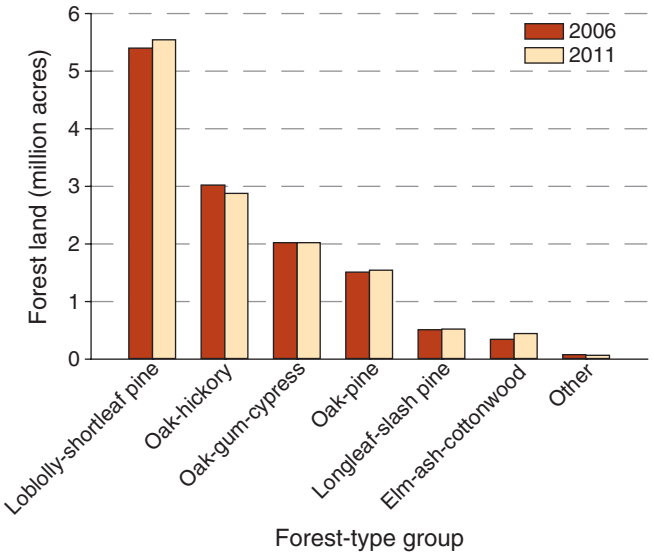


Figure 4—Area of forest land by forest-type group (not including nonstocked stands) and survey year, South Carolina.

Table 6—Area of forest land by forest-type group and survey unit, South Carolina, 2011

Forest-type group	Survey unit: Southern Coastal Plain	Survey unit: Northern Coastal Plain	Survey unit: Piedmont	All units
	thousand acres			
White-red-jack pine	0.0	1.0	2.0	3.0
Longleaf-slash pine	242.9	268.2	13.6	524.7
Loblolly-shortleaf pine	1,506.0	2,075.7	1,960.2	5,541.9
Other eastern softwoods	0.0	4.7	10.6	15.4
Oak-pine	421.3	506.8	616.7	1,544.9
Oak-hickory	473.6	676.4	1,724.8	2,874.8
Oak-gum-cypress	756.8	1,188.9	77.7	2,023.4
Elm-ash-cottonwood	56.7	189.1	205.8	451.7
Other hardwoods	0.0	0.0	10.3	10.3
Tropical hardwoods	1.5	0.0	0.0	1.5
Exotic hardwoods	5.8	7.3	9.2	22.3
Nonstocked	37.4	38.5	18.2	94.2
Total groups	3,502.0	4,955.7	4,662.8	13,120.5

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.

Approximately one-half of the forest land in South Carolina was in large-diameter stands (6.5 million acres) (see appendix table C.5). This was an increase of 8.3 percent since 2006. Medium-diameter stands occupied 3.6 million acres (virtually no change), and small-diameter stands occupied 2.9 million acres (a 13-percent decrease). An analysis of stand-size class on timberland shows that the forests in South Carolina are maturing. Area of large-diameter stands in 2011 was the highest ever recorded by FIA (fig. 5). Clearly,

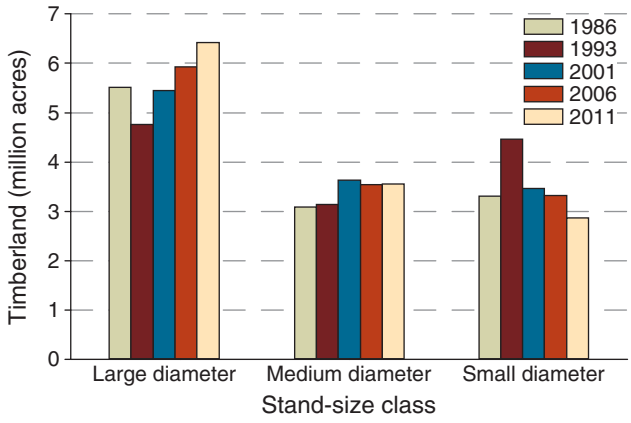


Figure 5—Area of timberland by stand-size class (not including nonstocked stands) and survey year, South Carolina. Timberland is used here for comparisons purposes, as forest land estimates are not available for surveys prior to 2001.

stands have recovered from hurricane Hugo which significantly impacted forests in South Carolina between the 1986 and 1993 surveys (Conner and others 2004). As for stand age, approximately 66 percent of forest land was <41 years old (fig. 6). The 1- to 20-year-old class saw a 13-percent decrease, while the 21- to 40-year-old class saw a 20-percent increase in acreage since 2006.

About 3.4 million acres of forest land showed evidence of artificial regeneration (see appendix table C.7). This was a 3.2-percent decrease since 2006. Overall, 74 percent of forest land in South Carolina was naturally regenerated and 26 percent was artificially regenerated. Approximately 53 percent of the acres of the loblolly-pine forest-type group showed evidence of artificial regeneration. In contrast to the loblolly-shortleaf group, the other groups are almost all naturally regenerated. Final harvests in South Carolina fell from 170,400 acres per year between 2002 and 2006 to 140,700 acres per year between 2007 and 2011 (table 7). Likewise, the annual rate at which harvested stands were artificially regenerated declined from 105,700 acres per year in 2006 to 56,100 acres per year in 2011, a 47-percent decrease.

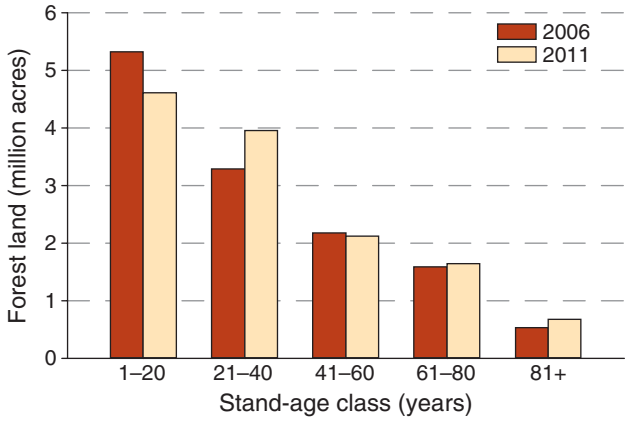


Figure 6—Forest land area by stand-age class (not including nonstocked stands) and survey year, South Carolina.

Table 7—Area of forest land treated and regenerated annually by survey period, South Carolina

Survey period	Final harvest	Regenerated annually		
		Natural	Artificial	Total
	thousand acres per year			
1994–2001[a]	189.3	133.9	124.9	258.8
2002–06	170.4	54.5	105.7	160.2
2007–11	140.7	85.0	56.1	141.1

[a] Values for the 2001 survey are from Conner and others 2009.

NUMBER OF TREES, VOLUME, AND BIOMASS

The number of live trees ≥1.0 inch diameter at breast height (d.b.h.) increased from 10.0 to 10.1 billion stems. This change was a result of both a decrease in the number of softwood stems and an increase in the number of hardwood stems. The majority (79.1 percent) of the 10.1 billion trees were <5.0 inches d.b.h. (see appendix table C.11). Increases were noted in all size classes, except for very small decreases in the 3.0–4.9 and the 7.0–8.9 inch categories. The number of live softwood trees ≥1.0 inch d.b.h. decreased from 3.2 to 3.1 billion trees, while the number of hardwood trees increased from 6.9 billion to 7.1 billion. Despite a 7.0-percent decrease, loblolly pine continued to rank first for number of live trees ≥1.0 inch d.b.h. with 2.4 billion stems, which represented 24 percent of the total (table 8). Sweetgum was second, with 1.7 billion live stems, an increase of 6.4 percent since 2006. Red maple, water oak, and eastern redcedar were third, fourth, and fifth, respectively, for number of live stems.

Table 8—Top 25 tree species dominant for number of stems (≥1.0 inch d.b.h.) on forest land by survey year, South Carolina

Tree species	2006	2011	Change
	- - million trees - -		*percent*
Loblolly pine	2,574.9	2,394.5	-7.0
Sweetgum	1,558.4	1,658.3	6.4
Red maple	846.6	934.9	10.4
Water oak	734.7	739.6	0.7
Eastern redcedar	196.4	205.5	4.6
Laurel oak	178.1	202.9	14.0
Longleaf pine	143.8	200.6	39.5
Blackgum	173.5	194.7	12.2
Swamp tupelo	223.6	189.6	-15.2
Black cherry	188.8	187.1	-0.9
Winged elm	169.8	181.1	6.7
American holly	151.9	174.9	15.1
Yellow-poplar	157.0	173.6	10.6
Flowering dogwood	222.5	172.3	-22.6
Redbay	160.8	171.5	6.7
American hornbeam	179.5	171.4	-4.5
Green ash	166.3	160.4	-3.5
White oak	153.6	155.0	0.9
Mockernut hickory	104.8	111.6	6.4
Sourwood	94.2	100.9	7.1
Southern red oak	109.9	97.8	-11.0
Post oak	101.7	91.3	-10.2
Willow oak	98.8	88.5	-10.4
Sweetbay	74.9	75.6	0.9
Virginia pine	81.6	71.8	-12.0

d.b.h. = diameter at breast height.

As of 2011, total all-live volume on forest land was estimated to be 24.1 billion cubic feet, the most ever reported for the State. This was up by 2.2 billion cubic feet (10 percent) since 2006 and was up by 3.6 billion cubic feet over 2001 estimates. Live volume was still split almost evenly between softwoods (12.2 billion cubic feet) and hardwoods (12.0 billion cubic feet). Softwoods saw a slightly larger increase (12.7 percent) over the previous survey than did hardwoods (7.0 percent). The distribution of all-live volume by diameter class highlights one of the differences between softwood and hardwood stands (figs. 7 and 8). There tends to be more volume in larger trees for hardwoods than for softwoods. Since the last survey, volume increased in all size classes for both hardwoods and softwoods, except for a small decrease in softwoods 5.0–6.9 inches d.b.h. Loblolly pine still dominates volume in South Carolina, accounting for

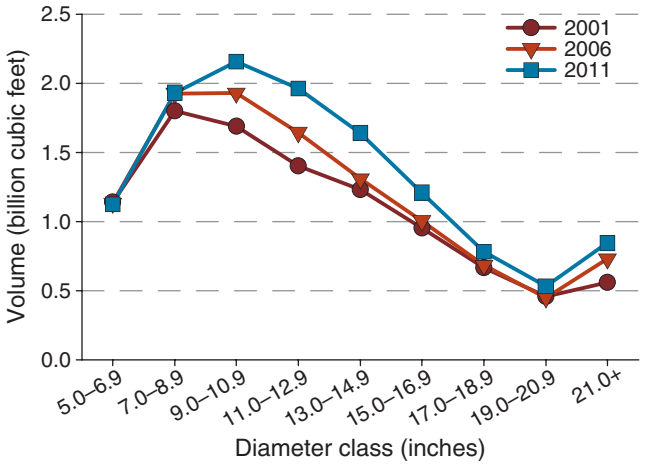


Figure 7—All-live softwood volume on forest land by diameter class and survey year, South Carolina.

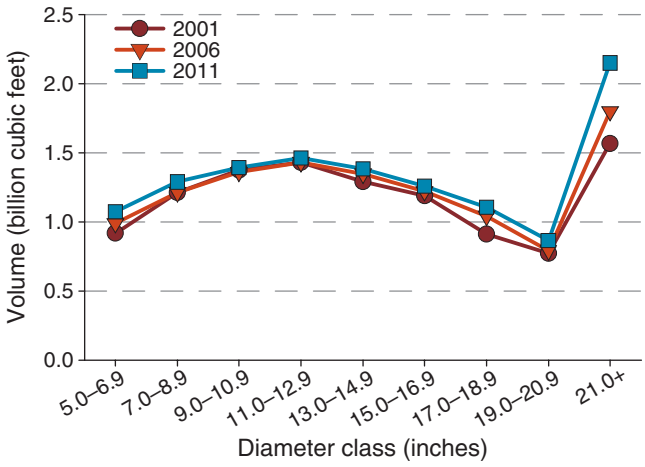


Figure 8—All-live hardwood volume on forest land by diameter class and survey year, South Carolina.

Table 9—Top 25 tree species dominant for all-live volume (≥5.0 inches d.b.h.) on forest land by survey year, South Carolina

Tree species	2006	2011	Change
	million cubic feet		*percent*
Loblolly pine	8,549.5	9,890.5	15.7
Sweetgum	2,050.8	2,179.9	6.3
Yellow-poplar	947.4	1,048.3	10.7
Red maple	858.2	948.2	10.5
Water oak	790.2	928.6	17.5
White oak	826.4	896.8	8.5
Swamp tupelo	845.5	847.7	0.3
Laurel oak	567.8	607.1	6.9
Longleaf pine	530.0	590.5	11.4
Willow oak	368.5	391.2	6.2
Water tupelo	373.8	389.1	4.1
Shortleaf pine	375.7	355.0	-5.5
Baldcypress	374.1	344.7	-7.9
Southern red oak	321.3	332.4	3.5
Green ash	233.9	241.8	3.4
Virginia pine	263.9	232.6	-11.9
Scarlet oak	229.1	231.1	0.9
Mockernut hickory	226.6	218.5	-3.6
Cherrybark oak	171.3	213.5	24.6
Post oak	177.9	187.4	5.3
Northern red oak	167.7	179.1	6.8
Slash pine	196.5	163.7	-16.7
Pond pine	143.2	159.3	11.2
Pondcypress	106.2	140.5	32.3
Eastern redcedar	121.0	137.7	13.8

d.b.h. = diameter at breast height.

41 percent of the total live volume (table 9). This species increased by 15.7 percent from 8.5 billion cubic feet to 9.9 billion cubic feet. Sweetgum (2.2 billion cubic feet) and yellow-poplar (1.0 billion cubic feet) ranked second and third, respectively, for live volume. All-live volume averaged 1,838.6 cubic feet per acre (table 10). By ownership, public land averaged 2,525.0 cubic feet per acre, compared to private land which averaged 1,743.7 cubic feet per acre, highlighting the fact that stands tend to be older on public land. Aboveground dry weight was estimated to be 639.1 million tons and total carbon was estimated to be 319.5 million tons, the majority of which was in private ownership (see appendix tables C.20 and C.21).

This stand of trees in Horry County is on a 25-year sawtimber and poletimber rotation while producing intermediate products from a two-thin regime. Forest industry land ownership peaked at 2.6 million acres in the mid-1980s. (photo courtesy of Michelle Johnson, South Carolina Forestry Commission and Joey Ferguson, Resource Management Services)

Table 10—Volume of live trees per acre on forest land by survey year, unit, and ownership group, South Carolina

Survey year and unit	All groups	Ownership group	
		Public	Private
	cubic feet per acre		
2001			
Southern Coastal Plain	1,854.1	2,868.3	1,771.8
Northern Coastal Plain	1,406.6	1,479.3	1,397.7
Piedmont	1,633.2	2,462.1	1,543.5
All units	1,606.7	2,126.0	1,551.6
2006			
Southern Coastal Plain	1,758.1	2,824.7	1,666.6
Northern Coastal Plain	1,607.0	1,737.5	1,587.0
Piedmont	1,709.3	2,644.4	1,571.4
All units	1,683.4	2,287.2	1,603.3
2011			
Southern Coastal Plain	1,912.7	2,877.5	1,825.8
Northern Coastal Plain	1,736.6	2,041.2	1,686.9
Piedmont	1,891.3	2,909.6	1,738.3
All units	1,838.6	2,525.0	1,743.7

GROWTH AND REMOVALS

Annual net growth of all-live trees on forest land increased from 1,150.7 million cubic feet per year in 2006 to 1,289.5 million cubic feet per year in 2011, a 12.1-percent increase (see appendix table C.22). Net annual growth of loblolly pine averaged 833.3 million cubic feet per year, a 17.7-percent increase. Growth of loblolly pine accounted for 65 percent of the growth for the State. Between 2007 and 2011, net growth of all-live softwoods averaged 905.9 million cubic feet per year, a 17.3-percent increase over the previous survey (fig. 9). Growth of hardwoods averaged 383.7 million cubic feet per year, a 1.5-percent increase over the previous survey.

Annual net growth in planted stands averaged 557.1 million cubic feet per year and growth in natural stands averaged 732.5 million cubic feet per year. On a per-acre basis, growth in planted stands (164.5 cubic feet per acre per year) was more than double that in natural stands (75.3 cubic feet per acre per year) (table 11). Softwood forest types accounted for 94.1 percent of the net growth in planted stands and 40.7 percent of the net growth in natural stands.

Between 2007 and 2011, annual removals averaged 834.0 million cubic feet per year (see appendix table C.28). This was a 10.7-percent increase over the previous survey. As with growth, removals of loblolly pine dominated total removals at 562.3 million cubic feet per year, or 67 percent of the total. Removals of softwoods as a group averaged 621.0 million cubic feet per year, a 13.9-percent increase over the previous survey. Removals of hardwoods averaged 213.0 million cubic feet per year, a 2.1-percent increase.

Overall, the growth-to-removals ratio, an indicator of sustainability, averaged 1.5:1.0, as it did during the last survey. The growth-to-removals ratio for softwoods increased slightly from 1.4:1.0 to 1.5:1.0 and remained unchanged at 1.8:1.0 for hardwoods. So while there were increases in both growth and removals, the ratio between the two remained basically unchanged (fig. 9).

Table 11—Average annual net growth per acre by major species group and stand origin, South Carolina, 2011

Major species group	Total	Stand origin	
		Natural stands	Planted stands
	cubic feet per acre per year		
Softwoods	134.9	99.6	169.0
Hardwoods	67.2	65.1	118.3
All groups	98.3	75.3	164.5

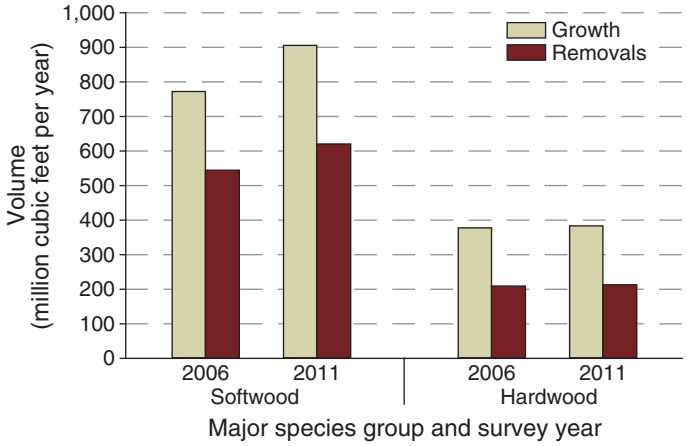


Figure 9—Average annual net growth and removals by major species group and survey year, South Carolina.

Piles of logging slash from a recent clearcut located in Fairfield County, SC.

FOREST HEALTH

Mortality on South Carolina's forest land averaged 171.3 million cubic feet per year for the 2011 survey (see appendix table C.25). This was a decrease of 13.5 percent over the previous survey when mortality averaged 198.1 million cubic feet per year. At the species level, some species saw decreases in mortality, while others saw increases. Loblolly pine had the highest mortality (as would be expected, as this species accounted for the most volume) at 59.2 million cubic feet per year. This was a decrease of 20.4 percent from the previous survey. Sweetgum (12.6 million cubic feet per year) and red maple (11.7 million cubic feet per year) were second and third, respectively, for mortality.

Fire (from all causes) affected an estimated 103,900 acres of forest land per year in South Carolina between 2007 and 2011 (see appendix table C.8). This was a significant increase over the previous survey when fire affected an estimated 60,400 acres of forest land per year.

Crews noted nonnative invasive plants (NNIPs) on 58 percent of forested plots and 41 percent of forested subplots across South Carolina. The Piedmont unit had the highest percentage of forested plots with NNIPs (88 percent); the Southern Coastal Plain had the lowest (38 percent). Across the State, 25 of the 33 NNIPs on the invasive species list were recorded (table 12). Japanese honeysuckle, Chinese privet, and Chinese lespedeza were the most often occurring NNIPs in South Carolina's

Table 12—Occurrence of nonnative invasive plants by species, South Carolina, 2011

Species	Plots	Plots	Subplots	Subplots
	number	*percent*	*number*	*percent*
Japanese honeysuckle	1,213	48.46	3,002	32.75
Chinese privet	630	25.17	1,209	13.19
Chinese lespedeza	314	12.54	538	5.87
Shrubby lespedeza	102	4.08	165	1.80
Thorny olive	78	3.12	127	1.39
Nonnative roses	74	2.96	95	1.04
Nepalese browntop	65	2.60	133	1.45
Chinaberry	57	2.28	76	0.83
Tallowtree	51	2.04	80	0.87
Mimosa	45	1.80	61	0.67
Chinese/Japanese wisteria	41	1.64	59	0.64
Tree-of-heaven	25	1.00	33	0.36
Japanese privet	22	0.88	37	0.40
Kudzu	22	0.88	35	0.38
Sacred bamboo	17	0.68	18	0.20
English ivy	11	0.44	11	0.12
Autumn olive	10	0.40	14	0.15
Paulownia	7	0.28	7	0.08
Periwinkle	5	0.20	6	0.07
Chinese yams	4	0.16	4	0.04
Nonnative bamboo	4	0.16	7	0.08
Bush honeysuckle	2	0.08	2	0.02
Japanese climbing fern	2	0.08	5	0.05
Tropical soda apple	2	0.08	2	0.02
Oriental bittersweet	1	0.04	1	0.01

Chinese lespedeza (left), Japanese honeysuckle (top right), and Chinese privet (bottom right), are the most frequent nonnative invasive plants in South Carolina's forests. (photos courtesy of Chisolm Beckham, South Carolina Forestry Commission)

forests. These three NNIPs occurred on 48, 25, and 13 percent of forested plots, respectively. There was one new species recorded (oriental bittersweet), and two species that were recorded during the 2006 survey, but not during the 2011 survey (tall fescue and winged burning bush). This does not necessarily mean, however, that these two species disappeared from South Carolina. During the 2011 survey, crews only recorded the four most prevalent NNIPs present on a subplot, so while tall fescue may have been present, it may not have been recorded due to a lower prevalence than other NNIPs that were also present on the subplot.

FIA assesses several additional indicators to aid in the detection of potential forest health issues that may warrant further evaluation. These Phase 3 (P3) indicators include ozone-induced injury, crown condition, and down woody material. Readers should be aware that these indicators are based on a smaller plot population than the regular, Phase 2 (P2), sample, where approximately 1 out of every 16 P2 plots is a P3 plot, or 1 plot per 96,000 acres. In addition, no P3 data were collected during the 2011 field season due to budgetary constraints.

Tree crown condition is a potential indicator of forest health. Unusually poor crown conditions or changes in crown conditions through time can indicate areas of concern that may warrant further investigation. Crown density averaged 42 percent across all plots. There were six species (three softwoods and three hardwoods) that had no trees with a crown density >50 percent (table 13). Crown dieback averaged 1.3 percent across all plots. Black oak, sourwood, and willow oak had the highest percentage of trees with >15 percent dieback (table 13). Foliage transparency averaged 20.3 percent across

Table 13—Crown density, crown dieback, and foliage transparency of trees (≥5.0 inches d.b.h., n ≥10) by species, South Carolina, 2010

Species	Trees	Crown density			Crown dieback			Foliage transparency		
		0 to 25%	26 to 50%	>50%	0 to 5%	6 to 15%	>15%	0 to 25%	26 to 50%	>50%
	- n -	*- percentage of trees -*								
Loblolly pine	1,362	10.0	84.9	5.1	99.3	0.7	0.1	90.3	9.7	0.0
Sweetgum	215	8.4	67.0	24.7	96.3	2.3	1.4	93.5	6.0	0.5
Water oak	146	10.3	68.5	21.2	91.8	3.4	4.8	80.8	19.2	0.0
Red maple	135	11.1	71.1	17.8	89.6	3.7	6.7	91.1	8.1	0.7
Virginia pine	108	2.8	97.2	0.0	97.2	2.8	0.0	99.1	0.9	0.0
Longleaf pine	99	32.3	67.7	0.0	100.0	0.0	0.0	66.7	33.3	0.0
Shortleaf pine	82	6.1	92.7	1.2	96.3	2.4	1.2	93.9	4.9	1.2
White oak	74	9.5	68.9	21.6	93.2	4.1	2.7	90.5	9.5	0.0
Yellow-poplar	59	5.1	83.1	11.9	96.6	0.0	3.4	96.6	1.7	1.7
Swamp tupelo	53	49.1	39.6	11.3	90.6	5.7	3.8	86.8	11.3	1.9
Eastern redcedar	44	0.0	88.6	11.4	95.5	2.3	2.3	93.2	6.8	0.0
Pond pine	41	63.4	26.8	9.8	100.0	0.0	0.0	87.8	12.2	0.0
Blackgum	36	2.8	83.3	13.9	100.0	0.0	0.0	88.9	11.1	0.0
Southern red oak	35	0.0	68.6	31.4	97.1	2.9	0.0	88.6	11.4	0.0
Laurel oak	33	0.0	66.7	33.3	97.0	3.0	0.0	81.8	18.2	0.0
Baldcypress	31	0.0	64.5	35.5	100.0	0.0	0.0	96.8	3.2	0.0
Mockernut hickory	29	3.4	69.0	27.6	100.0	0.0	0.0	100.0	0.0	0.0
Black cherry	27	11.1	81.5	7.4	96.3	0.0	3.7	85.2	11.1	3.7
Black oak	22	13.6	81.8	4.5	77.3	9.1	13.6	95.5	0.0	4.5
Water tupelo	21	0.0	66.7	33.3	100.0	0.0	0.0	95.2	4.8	0.0
Sourwood	19	15.8	84.2	0.0	84.2	5.3	10.5	94.7	0.0	5.3
Post oak	19	5.3	84.2	10.5	94.7	5.3	0.0	100.0	0.0	0.0
Black willow	19	0.0	84.2	15.8	94.7	0.0	5.3	26.3	73.7	0.0
American hornbeam	15	13.3	60.0	26.7	100.0	0.0	0.0	66.7	33.3	0.0
Scarlet oak	15	0.0	86.7	13.3	100.0	0.0	0.0	100.0	0.0	0.0
Slash pine	14	7.1	92.9	0.0	100.0	0.0	0.0	92.9	7.1	0.0
Green ash	14	14.3	78.6	7.1	100.0	0.0	0.0	85.7	14.3	0.0
Willow oak	13	7.7	92.3	0.0	76.9	15.4	7.7	61.5	38.5	0.0
Winged elm	13	0.0	61.5	38.5	100.0	0.0	0.0	100.0	0.0	0.0
Pignut hickory	11	0.0	81.8	18.2	100.0	0.0	0.0	90.9	9.1	0.0
Sand hickory	11	9.1	45.5	45.5	100.0	0.0	0.0	100.0	0.0	0.0
American holly	11	0.0	90.9	9.1	100.0	0.0	0.0	45.5	54.5	0.0
Flowering dogwood	10	20.0	60.0	20.0	90.0	10.0	0.0	90.0	10.0	0.0
Northern red oak	10	10.0	90.0	0.0	80.0	20.0	0.0	100.0	0.0	0.0

d.b.h. = diameter at breast height; n = number.
0.0 = no sample for the cell or a value of >0.0 but <0.05.

An example of a tree with extreme dieback with only epicormic branching that would receive crown ratings as follows: uncompacted crown ratio = 0 percent, density = 0 percent, dieback = 99 percent, and foliage transparency = 99 percent. (photo by Kadonna Randolph, U.S. Forest Service)

all plots. Very few trees (0.3 percent) had >50 percent transparency. About 69 percent of saplings were in the vigor class 1 (good), 29.6 percent were in vigor class 2 (average), and only 1.9 percent were vigor class 3 (poor).

An important part of any ecosystem is the return of nutrients to the system via decomposition. In forested ecosystems deadwood can be a significant store of nutrients (Harmon and others 1987, Keenan and others 1993). Standing and down-dead trees are also important habitats for a wide variety of organisms, including microbes, invertebrates, fungi, and small mammals. Additionally, a wide range of birds, reptiles, and amphibians depend on deadwood in some part of their lifecycle. Inadequate amounts of coarse woody debris (CWD; down-dead logs ≥3.0 inches in diameter and ≥3.0 feet in length), usually as a result of intensive stand management, can negatively impact small vertebrates in forest ecosystems (Butts and McComb 2000).

Volume of CWD averaged 182.5 cubic feet per acre across the State. This varied from a low of 99.4 cubic feet per acre in the Southern Coastal Plain, to a high of 235.8 cubic feet per acre in the Northern Coastal Plain (table 14). By forest-type group, the oak-gum-cypress stands had the highest average volume of CWD (404.3 cubic feet per acre), and longleaf-slash pine stands had the lowest (48.6 cubic feet per acre). The majority of CWD was <13.0 inches diameter at transect (85 percent) and in decay classes 3 and 4 (75 percent).

CWD is classified as a 1,000-hour fuel, while fine woody debris (FWD) is classified into 1-, 10-, and 100-hour fuel categories. These fuel class numbers correspond to the approximate amount of time required for the moisture content to fluctuate within a given piece of deadwood (Brown 1974).

Table 14—Volume of down woody material by survey unit, South Carolina, 2010

Survey unit	Fine woody debris	Coarse woody debris
	cubic feet per acre	
Southern Coastal Plain	117.74	99.39
Northern Coastal Plain	115.62	235.83
Piedmont	158.37	194.42
All units	131.86	182.54

Consequently, FWD is an important factor in fire hazard prediction. The 100-hour class FWD, the FWD that dries out slowest and is least hazardous, accounted for the majority of the total FWD biomass (table 15). Overall, FWD biomass averaged 1.7 tons per acre. Biomass of 1,000-hour fuels averaged 1.5 tons per acre, statewide.

Ozone-induced foliar injury is evaluated between late July and mid-August (U.S. Department of Agriculture Forest Service 2015). The amount and severity of ozone injury varies according to a complex set of factors that include exposure, rates of stomatal uptake, and sensitivity to ozone. Variation in injury within a plant is largely determined by the position of the foliage, exposure to air and sunlight, and the maturity of the leaves. Monitoring foliar injury of bioindicator plants does not identify specific levels of ozone present, but rather identifies whether conditions are favorable for ozone injury to occur (Coulston and others 2003). Although correlations between high levels of ozone exposure and foliar injury have been observed (Smith and others 2003), relationships between ozone exposure and tree responses have been difficult to confirm (Chappelka and Samuelson 1998).

Some studies have shown that periods of drought offset the effects of ozone by causing stomatal conductance to be reduced (Patterson and others 2000). Between 2007 and 2010, 10,239 plants from 26–27 biosites across South Carolina were evaluated, of which 99.7 percent showed no ozone injury (table 16). This follows the trend in other States where little to no ozone injury was detected in the 2006 to 2010 time period (Rose 2013, Rosson and Rose 2015). Whether this is due to drought, reduced ozone exposure, a combination of the two, or some other factor is unclear.

Table 16—Number of biosites and plants evaluated for ozone-induced foliar injury, by year, South Carolina

Year	Biosites	Plants evaluated	Plants injured
		number	
2007	26	2,438	19
2008	26	2,630	5
2009	27	2,693	0
2010	26	2,478	4

Table 15—Mean fuel loading on forest land by forest-type group (n ≥5 conditions) and fuel class, South Carolina, 2010

	Fuel class					Forest floor fuels	
Forest-type group	1-hour	10-hour	100-hour	1,000+ hour	Slash	Duff	Litter
				tons per acre			
Oak-hickory	0.00	0.40	1.60	2.58	2.19	12.34	14.11
Oak-gum-cypress	0.00	0.60	1.10	3.24	0.00	12.80	7.96
Oak-pine	0.00	0.40	1.60	1.21	0.00	12.45	12.84
Elm-ash-cottonwood	0.05	0.30	1.30	2.75	0.00	3.10	7.10
Longleaf-slash pine	0.03	0.28	1.00	0.35	0.00	4.43	17.76
Loblolly-shortleaf pine	0.03	0.27	1.20	0.70	0.99	10.09	15.57
All groups	0.04	0.34	1.30	1.50	0.91	10.57	13.59

n = number; 0.00 = no sample for the cell or a value of >0.00 but <0.005.

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View of Lake Jocassee and watershed in Pickens County, SC.

GLOSSARY

All-live tree—All living trees. All size classes, all tree classes, and both saw-log and nonsaw-log species are included. See: FIA tree species list in the field manual.

Average annual mortality—Average annual volume of trees ≥5.0 inches d.b.h. that died from human and natural causes during the intersurvey period, excluding those removed by harvesting, cultural operations, land clearing or changes in land use.

Average annual removals—Average annual volume of trees ≥5.0 inches d.b.h. removed from the inventory by harvesting, cultural operations (such as timber-stand improvement), land clearing, or changes in land use during the intersurvey period.

Average net annual growth—Average annual net change in volume of trees ≥5.0 inches d.b.h./d.r.c. without taking into account losses from cutting (gross growth minus mortality) during the intersurvey period.

Biomass—For the southern region, total aboveground biomass is estimated using allometric equations and is defined as the aboveground weight of wood and bark in live trees ≥1.0 inch d.b.h./d.r.c. from the ground to the tip of the tree, excluding all foliage (leaves, needles, buds, fruit, and limbs <0.5 inch in diameter). Biomass is expressed as oven-dry weight and the units are tons.

Note: the weight of wood and bark in limbs <0.5 inch in diameter is included in the biomass of small-diameter trees.

Blind check—A reinstallation done by a qualified inspection crew without production crew data on hand; at least two full subplots are completely remeasured along with all the plot level information. The two datasets are maintained separately. Discrepancies between the two sets of data are not reconciled. See: Quality assurance and quality control.

Bole—Trunk or main stem of a tree. See: Main stem.

Census water—See: Land use.

Coarse woody debris (CWD)—Downed, dead tree and shrub boles, large limbs, and other woody pieces with a minimum small-end diameter of ≥3 inches and a length of ≥3 feet not attached to a living or standing dead source.

Cold check—An inspection done either as part of the training process, or as part of the ongoing quality control program. Normally the installation crew is not present at the time of inspection. The inspector has the completed data in-hand at the time of inspection. The inspection can include the whole plot or a subset of the plot. Data errors are corrected. See: Quality assurance and quality control.

Condition class—The combination of discrete landscape and forest attributes that identify, define, and stratify the area associated with a plot. Examples of such attributes include condition status, forest type, stand origin, stand size, owner group, reserve status and stand density.

Crown—The part of a tree or woody plant bearing live branches or foliage.

Crown vigor class—A visual assessment of the apparent crown vigor of saplings. The purpose is to separate excellent saplings with superior crowns from stressed individuals with poor crowns.

Crown density—The amount of crown stem, branches, twigs, shoots, buds, foliage, and reproductive structures that block light penetration through the projected crown outline. Measured as a percentage.

Crown dieback—Recent mortality of branches with fine twigs, which begins at the terminal portion of a branch and proceeds toward the trunk. Dieback is only considered when it occurs in the upper and outer portions of the tree. Dead branches in the lower live crown are not considered as part of crown dieback, unless there is continuous dieback from the upper and outer crown down to those branches.

Cycle—One sequential and complete set of panels.

Diameter at breast height (d.b.h.)—The diameter for tree stem, located at 4.5 feet above the ground (breast height) on the uphill side of a tree. The point of diameter measurement may vary on abnormally formed trees.

Diameter class—A classification of trees based on diameter outside bark, measured at breast height (d.b.h.) above the ground or at root collar (d.r.c.). Note: Diameter classes are commonly in 2-inch increments, beginning with 2-inches. Each class provides a range of values with the class name being the approximate midpoint. For example, the 6-inch class includes trees 5.0 through 6.9 inches d.b.h.

Disturbance—Natural or human-caused disruption that is ≥1.0 acre in size and results in mortality and/or damage to 25 percent of all trees in a stand or 50 percent of an individual species' count or, in the case when the disturbance does not initially affect tree growth or health (e.g. grazing, browsing, flooding, etc.), affects 25 percent of the soil surface or understory vegetation. For initial forest plot establishment the disturbance must be within the last 5 years. For remeasured plots only those disturbances that have occurred since the previous inventory are recognized.

Down woody material (DWM)—DWM is dead material on the ground in various stages of decay. It includes coarse and fine woody material. Previously named down woody debris (DWD). The depth of duff layer, litter layer, and overall fuelbed; fuel loading on the microplot; and residue piles are also measured as part of the DWM indicator for FIA.

Dry weight—The oven-dry weight of biomass.

Federal land—An ownership class of public lands owned by the U.S. Government. See: Ownership.

Fine woody debris (FWD)—Downed, dead branches, twigs, and small tree or shrub boles <3 inches in diameter not attached to a living or standing dead source.

Fixed-radius plot—A circular sampled area with a specified radius in which all trees of a given size, shrubs, or other items are tallied.

Foliage transparency—The amount of skylight visible through microholes in the live portion of the crown, i.e. where you see foliage, normal or damaged, or remnants of its recent presence. Recently defoliated branches are included in foliage transparency measurements. Macroholes are excluded unless they are the result of recent defoliation. Dieback and dead branches are always excluded from the estimate. Foliage transparency is different from crown density because it emphasizes foliage and ignores stems, branches, fruits, and holes in the crown.

Forest floor—The entire thickness of organic material overlying the mineral soil, consisting of the litter and the duff (humus).

Forest industry land—See: Ownership.

Forest land—Land that is at least 10 percent stocked by forest trees of any size, or land formerly having such tree cover, and is not currently developed for a nonforest use. The minimum area for classification as forest land is 1 acre. Roadside, streamside, and shelterbelt strips of timber must be at least 120 feet wide to qualify as forest land. Unimproved roads and trails, streams and other bodies of water, or natural clearings in forested areas shall be classified as forest, if <120 feet in width or 1.0 acre in size. Forest land is divided into timberland, reserved forest land, and other forest land (such as woodland).

Forest type—A classification of forest land based upon and named for the tree species that forms the plurality of live-tree stocking. A forest-type classification for a field location indicates the predominant live-tree species cover for the field location; hardwoods and softwoods are first grouped to determine predominant group, and forest type is selected from the predominant group.

Forest-type group—A combination of forest types that share closely associated species or site requirements.

Examples for the Southern Region include:

Elm-ash-cottonwood—Forests in which elm, ash, or cottonwood, singly or in combination, constitute a plurality of the stocking. (Common associates include willow, sycamore, beech, and maple.)

Loblolly-shortleaf pine—Forests in which loblolly pine, shortleaf pine, or other southern yellow pines, except longleaf or slash pine, singly or in combination, constitute a plurality of the stocking. (Common associates include oak, hickory, and gum.)

Longleaf-slash pine—Forests in which longleaf or slash pine constitute a majority of the stocking (Common associates include: loblolly pine, shortleaf pine, various oak species and well as a variety of hardwoods.)

Maple-beech-birch—Forests in which maple, beech, or yellow birch, singly or in combination, constitute a plurality of the stocking. (Common associates include hemlock, elm, basswood, and white pine.)

Oak-gum-cypress—Bottomland forests in which tupelo, blackgum, sweetgum, oaks, or southern cypress, singly or in combination, constitute a plurality of the stocking, except where pines account for 25 to 50 percent of stocking, in which case the stand is classified as oak-pine. (Common associates include cottonwood, willow, ash, elm, hackberry, and maple.)

Oak-hickory—Forests in which upland oaks or hickory, singly or in combination, constitute a plurality of the stocking, except where pines account for 25 to 50 percent, in which case the stand is classified oak-pine. (Common associates include yellow-poplar, elm, maple, and black walnut.)

Oak-pine—Forests in which hardwoods (usually upland oaks) constitute a plurality of the stocking but in which pines account for 25 to 50 percent of the stocking. (Common associates include gum, hickory, and yellow-poplar.)

Fuel class—Categories of forest fire fuels defined by the approximate amount of time it takes for moisture conditions to fluctuate. Large coarse woody debris pieces take longer to dry out than smaller fine woody pieces.

1,000-hour fuels—Coarse woody debris with a transect diameter ≥3.0 inches in diameter and ≥3.0 feet long.

100-hour fuels—Fine woody debris with a transect diameter between 1.0 and 2.9 inches.

10-hour fuels—Fine woody debris with a transect diameter between 0.25 and 0.9 inches.

1-hour fuels—Fine woody debris with a transect diameter ≤0.24 inches.

Growing-stock trees—Live large-diameter timber species (excludes nonsaw-log species) trees with one-third or more of the gross board-foot volume in the entire saw-log portion meeting grade, soundness, and size requirements or the potential to do so for medium-diameter and small-diameter trees. A growing-stock tree must have one 12-foot log or two noncontiguous 8-foot merchantable logs, now (large diameter) or prospectively (medium diameter and small diameter), to qualify as growing stock.

Hardwoods—Tree species belonging to the botanical divisions Magnoliophyta, Ginkgophyta, Cycadophyta, or Pteridophyta, usually angiospermic, dicotyledonous, broad-leaved and deciduous.

Soft hardwoods—Hardwood species with an average specific gravity of ≤0.50, such as gums, yellow-poplar, cottonwoods, red maple, basswoods, and willows.

Hard hardwoods—Hardwood species with an average specific gravity >0.50, such as oaks, hard maples, hickories, and beech.

Hot check—An inspection normally done as part of the training process. The inspector is present on the plot with the trainee and provides immediate feedback regarding data quality. Data errors are corrected. Hot checks can be done on training plots or production plots. See: Quality assurance and quality control.

Land—The area of dry land and land temporarily or partly covered by water, such as marshes, swamps, and river flood plains.

Land cover—The dominant vegetation or other kind of material that covers the land surface. A given land cover may have many land uses.

Land use—The purpose of human activity on the land; it is usually, but not always, related to land cover.

Southern regional present land use categories are as follows:

Accessible timberland—Land that is within the population of interest, is accessible, is on a subplot that can be occupied at subplot center, can safely be visited, and meets the criteria for forest land (see: forest land).

Accessible other forest land—Land that meets the definition of accessible forest land, but is incapable of producing 20 cubic feet per acre per year of industrial wood under natural conditions because of adverse site conditions. Adverse conditions include sterile soils, dry climate, poor drainage, high elevation, steepness and soil rockiness.

Agricultural land—Land managed for crops, pasture, or other agricultural use. The area must be at least 1.0 acre in size and 120 feet wide (with the exception of windbreak/shelterbelt, which has no minimum width). This land use includes cropland, pasture (improved through cultural practices), idle farmland, orchard, Christmas tree plantation, maintained wildlife opening, and windbreak/shelterbelt.

Rangeland—Land primarily composed of grasses, forbs, or shrubs. This includes lands vegetated naturally or artificially to provide a plant cover managed like native vegetation and does not meet the definition of pasture. The area must be at least ≥1.0 acre in size and ≤120 feet wide.

Developed—Land used primarily by humans for purposes other than forestry or agriculture. This land use includes cultural (business, industrial/commercial, residential, and other places of intense human activity), rights-of-way (improved roads, railway, power lines, maintained canal), recreation (parks, skiing, golf courses), and mining.

A mix of forest and agricultural land represents forest fragmentation over Sumter County, SC.

Other—Land parcels ≥1.0 acre in size and ≥120 feet wide, which do not fall into one of the uses described above. Examples include undeveloped beaches, barren land (rock, sand), marshes, bogs, ice, and snow. This land use includes nonvegetated, wetland, beach, and nonforest-chaparral.

Census water—Rivers and streams that are >200 feet wide and bodies of water >4.5 acres in size.

Noncensus water—Rivers, streams and other bodies of water that do not meet the requirements for census water.

Nonsampled—Not sampled due to denied access, hazardous conditions, being outside the U.S. or other reasons.

Large-diameter trees—Softwoods ≥9.0 inches d.b.h. and hardwoods ≥11.0 inches d.b.h. These trees were called sawtimber-sized trees in prior surveys. See: Stand-size class.

Litter—Undecomposed or only partially decomposed organic material that can be readily identified (e.g., plant leaves, twigs, etc.).

Main stem—The central portion of the tree extending from the ground level to the tip for timber species. For woodland species the main stem extends from the ground level to the tips of all branches of qualifying stems. For timber species trees that fork, the main stem follows the fork that would yield the most merchantable volume.

Measurement quality objective (MQO)—A data user's estimate of the precision, bias, and completeness of data necessary to satisfy a prescribed application (e.g., Resource Planning Act, assessments by State foresters, forest planning, forest health analyses). Describes the acceptable tolerance for each data element. MQOs consist of two parts: a statement of the tolerance and a percentage of time when the collected data are required to be within tolerance. MQOs can only be assigned where standard methods of sampling or field measurements exist, or where experience has established upper or lower bounds on precision or bias. MQOs can be set for measured data elements, observed data elements, and derived data elements.

Medium-diameter tree—Softwood timber species 5.0 to 8.9 inches d.b.h. and hardwood timber species 5.0 to 10.9 inches d.b.h. These trees were called poletimber-sized trees in prior surveys. See: Stand-size class.

Microplot—A circular, fixed-radius plot with a radius of 6.8 feet (0.003 acre) that is used to sample trees <5.0 inches d.b.h./d.r.c., as well as other vegetation. Point center is 90 degrees and 12 feet offset from point center of each subplot.

National forest land—See: Ownership.

Noncensus water—See: Land use.

Nonforest land—Land that does not support or has never supported, forests, and lands formerly forested where use for timber management is precluded by development for other uses. Includes areas used for crops, improved pasture, residential areas, city parks, improved roads of any width and adjoining rights-of-way, power line clearings of any width, and noncensus water. If intermingled in forest areas, unimproved roads and nonforest strips must be ≥120 feet wide, and clearings, etc., ≥1.0 acre in size, to qualify as nonforest land.

Nonindustrial private forest land—See: Ownership.

Other forest land—Forest land other than timberland and reserved forest land. It includes available and reserved forest land that is incapable of producing 20 cubic feet per acre per year of wood under natural conditions because of adverse site conditions such as sterile soils, dry climate, poor drainage, high elevation, steepness, or rockiness.

Other public land—See: Ownership.

Other removals—The volume of trees removed from the inventory by cultural operations such as timber stand improvement, land clearing, and other changes in land use, resulting in the removal of the trees from timberland.

Ownership—A legal entity having control of a parcel or group of parcels of land. An ownership may be an individual; a combination of persons; a legal entity such as corporation, partnership, club, or trust; or a public agency.

National forest land—Federal land that has been legally designated as national forests or purchase units, and other land under the administration of the Forest Service, including experimental areas and Bankhead-Jones Title III land.

Forest industry land—An ownership class of private lands owned by a company or an individual(s) operating a primary wood-processing plant.

Nonindustrial private forest (NIPF) land—Privately owned land excluding forest industry land.

Corporate—Owned by corporations, including incorporated farm ownerships.

Individual—All lands owned by individuals, including farm operators.

Other public—An ownership class that includes all public lands except national forests.

Miscellaneous Federal land—Federal land other than national forests.

State, county, and municipal land—Land owned by States, counties, and local public agencies or municipalities, or land leased to these governmental units for 50 years or more.

Phase 1 (P1)—FIA activities related to remote sensing, the primary purpose of which is to label plots and obtain stratum weights for population estimates.

Phase 2 (P2)—FIA activities conducted on the network of ground plots. The primary purpose is to obtain field data that enable classification and summarization of area, tree, and other attributes associated with forest land uses.

Phase 3 (P3)—A subset of Phase 2 plots where additional attributes related to forest health are measured.

Plantation—Stands that currently show evidence of being planted or artificially seeded.

Poletimber-sized tree—Softwood timber species 5.0 to 8.9 inches d.b.h. and hardwood timber species 5.0 to 10.9 inches d.b.h. Now referred to as medium-diameter trees.

Private land—See: Ownership.

Productivity class—A classification of forest land in terms of potential annual cubic-foot volume growth per acre at culmination of mean annual increment (MAI) in fully stocked natural stands.

Quality assurance (QA)—The total integrated program for ensuring that the uncertainties inherent in FIA data are known and do not exceed acceptable magnitudes, within a stated level of confidence. Quality assurance encompasses the plans, specifications, and policies affecting the collection, processing, and reporting of data. It is the system of activities designed to provide program managers and project leaders with independent assurance that total system quality control is being effectively implemented.

Quality control (QC)—The routine application of prescribed field and laboratory procedures (e.g., random check cruising, periodic calibration, instrument maintenance, use of certified standards, etc.) in order to reduce random and systematic errors and ensure that data are generated within known and acceptable performance limits. Quality control also ensures the use of qualified personnel; reliable equipment and supplies; training of personnel; good field and laboratory practices; and strict adherence to standard operating procedures.

Reserved forest land—Forest land where management for the production of wood products is prohibited through statute or administrative designation. Examples include national forest wilderness areas and national parks and monuments.

Reversion—Land that reverts from a nonforest land use to a forest land use.

Sapling—Live trees 1.0 to 4.9 inches d.b.h./d.r.c.

Seedling—Live trees <1.0 inch d.b.h./d.r.c. that are ≥6.0 inches in height for softwoods and ≥12.0 inches in height for hardwoods and >0.5 inch d.b.h./d.r.c. at ground level for longleaf pine.

Site index—The average total height that dominant and codominant trees in fully-stocked, even-aged stands will obtain at key ages (usually 25 or 50 years).

Small-diameter trees—Trees 1.0 to 4.9 inches in d.b.h./d.r.c. These were called sapling-seedling sized trees in prior surveys. See: Stand-size class.

Softwoods—Tree species belonging to the botanical division Coniferophyta, usually evergreen having needles or scale-like leaves.

Species group—A collection of species used for reporting purposes.

Stand—Vegetation or a group of plants occupying a specific area and sufficiently uniform in species composition, age arrangement, structure, and condition as to be distinguished from the vegetation on adjoining areas.

Stand age—A stand descriptor that indicates the average age of the live dominant and codominant trees in the predominant stand-size class of a condition.

Standing dead tree—A dead tree ≥5.0 inches d.b.h. that has a bole which has an unbroken actual length of at least 4.5 feet, and lean <45 degrees from vertical as measured from the base of the tree to 4.5 feet.

Stand origin—A classification of forest stands describing their means of origin.

Planted—Planted or artificially seeded.

Natural—No evidence of artificial regeneration.

Stand-size class—A classification of forest land based on the diameter-class distribution of live trees in the stand. See definitions of large-, medium-, and small-diameter trees.

Large-diameter stands—Stands at least 10 percent stocked with live trees, with one-half or more of total stocking in large- and medium-diameter trees, and with large-diameter tree stocking at least equal to medium-diameter tree stocking.

Medium-diameter stands—Stands at least 10 percent stocked with live trees, with one-half or more of total stocking in medium- and large-diameter trees, and with medium-diameter tree stocking exceeding large-diameter tree stocking.

Small-diameter stands—Stands at least 10 percent stocked with live trees, in which small-diameter trees account for more than one-half of total stocking.

Nonstocked stands—Stands <10 percent stocked with live trees.

State, county, and municipal land—See: Ownership.

Stocking—(1) At the tree level, stocking is the density value assigned to a sampled tree (usually in terms of numbers of trees or basal area per acre), expressed as a percent of the total tree density required to fully utilize the growth potential of the land. (2) At the stand level, stocking refers to the sum of the stocking values of all trees sampled.

Subplot—A circular area with a fixed horizontal radius of 24.0 feet (1/24 acre), primarily used to sample trees ≥5.0 inches at d.b.h./d.r.c.

Survivor tree—A sample tree alive at both the current and previous inventories.

Timberland—Forest land that is producing or capable of producing 20 cubic feet per acre or more per year of wood at culmination of MAI. Timberland excludes reserved forest lands.

Treatment—Forestry treatments are a form of human disturbance. The term treatment further implies that a silvicultural application has been prescribed. This does not include occasional stumps of unknown origin or sparse removals for firewood, Christmas trees, or other miscellaneous purposes. The area affected by any treatment must be at least 1.0 acre in size.

None—No observable treatment.

Cutting—The removal of one or more trees from a stand. SRS FIA categories are the following:

Clearcut harvest—The removal of the majority of the merchantable trees in a

stand; residual stand stocking is under 50 percent.

Partial harvest—Removal primarily consisting of highest quality trees. Residual consists of lower quality trees because of high grading or selection harvest (e.g. uneven aged, group selection, high grading, species selection).

Seed-tree/shelterwood harvest—Crop trees are harvested leaving seed source trees either in a shelterwood or seed tree. Also includes the final harvest of the seed trees.

Commercial thinning—The removal of trees (usually of medium-diameter) from medium-diameter stands leaving sufficient stocking of growing-stock trees to feature in future stand development. Also included are thinning in large-diameter stands where medium-diameter trees have been removed to improve quality of those trees featured in a final harvest.

Timber stand improvement (cut trees only)—The cleaning, release, or other stand improvement involving noncommercial cutting applied to an immature stand that leaves sufficient stocking.

Salvage cutting—The harvesting of dead or damaged trees or of trees in danger of being killed by insects, disease, flooding, or other factors in order to save their economic value.

Site preparation—Clearing, slash burning, chopping, disking, bedding, or other practices clearly intended to prepare a site for either natural or artificial regeneration.

Artificial regeneration—Following a disturbance or treatment (usually cutting), a new stand where at least 50 percent of the live trees present resulted from planting or direct seeding.

Natural regeneration—Following a disturbance or treatment (usually cutting), a new stand where at least 50 percent of the live trees present (of any size) were established through the growth of existing trees and/or natural seeding or sprouting.

Other silvicultural treatment—The use of fertilizers, herbicides, girdling, pruning, or other activities designed to improve the commercial value of the residual stand, or chaining, which is a practice used on woodlands to encourage wildlife forage.

Tree—A woody perennial plant, typically large, with a single well-defined stem carrying a more or less definite crown; sometimes defined as attaining a minimum diameter of 3 inches and a minimum height of 15 feet at maturity. For FIA, any plant on the tree list in the current field manual is measured as a tree.

Tree class—An assessment of the general quality of a tree.

Cull species—Species measured at d.r.c. and timber species (measured at d.b.h.) that would not produce saw-logs. See national list of nonsaw-log species.

Growing stock—Live large-diameter timber species (excludes nonsaw-log species) trees with one-third or more of the gross board-foot volume in the entire saw-log portion meeting grade, soundness, and size requirements or the potential to do so for medium-diameter trees. A growing-stock tree must have one 12-foot log or two noncontiguous 8-foot merchantable logs, now (large-diameter) or prospectively (medium-diameter), to qualify as growing stock.

Rough cull—Trees that do not contain at least one 12-foot saw log or two 8-foot logs now or prospectively, primarily because of roughness or poor form. Less than ⅓ of its gross board-foot volume meets size, soundness, and grade

Multifamily construction was the first housing sector to rebound following the recent recession and housing downturn. The State's forest resource will support expansion of lumber and other forest products that utilize large-diameter trees.

requirements and <½ of the cubic-foot cull is rotten or unsound.

Rotten cull—Trees that do not contain at least one 12-foot saw log or two 8-foot logs now or prospectively and/or do not meet grade specifications for percent sound primarily because of rot. All species not having ⅓ or more of its gross board-foot volume meeting size, soundness, and grade requirements, and over ½ of the cubic-foot cull is rotten or unsound.

Tree grade—A classification of the saw-log portion of large-diameter trees based on: (1) the grade of the butt log, or (2) the ability to produce at least one 12-foot or two 8-foot logs in the upper section of the saw-log portion. Tree grade is an indicator of quality; grade 1 is the best quality.

Volume—A measure of the solid content of the tree stem used to measure wood quantity.

Gross board-foot volume—Total board-foot volume of wood inside bark without deductions for total board-foot cull.

Gross cubic-foot volume—Total cubic-foot volume of wood inside bark without deductions for rotten, missing, or broken-top cull.

Net board-foot volume—Gross board-foot volume minus deductions for total board-foot cull.

Net cubic-foot volume—Gross cubic-foot volume minus deductions for rotten, missing, and broken-top cull.

INVENTORY METHODS

The South Carolina 2011 inventory was a three-phase, fixed-plot design conducted on an annual basis. Phase 1 (P1) provides the area estimates for the inventory. Phase 2 (P2) involves on-the-ground measurements of sample plots by field personnel. Phase 3 (P3) is a subset of the P2 plot system where additional measurements are made by field personnel to aid in the assessment of forest health. The three phases of the sampling method are based on a hexagonal-grid design, with successive phases being sampled with less intensity. There are 16 P2 hexagons for every P3 hexagon. P2 and P3 hexagons represent about 6,000 and 96,000 acres, respectively. Methods for P2 and P3 are documented in the field guide (U.S. Department of Agriculture Forest Service 2015).

Under the annual inventory system, 20 percent (1 panel) of the total number of plots in a State are measured every year over a 5-year period (1 cycle). Each panel of plots is selected on a subgrid which is slightly offset from the previous panel, so that each panel covers essentially the same sample area (both spatially and in intensity) as the prior panel. In the sixth year, the plots that were measured in the first panel are remeasured. This marks the beginning of the next cycle of data collection. After field measurements are completed, a cycle of data is available for the 5-year report.

Bottomland hardwood forest in Congaree National Park in Richland County, SC, the largest intact expanse of old growth bottomland hardwoods remaining in the Southeastern United States. The park supports the growth of several national and State champion trees.

Phase 1

For the 2011 inventory of South Carolina, the P1 forest area estimate was based on classifying National Land Cover Database (NLCD) points. Stratification of forest and nonforest was performed at the unit level. Area estimation of all lands and ownerships was based on the probability of selection of P2 plot locations. As a result, the known forest land area (for specific ownerships) does not always agree with area estimates based on probability of selection. For example, the acreage of national forests, published by the National Forest System, will not agree exactly with the statistical estimate of national forest land derived by Forest Inventory and Analysis (FIA). These numbers could differ substantially for very small areas. In addition, the 2011 area estimates, especially at the county level, have higher sampling errors than those prior to the 2006 survey because of the switch from dot counts to NLCD for area estimates. Further explanation of this change can be found in Conner and others (2009).

Phase 2

Bechtold and Patterson (2005) describe P2 and P3 ground plots and explain their use. These plots are clusters of four points arranged so that one point is central and the other three lie 120 feet from it at azimuths of 0, 120, and 240 degrees (fig. A.1). Each point is the center of a circular subplot with a fixed 24-foot radius. Trees ≥5.0 inches diameter at breast height (d.b.h.) are measured in these subplots. Each subplot in turn contains a circular microplot with a fixed 6.8-foot radius. Trees 1.0– 4.9 inches d.b.h. and seedlings (<1.0 inch d.b.h.) are measured in these microplots.

Sometimes a plot cluster straddles two or more land use or forest condition classes (Bechtold and Patterson 2005). There are seven condition-class variables that require mapping of a unique condition on a plot: land use, forest type, stand size, ownership, stand density, regeneration status, and reserved status. A new condition is defined and mapped each time one of these variables changes during plot measurement.

Phase 3

Data on forest health variables (P3) are collected on about $1/16^{th}$ of the P2 sample plots. P3 data are coarse descriptions and are meant to be used as general indicators of overall forest health over large geographic areas. P3 data collection includes variables pertaining to tree crown health and down woody material (DWM), and foliar ozone injury. Tree crown health and DWM measurements are collected by using the same plot design used during P2 data collection (fig. A.1).

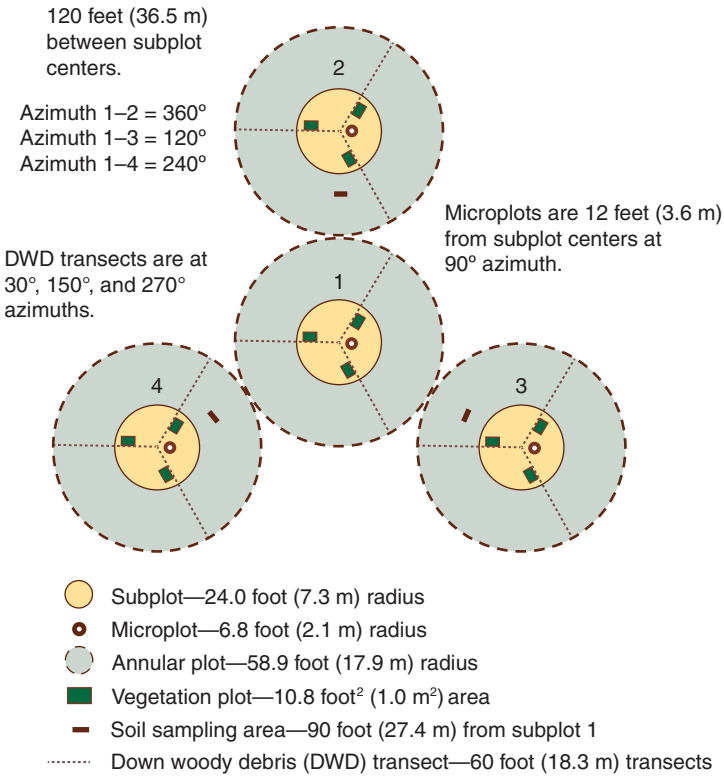

Figure A.1—Layout of fixed-radius plot.

Biomonitoring sites for ozone data collection are located independently of the FIA plot grid. Sites must be 1-acre fields or similar open areas adjacent to or surrounded by forest land, and must contain a minimum number of plants of at least two identified bioindicator species (U.S. Department of Agriculture Forest Service 2015). Plants are evaluated for ozone injury, and voucher specimens are submitted to a regional expert for verification of ozone-induced foliar injury.

Due to budgetary constraints, only four-fifths of the P3 data were collected in the 2011 survey. As a result, the number of plots and the comparability of data across surveys were reduced.

SUMMARY

Users wishing to make rigorous comparisons of data between surveys should be aware of any changes in methodologies between measurements. The most valuable and powerful trend information is obtained when the same plots are revisited from one survey to the next and measured in the same way. Determining the strength of a trend, or determining the level of confidence associated with a trend, is difficult or impossible when sampling methods change over time.

A poletimber pine stand in Williamsburg County, SC, displays timber heavily damaged by a winter storm.

A young hardwood stand located in the 1,590 acre Woods Bay State Natural Area in Sumter and Clarendon Counties, SC.

DATA RELIABILITY

A relative standard of accuracy has been incorporated into the forest survey. This standard satisfies user demands, minimizes human and instrumental sources of error, and keeps costs within prescribed limits. The two primary types of error are measurement error and sampling error.

Measurement Error

There are three elements of measurement error: (1) biased error, caused by instruments not properly calibrated; (2) compensating error, caused by instruments of moderate precision; and (3) accidental error, caused by human error in measuring and compiling. All of these are held to a minimum by the Forest Inventory and Analysis (FIA) quality assurance (QA) program. The goal of the QA program is to provide a framework of quality control procedures to assure the production of complete, accurate, and unbiased forest assessments for given standards. These methods include use of nationally standardized field manuals, use of portable data recorders, thorough entry-level training, periodic review training, supervision, use of check plots, editing checks, and an emphasis on careful work. Additionally, data quality is assessed and documented by using performance measurements and post-survey assessments. These assessments are then used to identify areas of the data collection process that need improvement or refinement in order to meet the program's quality objectives.

Each variable collected by FIA is assigned a measurement quality objective (MQO) and a measurement tolerance level. The MQOs are documented in the FIA National Field Manual (U.S. Department of Agriculture Forest Service 2015). In some instances, the MQOs are a "best guess" of what experienced field crews should be able to consistently achieve. Tolerances are somewhat arbitrary and are based on the crews' ability to make repeatable measurements or observations within the assigned MQO.

Evaluation of field crew performance is accomplished by calculating the differences between data collected by the field crew and data collected by the QA crew on blind-check plots. Results of these calculations are compared to the established MQOs. In the analysis of blind-check data, an observation is within tolerance when the difference between the field crew observation and the QA crew observation does not exceed the assigned tolerance for that variable. For many categorical variables, the tolerance is "no error" allowed, so only observations that are identical are within the tolerance level. Tables B.1, B.2, and B.3 show the results of various blind checks for South Carolina.

Table B.1—Results of plot and condition-level blind checks for South Carolina and the Southern Region, 2011

Variable	South Carolina		Southern Region	
	Observations	Tolerance	Observations	Tolerance
	number	*percent*	*number*	*percent*
Plot variables				
Plot status	12	100.0	191	100.0
Plot nonsampled reason	0	—	0	—
Sample kind	6	100.0	185	100.0
Distance to road	12	75.0	148	74.3
Water on plot	6	66.7	16	81.3
Plot in correct county	12	100.0	191	100.0
Corrected county	0	—	0	—
Number of accessible forest land conditions	6	100.0	148	94.6
Number of subplot centers reverted	0	—	3	66.7
Distance to urban	6	33.3	148	60.8
Distance to agriculture	6	66.7	148	71.6
Plot accessibility	6	100.0	12	58.3
Condition variables				
Condition status	20	100.0	279	100.0
Condition nonsampled reason	0	—	1	100.0
Reserved status	16	100.0	215	99.5
Owner group	16	100.0	215	98.6
Forest type	16	87.5	212	75.9
Forest-type group	16	93.8	212	85.4
Stand-size class	16	81.3	215	82.8
Regeneration status	16	100.0	215	96.7
Tree density	16	100.0	215	100.0
Artificial regeneration species	4	75.0	64	96.9
Owner class	16	100.0	215	94.9
Private owner industrial status	14	100.0	171	94.2
Stand age	16	75.0	212	49.5
Disturbance 1	16	100.0	215	90.7
Disturbance year 1	0	—	17	82.4
Disturbance 2	0	—	17	100.0
Disturbance year 2	0	—	1	0.0
Disturbance 3	0	—	1	100.0
Disturbance year 3	0	—	0	—
Treatment 1	16	100.0	215	92.6
Treatment year 1	0	—	42	69.0
Treatment 2	0	—	42	88.1
Treatment year 2	0	—	13	92.3
Treatment 3	0	—	13	92.3
Treatment year 3	0	—	8	87.5
Physiographic class	16	100.0	215	77.7
Present land use	16	100.0	215	97.2
Total acres	12	91.7	142	97.2

continued

Table B.1—Results of plot and condition-level blind checks for South Carolina and the Southern Region, 2011 (continued)

Variable	South Carolina		Southern Region	
	Observations	Tolerance	Observations	Tolerance
	number	*percent*	*number*	*percent*
Condition variables				
Percent forest	12	91.7	123	87.0
Stand structure	16	100.0	215	88.8
Operability	16	100.0	215	83.7
Site class	16	100.0	215	76.7
Fire	16	100.0	215	94.4
Grazing	16	100.0	215	96.3
Subplot variables				
Subplot nonsampled reason	0	—	1	0.0
Subplot center condition	48	97.9	660	96.4
Microplot center condition	47	100.0	637	100.0
Subplot slope	34	91.2	546	90.1
Subplot aspect	34	64.7	546	67.6
Snow/water depth	34	100.0	546	99.1
Boundary variables				
Existence of change	3	66.7	0	—
Boundary change	3	66.7	15	86.7
Contrasting condition	4	100.0	76	93.4
Left azimuth	2	100.0	15	60.0
Right azimuth	2	100.0	15	53.3
Existence of corner	2	100.0	15	80.0
Corner azimuth	0	—	2	0.0
Corner distance	0	—	2	50.0
Boundary status	4	100.0	76	98.7

— = no value for the cell.

Table B.2—Results of tree and seedling blind checks for South Carolina and the Southern Region, 2011

Variable	South Carolina		Southern Region	
	Observations	Tolerance	Observations	Tolerance
	number	*percent*	*number*	*percent*
Tree variables				
Condition number	223	99.6	2,718	97.7
Azimuth	205	90.2	2,417	88.4
Horizontal distance	203	98.0	2,414	94.8
Present tree status	223	99.6	2,718	99.2
Reconcile	27	100.0	379	98.7
Standing dead	10	90.0	198	99.5
Species	223	96.9	2,718	94.7
Genus	223	98.7	2,718	98.8
Live d.b.h.	187	81.3	2,234	68.8
Sound dead d.b.h.	0	—	19	68.4
Decayed dead d.b.h.	0	—	45	95.6
Live rotten/missing cull	1	0.0	131	80.9
Dead rotten/missing cull	0	—	41	65.9
Number of d.r.c. stems	3	100.0	82	100.0
Root collar diameter	3	66.7	82	63.4
Total length	190	85.3	1,614	79.3
Live tree actual length	1	100.0	18	50.0
Dead tree actual length	1	100.0	40	80.0
Crown class	190	84.2	2,307	81.1
Compacted crown ratio	190	63.7	2,302	75.8
Cause of death	2	50.0	289	90.7
Mortality year	2	100.0	289	100.0
Decay class	10	100.0	198	96.0
Tree class	179	88.3	2,307	89.1
Tree grade	61	55.7	379	68.6
Board foot cull	61	59.0	379	72.8
Dieback incidence	124	96.8	1,477	97.2
Dieback severity	0	—	5	60.0
Utilization class	14	100.0	172	97.1
Seedling variables				
Species	52	88.5	645	90.2
Genus	52	98.1	645	98.3
Count	52	69.2	645	65.6
Invasive cover	11	72.7	162	56.8

d.b.h. = diameter at breast height; d.r.c. = diameter at root collar.
— = no value for the cell.

Table B.3—Results of various blind checks for South Carolina and the Southern Region, 2011

Variable	South Carolina			Southern Region		
	Observations found by both	Observations found by cruiser	Observations found by QA	Observations found by both	Observations found by cruiser	Observations found by QA
	number					
Missing/extra tree	223	1	0	2,745	25	42
Seedlings	52	6	12	645	96	155
Invasive species	11	20	7	162	141	66

QA = quality assurance.

Sampling Error

Sampling error is associated with the natural and expected deviation of the sample from the true population mean. This deviation is susceptible to a mathematical evaluation of the probability of error. Sampling errors for State totals are based on one standard deviation. That is, there is a 68.27-percent probability that the confidence interval given for each sample estimate will cover the true population mean (table B.4)

The size of the sampling error generally increases as the size of the area examined decreases. Also, as area or volume totals are stratified by forest type, species, diameter class, ownership, or other subunits, the sampling error may increase and be greatest for the smallest divisions. However, there may be instances where a smaller component does not have a proportionately larger sampling error. This can happen when the post-defined strata are more homogeneous than the larger strata, thereby having a smaller variance. For specific post-defined strata the sampling error can be calculated by using the following formula. Sampling errors obtained by this method are only approximations of reliability because this process assumes constant variance across all subdivisions of totals.

$$SE_s = SE_t \frac{\sqrt{X_t}}{\sqrt{X_s}}$$

where

SE_s = sampling error for subdivision of survey unit or State total

SE_t = sampling error for survey unit or State total

X_s = sum of values for the variable of interest (area or volume) for subdivision of survey unit or State

X_t = total area or volume for survey unit or State

For example, the estimate of sampling error for softwood live-tree volume in the 9.0–10.9 inch d.b.h. class is computed as:

$$SE_s = 2.4\% \left[\frac{\sqrt{12{,}159.6}}{\sqrt{2{,}152.9}} \right] = 5.7\%$$

Thus, the estimated sampling error is 5.7 percent, and the resulting 68.27-percent confidence interval for softwood live-tree volume in the 9.0–10.9 inch d.b.h. class is 2,152.9 ± 122.8 million cubic feet.

Table B.4—Statistical reliability for South Carolina, 2011

Item	Sample estimate and 68.27-percent confidence interval	Sampling error
		percent
Area (*thousand acres*)		
Forest land	13,120.5 ± 99.1	0.76
Southern Coastal Plain	3,502.0 ± 52.9	1.51
Northern Coastal Plain	4,955.7 ± 60.0	1.21
Piedmont	4,662.8 ± 58.8	1.26
Number of trees on forest land (*million trees*)		
Number of live trees[a]	10,110.8 ± 181.2	1.79
Softwoods	3,060.0 ± 104.0	3.40
Loblolly pine	2,394.5 ± 96.3	4.02
Eastern redcedar	205.5 ± 16.7	8.13
Longleaf pine	200.6 ± 27.4	13.66
Hardwoods	7,050.9 ± 143.8	2.04
Sweetgum	1,658.3 ± 61.5	3.71
Red maple	934.9 ± 46.8	5.01
Water oak	739.6 ± 39.1	5.29
Number of standing dead trees[b]	86.3 ± 2.8	3.26
Biomass on forest land (*million short tons*)		
Aboveground dry weight of live trees[a]	597.8 ± 8.7	1.45
Volume on forest land (*million cubic feet*)		
Net volume of live trees[b]	24,123.2 ± 389.1	1.61
Softwoods	12,159.6 ± 291.8	2.40
Loblolly pine	9,890.5 ± 279.9	2.83
Longleaf pine	590.5 ± 71.9	12.17
Shortleaf pine	355.0 ± 32.2	9.06
Hardwoods	11,963.6 ± 331.4	2.77
Sweetgum	2,179.9 ± 100.5	4.61
Yellow-poplar	1,048.3 ± 84.4	8.05
Red maple	948.2 ± 58.0	6.12
Growth, removals, and mortality on forest land (*million cubic feet per year*)		
Annual net growth of live trees[b]	1,289.5 ± 24.8	1.92
Softwoods	914.6 ± 24.0	2.62
Hardwoods	393.5 ± 13.2	3.36
Annual mortality of trees[b]	171.3 ± 7.6	4.46
Softwoods	80.9 ± 5.4	6.71
Hardwoods	90.4 ± 5.6	6.15
Annual removals of live trees[b]	834.0 ± 46.1	5.52
Softwoods	621.0 ± 37.3	6.00
Hardwoods	212.6 ± 24.8	11.67

d.b.h. = diameter at breast height.
[a] Trees that are ≥1.0 inch d.b.h.
[b] Trees that are ≥5.0 inches d.b.h.

The scenic Little Eastatoee Creek at Long Shoals Wayside Park on Poe Creek State Forest in Pickens County, SC.

Table C.1—Area by survey unit and land status, South Carolina, 2011

Survey unit	Total area	All forest land	Unreserved			Reserved			Nonforest land	Census water
			Total	Timber-land	Un-productive	Total	Productive	Un-productive		
	thousand acres									
Southern Coastal Plain	5,516.3	3,502.0	3,481.6	3,477.5	4.1	20.4	20.4	0.0	1,661.9	352.4
Northern Coastal Plain	8,112.8	4,955.7	4,868.5	4,854.7	13.8	87.2	87.2	0.0	2,493.2	663.9
Piedmont	6,863.8	4,662.8	4,617.6	4,609.3	8.3	45.2	45.2	0.0	2,035.1	165.9
All survey units	20,492.8	13,120.5	12,967.7	12,941.5	26.2	152.8	152.8	0.0	6,190.1	1,182.2

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.

Table C.2—Area of forest land by ownership class and land status, South Carolina, 2011

Ownership class	All forest land	Unreserved			Reserved		
		Total	Timberland	Un-productive	Total	Productive	Un-productive
	thousand acres						
U.S. Forest Service							
National forest	598.8	581.1	581.1	0.0	17.8	17.8	0.0
Other Forest Service	6.1	6.1	6.1	0.0	0.0	0.0	0.0
Total	604.9	587.1	587.1	0.0	17.8	17.8	0.0
Other Federal							
National Park Service	34.1	0.0	0.0	0.0	34.1	34.1	0.0
U.S. Fish and Wildlife Service	72.7	0.0	0.0	0.0	72.7	72.7	0.0
Dept. of Defense/Dept. of Energy	320.1	314.4	308.2	6.3	5.6	5.6	0.0
Other Federal	3.2	3.2	3.2	0.0	0.0	0.0	0.0
Total	430.1	317.7	311.4	6.3	112.4	112.4	0.0
State and local government							
State	381.2	381.2	381.2	0.0	0.0	0.0	0.0
Local	177.1	154.5	154.5	0.0	22.6	22.6	0.0
Total	558.3	535.7	535.7	0.0	22.6	22.6	0.0
Forest industry							
Corporate	336.4	336.4	336.4	0.0	0.0	0.0	0.0
Total	336.4	336.4	336.4	0.0	0.0	0.0	0.0
Nonindustrial private							
Corporate	3,671.6	3,671.6	3,657.2	14.4	0.0	0.0	0.0
Conservation/natural resources organization	60.6	60.6	60.6	0.0	0.0	0.0	0.0
Unincorporated local partnership/ association/club	116.2	116.2	116.2	0.0	0.0	0.0	0.0
Native American	6.3	6.3	6.3	0.0	0.0	0.0	0.0
Individual	7,336.1	7,336.1	7,330.5	5.5	0.0	0.0	0.0
Total	11,190.8	11,190.8	11,170.9	19.9	0.0	0.0	0.0
All classes	13,120.5	12,967.7	12,941.5	26.2	152.8	152.8	0.0

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.

Table C.3—Area of forest land by forest-type group and site productivity class, South Carolina, 2011

Forest-type group	All classes	Site productivity class (*cubic feet/acre/year*) 0–19	20–49	50–84	85–119	120–164	165–224	225+
				thousand acres				
Softwood types								
White-red-jack pine	15.6	0.0	0.0	0.0	0.0	15.6	0.0	0.0
Longleaf-slash pine	524.7	0.0	167.4	224.7	114.4	14.0	4.2	0.0
Loblolly-shortleaf pine	5,541.9	10.8	165.1	1,423.4	1,841.9	1,254.5	842.4	4.1
Other eastern softwoods	15.4	0.0	1.5	10.5	0.0	0.0	3.3	0.0
Total softwoods	6,097.5	10.8	334.0	1,658.5	1,956.3	1,284.1	849.9	4.1
Hardwood types								
Oak-pine	1,544.8	0.0	139.4	572.0	540.2	198.4	94.9	0.0
Oak-hickory	2,874.8	4.1	258.5	1,560.2	669.1	283.8	99.1	0.0
Oak-gum-cypress	2,023.4	0.0	227.4	1,021.1	528.6	187.5	54.4	4.4
Elm-ash-cottonwood	451.7	9.9	30.3	252.6	90.5	51.6	16.7	0.0
Other hardwoods	10.3	0.0	0.0	10.3	0.0	0.0	0.0	0.0
Tropical hardwoods	1.5	0.0	0.0	1.5	0.0	0.0	0.0	0.0
Exotic hardwoods	22.3	0.0	0.0	14.9	5.8	1.6	0.0	0.0
Total hardwoods	6,928.8	14.0	655.6	3,432.8	1,834.1	722.8	265.1	4.4
Nonstocked	94.2	1.4	5.8	41.4	27.7	10.3	1.5	6.1
All groups	13,120.5	26.2	995.4	5,132.7	3,818.1	2,017.2	1,116.5	14.5

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.

Table C.4—Area of forest land by forest-type group and ownership group, South Carolina, 2011

Forest-type group	All ownerships	Ownership group				
		U.S. Forest Service	Other Federal	State and local government	Forest industry	Nonindustrial private
	thousand acres					
Softwood types						
White-red-jack pine	15.6	8.5	0.0	5.6	0.0	1.4
Longleaf-slash pine	524.7	23.4	92.8	81.0	0.0	327.5
Loblolly-shortleaf pine	5,541.9	326.9	144.0	103.6	165.4	4,802.1
Other eastern softwoods	15.4	0.0	0.0	0.0	0.0	15.4
Total softwoods	6,097.5	358.8	236.8	190.2	165.4	5,146.3
Hardwood types						
Oak-pine	1,544.8	70.6	44.4	84.7	13.3	1,331.8
Oak-hickory	2,874.8	69.9	39.8	136.1	17.4	2,611.7
Oak-gum-cypress	2,023.4	83.5	87.9	124.9	122.7	1,604.4
Elm-ash-cottonwood	451.7	19.5	18.1	14.8	16.0	383.3
Other hardwoods	10.3	2.7	0.0	0.0	0.0	7.6
Tropical hardwoods	1.5	0.0	1.5	0.0	0.0	0.0
Exotic hardwoods	22.3	0.0	1.6	0.0	0.0	20.7
Total hardwoods	6,928.8	246.1	193.3	360.4	169.5	5,959.5
Nonstocked	94.2	0.0	0.0	7.6	1.5	85.0
All groups	13,120.5	604.9	430.1	558.3	336.4	11,190.8

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.

Table C.5—Area of forest land by forest-type group and stand-size class, South Carolina, 2011

Forest-type group	All classes	Stand-size class			Non-stocked
		Large diameter	Medium diameter	Small diameter	
	thousand acres				
Softwood types					
White-red-jack pine	15.6	14.2	1.4	0.0	0.0
Longleaf-slash pine	524.7	264.2	104.8	155.7	0.0
Loblolly-shortleaf pine	5,541.9	2,754.7	1,921.4	865.8	0.0
Other eastern softwoods	15.4	4.7	5.8	4.9	0.0
Total softwoods	6,097.5	3,037.8	2,033.4	1,026.4	0.0
Hardwood types					
Oak-pine	1,544.8	664.8	424.7	455.3	0.0
Oak-hickory	2,874.8	1,395.5	564.8	914.5	0.0
Oak-gum-cypress	2,023.4	1,180.9	485.2	357.2	0.0
Elm-ash-cottonwood	451.7	255.8	74.4	121.5	0.0
Other hardwoods	10.3	0.0	0.0	10.3	0.0
Tropical hardwoods	1.5	1.5	0.0	0.0	0.0
Exotic hardwoods	22.3	5.8	7.3	9.2	0.0
Total hardwoods	6,928.8	3,504.3	1,556.4	1,868.1	0.0
Nonstocked	94.2	0.0	0.0	0.0	94.2
All groups	13,120.5	6,542.1	3,589.8	2,894.5	94.2

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.

Table C.6—Area of forest land by forest-type group and stand-age class, South Carolina, 2011

Forest-type group	All classes	Stand-age class (*years*) 1–20	21–40	41–60	61–80	81–100	101–120	121–140	141–160	161–180	181–200	201+	Non-stocked
						thousand acres							
Softwood types													
White-red-jack pine	15.6	0.0	2.8	7.1	5.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Longleaf-slash pine	524.7	171.1	118.9	109.2	77.8	47.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loblolly-shortleaf pine	5,541.9	2,293.2	2,425.2	513.9	237.9	59.1	10.6	0.0	0.0	0.0	0.0	0.0	2.0
Other eastern softwoods	15.4	6.4	4.7	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total softwoods	6,097.5	2,470.7	2,551.6	634.4	321.3	106.9	10.6	0.0	0.0	0.0	0.0	0.0	2.0
Hardwood types													
Oak-pine	1,544.8	576.2	397.6	299.9	204.3	48.6	5.6	0.0	0.0	0.0	0.0	0.0	12.6
Oak-hickory	2,874.8	931.8	516.9	624.1	563.7	210.6	10.8	0.0	0.0	0.0	0.0	0.0	17.0
Oak-gum-cypress	2,023.4	465.0	379.4	459.1	474.6	150.6	74.5	5.8	5.8	0.0	0.0	0.0	8.5
Elm-ash-cottonwood	451.7	137.4	96.9	98.5	76.8	35.9	6.1	0.0	0.0	0.0	0.0	0.0	0.0
Other hardwoods	10.3	10.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tropical hardwoods	1.5	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Exotic hardwoods	22.3	16.5	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total hardwoods	6,928.8	2,137.3	1,398.1	1,481.6	1,319.3	445.8	97.1	5.8	5.8	0.0	0.0	0.0	38.1
Nonstocked	94.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	94.2
All groups	13,120.5	4,608.0	3,949.7	2,116.0	1,640.7	552.7	107.7	5.8	5.8	0.0	0.0	0.0	134.2

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.

Table C.7—Area of forest land by forest-type group and stand origin, South Carolina, 2011

Forest-type group	Total	Stand origin	
		Natural stands	Artificial regeneration
	thousand acres		
Softwood types			
White-red-jack pine	15.6	15.6	0.0
Longleaf-slash pine	524.7	336.7	187.9
Loblolly-shortleaf pine	5,541.9	2,628.7	2,913.2
Other eastern softwoods	15.4	15.4	0.0
Total softwoods	6,097.5	2,996.4	3,101.2
Hardwood types			
Oak-pine	1,544.8	1,381.5	163.4
Oak-hickory	2,874.8	2,769.6	105.2
Oak-gum-cypress	2,023.4	2,017.0	6.3
Elm-ash-cottonwood	451.7	451.7	0.0
Other hardwoods	10.3	10.3	0.0
Tropical hardwoods	1.5	1.5	0.0
Exotic hardwoods	22.3	20.7	1.6
Total hardwoods	6,928.8	6,652.3	276.5
Nonstocked	94.2	85.2	9.0
All groups	13,120.5	9,733.8	3,386.7

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.

Table C.8—Area of forest land disturbed annually by forest-type group and disturbance class, South Carolina, 2011

Forest-type group	Disturbance class							
	Insects	Disease	Weather	Fire	Domestic animals	Wild animals	Human	Other natural
	thousand acres							
Softwood types								
White-red-jack pine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Longleaf-slash pine	0.0	1.2	0.0	19.4	0.0	0.0	0.0	0.0
Loblolly-shortleaf pine	6.8	2.7	6.3	58.2	0.0	0.0	4.5	3.4
Other eastern softwoods	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total softwoods	6.8	3.9	6.3	77.6	0.0	0.0	4.5	3.4
Hardwood types								
Oak-pine	0.0	0.0	0.8	11.0	1.6	2.5	3.0	0.0
Oak-hickory	0.0	0.3	2.5	10.4	1.2	3.3	8.3	0.0
Oak-gum-cypress	0.0	6.6	2.5	3.4	0.0	10.2	2.2	1.0
Elm-ash-cottonwood	0.0	0.0	2.2	0.0	0.0	0.6	0.4	0.0
Other hardwoods	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tropical hardwoods	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Exotic hardwoods	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total hardwoods	0.0	6.8	8.0	24.8	2.7	16.6	13.9	1.0
Nonstocked	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0
All groups	6.8	10.7	14.3	103.9	2.7	16.6	18.4	4.4

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.

Table C.9—Area of forest land treated annually by forest-type group and treatment class, South Carolina, 2011

Forest-type group[a]	Total treated	Treatment class: Cutting: Final harvest	Partial harvest	Seed-tree/ shelterwood harvest	Commercial thinning	Timber stand improvement	Salvage cutting
	thousand acres						
Softwood types							
White-red-jack pine	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Longleaf-slash pine	17.9	3.8	1.1	0.0	7.6	5.3	0.0
Loblolly-shortleaf pine	363.3	78.2	26.4	8.5	240.7	7.4	2.2
Other eastern softwoods	0.6	0.3	0.3	0.0	0.0	0.0	0.0
Total softwoods	381.8	82.3	27.8	8.5	248.3	12.7	2.2
Hardwood types							
Oak-pine	25.9	12.8	4.4	1.6	7.1	0.0	0.0
Oak-hickory	29.6	17.7	5.9	1.5	4.3	0.0	0.3
Oak-gum-cypress	35.9	26.4	5.9	0.0	3.6	0.0	0.0
Elm-ash-cottonwood	2.5	1.6	0.9	0.0	0.1	0.0	0.0
Other hardwoods	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tropical hardwoods	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Exotic hardwoods	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total hardwoods	94.0	58.4	17.0	3.1	15.1	0.0	0.3
Nonstocked	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All groups	475.7	140.7	44.8	11.6	263.4	12.7	2.5

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.
[a] Based on past conditions.

Table C.10—Area of forest land treated annually by forest-type group and treatment class, South Carolina, 2011

Forest-type group[a]	Treatment class			
		Regeneration		
	Site preparation	Artificial regeneration	Natural regeneration	Other silviculture
	thousand acres			
Softwood types				
White-red-jack pine	0.0	0.0	0.0	0.0
Longleaf-slash pine	1.0	0.9	0.5	4.2
Loblolly-shortleaf pine	29.6	35.6	23.3	14.5
Other eastern softwoods	0.0	0.0	0.0	0.0
Total softwoods	30.6	36.5	23.8	18.7
Hardwood types				
Oak-pine	14.7	11.2	15.7	2.2
Oak-hickory	5.7	8.1	34.2	4.1
Oak-gum-cypress	1.4	0.0	7.4	2.2
Elm-ash-cottonwood	0.2	0.0	1.4	0.0
Other hardwoods	0.0	0.0	0.0	0.0
Tropical hardwoods	0.0	0.0	0.0	0.0
Exotic hardwoods	0.0	0.0	0.0	0.0
Total hardwoods	22.0	19.3	58.7	8.5
Nonstocked	0.5	0.3	2.5	0.3
All groups	53.2	56.1	85.0	27.6

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.
[a] Based on current conditions.

Table C.11—Number of live trees on forest land by species group and diameter class, South Carolina, 2011

Species group	All classes	Diameter class (*inches*) 1.0–2.9	3.0–4.9	5.0–6.9	7.0–8.9	9.0–10.9	11.0–12.9	13.0–14.9	15.0–16.9	17.0–18.9	19.0–20.9	21.0–24.9	25.0–28.9	29.0–32.9	33.0–36.9	37.0+
	million trees															
Softwood																
Longleaf and slash pines	240.6	113.7	64.3	27.3	12.1	7.1	5.8	4.9	3.2	1.3	0.7	0.2	0.0	0.0	0.0	0.0
Loblolly and shortleaf pines	2,451.7	916.6	537.9	399.2	274.2	154.0	83.2	43.6	21.2	10.6	5.8	3.8	1.3	0.3	0.0	0.0
Other yellow pines	96.6	46.2	18.8	11.3	6.7	5.2	3.4	2.2	1.7	0.7	0.2	0.1	0.0	0.0	0.0	0.0
Eastern white and red pines	12.5	6.9	2.2	0.8	0.6	0.5	0.3	0.5	0.3	0.1	0.0	0.2	0.0	0.0	0.0	0.0
Eastern hemlock	8.0	4.7	1.3	0.6	0.4	0.5	0.2	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Cypress	44.7	14.8	5.5	4.5	4.4	4.9	3.6	2.7	2.3	0.8	0.4	0.7	0.0	0.1	0.0	0.0
Other eastern softwoods	205.8	147.5	30.1	16.5	7.0	2.5	1.2	0.6	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Total softwoods	3,060.0	1,250.3	660.0	460.2	305.6	174.7	97.7	54.5	28.9	13.8	7.2	5.2	1.5	0.4	0.1	0.0
Hardwood																
Select white oaks	166.4	88.2	32.7	12.6	8.6	6.1	5.3	4.2	2.9	2.2	1.5	1.2	0.4	0.3	0.1	0.0
Select red oaks	33.3	17.1	3.5	3.4	1.9	1.4	1.4	1.0	0.9	0.5	0.7	0.7	0.4	0.2	0.0	0.1
Other white oaks	187.1	121.3	31.1	11.7	8.1	4.7	3.3	2.2	1.7	0.9	0.7	0.8	0.1	0.2	0.1	0.1
Other red oaks	1,208.6	845.7	176.8	73.3	39.4	24.2	17.8	10.3	7.5	5.1	3.2	3.2	1.2	0.7	0.1	0.2
Hickory	235.8	161.3	33.7	16.1	9.0	6.1	4.0	2.6	1.5	1.0	0.2	0.3	0.0	0.0	0.0	0.0
Yellow birch	1.4	0.4	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hard maple	37.8	30.9	5.4	1.0	0.1	0.1	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Soft maple	934.9	690.9	140.7	49.3	23.8	12.4	6.7	4.8	2.8	1.3	0.9	1.0	0.2	0.0	0.0	0.0
Beech	27.3	17.4	5.9	1.9	0.8	0.4	0.5	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Sweetgum	1,658.3	1,192.3	266.3	93.5	44.8	25.5	14.8	8.5	5.5	3.3	1.9	1.6	0.3	0.0	0.0	0.0
Tupelo and blackgum	425.9	245.9	76.9	33.6	22.4	15.6	11.8	8.4	4.7	3.2	1.9	1.2	0.2	0.0	0.1	0.0
Ash	184.4	123.7	37.5	9.8	5.3	2.9	2.1	1.1	0.8	0.8	0.3	0.2	0.0	0.0	0.0	0.0
Cottonwood and aspen	10.6	7.0	0.9	0.7	0.6	0.4	0.2	0.1	0.2	0.1	0.0	0.1	0.0	0.0	0.0	0.0
Basswood	1.2	0.9	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow-poplar	173.6	101.0	27.1	13.5	8.9	6.4	4.3	3.5	2.7	2.2	1.3	1.9	0.6	0.1	0.1	0.0
Black walnut	1.8	0.0	0.5	0.4	0.3	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other eastern soft hardwoods	741.8	533.1	121.2	44.0	21.4	9.6	4.8	2.9	2.2	1.0	0.6	0.5	0.2	0.1	0.1	0.1
Other eastern hard hardwoods	425.8	341.3	60.0	17.0	5.0	1.7	0.5	0.3	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Eastern noncommercial hardwoods	594.8	457.6	92.2	27.6	10.6	4.5	1.4	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total hardwoods	7,050.9	4,976.0	1,113.1	409.5	211.2	122.3	79.2	51.0	33.7	22.0	13.3	12.6	3.8	1.7	0.8	0.6
All species	10,110.8	6,226.3	1,773.2	869.7	516.8	297.0	176.9	105.6	62.6	35.7	20.5	17.8	5.2	2.1	0.8	0.6

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.

Table C.12—Net[a] volume of live trees on forest land by ownership class and land status, South Carolina, 2011

Ownership class	All forest land	Land status					
		Unreserved			Reserved		
		Total	Timberland	Unproductive	Total	Productive	Unproductive
	million cubic feet						
U.S. Forest Service							
National forest	1,447.1	1,401.6	1,401.6	0.0	45.5	45.5	0.0
Other Forest Service	15.3	15.3	15.3	0.0	0.0	0.0	0.0
Total	1,462.4	1,416.9	1,416.9	0.0	45.5	45.5	0.0
Other Federal							
National Park Service	100.5	0.0	0.0	0.0	100.5	100.5	0.0
U.S. Fish and Wildlife Service	206.7	0.0	0.0	0.0	206.7	206.7	0.0
Dept. of Defense/Dept. of Energy	951.6	923.6	923.6	0.0	28.0	28.0	0.0
Other Federal	5.5	5.5	5.5	0.0	0.0	0.0	0.0
Total	1,264.3	929.0	929.0	0.0	335.3	335.3	0.0
State and local government							
State	832.1	832.1	832.1	0.0	0.0	0.0	0.0
Local	464.2	349.0	349.0	0.0	115.2	115.2	0.0
Total	1,296.3	1,181.2	1,181.2	0.0	115.2	115.2	0.0
Forest industry							
Corporate	689.1	689.1	689.1	0.0	0.0	0.0	0.0
Total	689.1	689.1	689.1	0.0	0.0	0.0	0.0
Nonindustrial private							
Corporate	6,470.5	6,470.5	6,467.5	3.0	0.0	0.0	0.0
Conservation/natural resources organization	103.6	103.6	103.6	0.0	0.0	0.0	0.0
Unincorporated local partnership/ association/club	170.2	170.2	170.2	0.0	0.0	0.0	0.0
Native American	6.5	6.5	6.5	0.0	0.0	0.0	0.0
Individual	12,660.2	12,660.2	12,660.2	0.1	0.0	0.0	0.0
Total	19,411.0	19,411.0	19,408.0	3.0	0.0	0.0	0.0
All classes	24,123.2	23,627.2	23,624.2	3.0	496.0	496.0	0.0

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.
[a] Excludes rotten, missing, and form cull defects volume.

Table C.13—Net[a] volume of live trees on forest land by forest-type group and stand-size class, South Carolina, 2011

Forest-type group	All size classes	Stand-size class			Non-stocked
		Large diameter	Medium diameter	Small diameter	
	million cubic feet				
Softwood types					
White-red-jack pine	78.5	72.6	5.9	0.0	0.0
Longleaf-slash pine	675.1	562.8	79.4	32.9	0.0
Loblolly-shortleaf pine	10,195.8	7,359.8	2,671.1	164.9	0.0
Other eastern softwoods	9.6	3.8	4.6	1.1	0.0
Total softwoods	10,958.9	7,999.0	2,761.0	198.9	0.0
Hardwood types					
Oak-pine	2,311.1	1,721.4	474.3	115.3	0.0
Oak-hickory	4,855.4	3,887.9	758.7	208.9	0.0
Oak-gum-cypress	5,063.5	4,222.6	749.3	91.6	0.0
Elm-ash-cottonwood	909.6	791.7	84.7	33.2	0.0
Other hardwoods	2.1	0.0	0.0	2.1	0.0
Tropical hardwoods	5.2	5.2	0.0	0.0	0.0
Exotic hardwoods	15.2	6.5	3.7	4.9	0.0
Total hardwoods	13,162.1	10,635.3	2,070.8	456.0	0.0
Nonstocked	2.2	0.0	0.0	0.0	2.2
All groups	24,123.2	18,634.3	4,831.8	654.9	2.2

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.
[a] Excludes rotten, missing, and form cull defects volume.

Table C.14—Net[a] volume of live trees on forest land by species group and ownership group, South Carolina, 2011

Species group	All ownerships	Ownership group				
		U.S. Forest Service	Other Federal	State and local government	Forest industry	Nonindustrial private
	million cubic feet					
Softwood						
Longleaf and slash pines	754.3	24.6	185.2	92.5	1.9	450.1
Loblolly and shortleaf pines	10,245.5	818.5	462.7	222.9	331.3	8,410.1
Other yellow pines	415.9	20.1	12.2	36.9	4.3	342.4
Eastern white and red pines	83.7	24.8	0.0	30.2	0.0	28.7
Eastern hemlock	35.3	8.6	0.0	16.7	0.0	10.1
Cypress	485.2	16.4	27.1	57.9	57.5	326.4
Other eastern softwoods	139.7	4.1	4.3	8.4	1.3	121.6
Total softwoods	12,159.6	917.1	691.4	465.5	396.2	9,689.3
Hardwood						
Select white oaks	990.2	54.5	15.3	85.4	9.6	825.4
Select red oaks	399.2	24.5	23.2	23.9	10.7	316.9
Other white oaks	478.4	17.1	40.2	58.5	3.7	359.0
Other red oaks	2,600.1	83.2	126.3	163.1	47.4	2,180.2
Hickory	473.6	21.4	16.7	34.8	2.2	398.6
Yellow birch	0.8	0.0	0.0	0.8	0.0	0.0
Hard maple	13.0	1.1	0.0	1.7	0.0	10.2
Soft maple	948.2	57.8	32.2	84.5	31.8	741.9
Beech	44.3	4.8	0.0	4.3	0.0	35.1
Sweetgum	2,179.9	65.6	98.0	105.8	60.9	1,849.5
Tupelo and blackgum	1,373.8	88.3	91.7	85.1	71.3	1,037.3
Ash	280.9	17.6	18.4	28.8	24.8	191.3
Cottonwood and aspen	71.4	0.0	13.3	4.8	0.3	53.1
Basswood	2.5	0.0	0.0	0.0	0.0	2.5
Yellow-poplar	1,048.3	55.1	51.3	84.2	0.3	857.4
Black walnut	17.7	0.0	0.9	0.0	0.0	16.9
Other eastern soft hardwoods	766.8	28.9	34.2	37.3	23.5	642.9
Other eastern hard hardwoods	97.9	5.3	3.1	10.4	1.8	77.1
Eastern noncommercial hardwoods	176.5	20.0	8.2	17.2	4.6	126.3
Total hardwoods	11,963.6	545.3	572.9	830.8	292.9	9,721.7
All species	24,123.2	1,462.4	1,264.3	1,296.3	689.1	19,411.0

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.
[a] Excludes rotten, missing, and form cull defects volume.

Table C.15—Net[a] volume of live trees on forest land by species group and diameter class, South Carolina, 2011

Species group	All classes	Diameter class (*inches*) 5.0–6.9	7.0–8.9	9.0–10.9	11.0–12.9	13.0–14.9	15.0–16.9	17.0–18.9	19.0–20.9	21.0–24.9	25.0–28.9	29.0–32.9	33.0–36.9	37.0+
							million cubic feet							
Softwood														
Longleaf and slash pines	754.3	58.7	74.1	86.7	125.6	148.4	128.2	69.1	43.6	19.8	0.0	0.0	0.0	0.0
Loblolly and shortleaf pines	10,245.5	974.6	1,733.5	1,902.1	1,669.6	1,323.1	905.8	613.5	440.2	408.4	188.9	63.2	9.5	13.1
Other yellow pines	415.9	31.2	46.0	66.4	68.9	62.7	69.8	40.3	13.5	13.2	3.8	0.0	0.0	0.0
Eastern white and red pines	83.7	2.2	4.0	6.8	6.2	14.3	13.7	5.9	2.5	22.9	5.1	0.0	0.0	0.0
Eastern hemlock	35.3	1.6	2.4	5.7	2.9	1.7	1.3	7.3	5.2	2.7	4.5	0.0	0.0	0.0
Cypress	485.2	15.0	33.1	62.5	68.6	75.4	84.8	38.0	24.5	60.4	5.6	12.9	4.5	0.0
Other eastern softwoods	139.7	38.6	36.9	22.9	17.1	12.8	3.7	4.3	0.0	0.0	3.4	0.0	0.0	0.0
Total softwoods	12,159.6	1,121.9	1,930.1	2,152.9	1,958.9	1,638.4	1,207.3	778.5	529.5	527.5	211.3	76.1	14.0	13.1
Hardwood														
Select white oaks	990.2	33.4	55.7	74.8	107.9	125.8	120.8	123.1	105.5	109.5	62.9	44.8	15.6	10.4
Select red oaks	399.2	11.2	14.0	18.3	27.0	28.8	33.3	27.2	47.4	64.4	50.7	41.8	0.0	35.0
Other white oaks	478.4	29.5	44.9	47.9	53.2	50.1	50.1	38.6	34.2	55.4	16.6	19.2	17.7	21.3
Other red oaks	2,600.1	203.0	239.8	271.6	313.4	267.1	268.8	240.3	195.9	270.9	138.8	103.8	31.4	55.3
Hickory	473.6	39.5	54.6	69.6	76.6	70.8	59.8	49.4	15.4	24.5	4.9	8.5	0.0	0.0
Yellow birch	0.8	0.2	0.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hard maple	13.0	2.3	0.7	1.5	3.5	1.0	0.9	3.1	0.0	0.0	0.0	0.0	0.0	0.0
Soft maple	948.2	145.5	145.7	136.5	113.1	114.1	93.0	57.0	53.8	64.8	19.2	5.6	0.0	0.0
Beech	44.3	5.1	5.5	5.0	9.9	0.8	5.0	10.5	2.5	0.0	0.0	0.0	0.0	0.0
Sweetgum	2,179.9	230.2	286.5	309.5	299.6	267.5	233.3	188.9	146.3	149.3	43.0	5.1	8.6	12.0
Tupelo and blackgum	1,373.8	88.8	138.6	178.4	213.8	217.0	159.2	142.9	101.8	85.9	23.5	0.0	17.7	6.1
Ash	280.9	27.7	34.9	34.4	40.0	31.4	31.9	42.3	16.6	13.5	0.0	8.3	0.0	0.0
Cottonwood and aspen	71.4	1.9	3.9	4.4	5.5	3.8	6.5	5.5	1.8	16.4	5.6	6.1	10.1	0.0
Basswood	2.5	0.2	0.6	1.1	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow-poplar	1,048.3	41.2	63.3	83.5	90.9	111.3	113.6	128.5	97.0	177.8	86.7	20.2	34.4	0.0
Black walnut	17.7	1.3	2.4	2.2	0.5	5.5	1.0	1.5	0.0	3.2	0.0	0.0	0.0	0.0
Other eastern soft hardwoods	766.8	115.6	120.9	99.8	81.4	70.4	75.9	43.7	38.7	38.8	31.1	13.7	17.4	19.4
Other eastern hard hardwoods	97.9	36.2	25.6	16.0	8.2	5.4	0.6	0.0	4.4	0.0	0.0	1.4	0.0	0.0
Eastern noncommercial hardwoods	176.5	58.1	49.7	36.3	16.5	10.9	4.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Total hardwoods	11,963.6	1,070.8	1,287.5	1,391.1	1,461.7	1,381.6	1,258.3	1,102.8	861.4	1,074.6	483.0	278.5	152.8	159.5
All species	24,123.2	2,192.7	3,217.6	3,544.1	3,420.6	3,020.1	2,465.6	1,881.4	1,390.8	1,602.1	694.2	354.6	166.8	172.7

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

0.0 = no sample for the cell or a value of >0.0 but <0.05.

[a] Excludes rotten, missing, and form cull defects volume.

Table C.16—Net[a] volume of live trees on forest land by forest-type group and stand origin, South Carolina, 2011

Forest-type group	Total	Stand origin	
		Natural stands	Artificial regeneration
	million cubic feet		
Softwood types			
White-red-jack pine	78.5	78.5	0.0
Longleaf-slash pine	675.1	523.1	152.0
Loblolly-shortleaf pine	10,195.8	5,315.7	4,880.1
Other eastern softwoods	9.6	9.6	0.0
Total softwoods	10,958.9	5,926.8	5,032.1
Hardwood types			
Oak-pine	2,311.1	2,229.6	81.5
Oak-hickory	4,855.4	4,804.1	51.4
Oak-gum-cypress	5,063.5	5,055.5	8.0
Elm-ash-cottonwood	909.6	909.6	0.0
Other hardwoods	2.1	2.1	0.0
Tropical hardwoods	5.2	5.2	0.0
Exotic hardwoods	15.2	13.9	1.3
Total hardwoods	13,162.1	13,020.0	142.1
Nonstocked	2.2	2.2	0.0
All groups	24,123.2	18,949.0	5,174.1

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.
[a] Excludes rotten, missing, and form cull defects volume.

Table C.17—Net[a] volume of growing-stock trees on timberland by species group and diameter class, South Carolina, 2011

Species group	All classes	Diameter class (*inches*) 5.0–6.9	7.0–8.9	9.0–10.9	11.0–12.9	13.0–14.9	15.0–16.9	17.0–18.9	19.0–20.9	21.0–24.9	25.0–28.9	29.0–32.9	33.0–36.9	37.0+
							million cubic feet							
Softwood														
Longleaf and slash pines	672.8	53.3	64.7	77.2	113.3	140.4	123.1	54.5	34.3	12.1	0.0	0.0	0.0	0.0
Loblolly and shortleaf pines	9,670.3	932.4	1,655.5	1,780.8	1,586.5	1,259.1	851.5	566.0	420.5	380.8	171.5	56.3	9.5	0.0
Other yellow pines	312.8	25.7	37.5	48.1	52.5	45.6	46.8	34.4	11.8	6.5	3.8	0.0	0.0	0.0
Eastern white and red pines	83.0	2.1	3.9	6.2	6.2	14.3	13.7	5.9	2.5	22.9	5.1	0.0	0.0	0.0
Eastern hemlock	17.0	1.1	2.1	2.7	1.3	1.7	0.0	3.7	0.0	0.0	4.5	0.0	0.0	0.0
Cypress	430.5	13.1	29.3	52.0	63.3	70.7	77.3	35.5	21.4	50.8	5.6	6.9	4.5	0.0
Other eastern softwoods	64.1	23.4	19.5	11.0	6.9	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total softwoods	11,250.4	1,051.1	1,812.5	1,978.0	1,830.1	1,535.2	1,112.4	699.9	490.4	473.1	190.5	63.2	14.0	0.0
Hardwood														
Select white oaks	878.3	27.1	49.6	69.9	93.6	119.3	108.6	114.6	97.6	90.7	58.3	33.5	15.6	0.0
Select red oaks	346.7	8.8	11.5	17.3	19.9	26.8	25.5	22.2	45.3	58.3	48.3	27.7	0.0	35.0
Other white oaks	294.9	19.8	30.0	29.8	33.2	34.6	33.6	21.5	16.9	42.4	13.7	4.7	5.4	9.3
Other red oaks	1,936.9	143.0	165.2	199.2	231.8	195.8	213.1	182.7	155.6	207.3	120.6	73.2	17.2	32.4
Hickory	402.4	32.9	46.9	57.9	63.4	59.4	56.4	43.4	13.9	19.7	0.0	8.5	0.0	0.0
Yellow birch	0.8	0.2	0.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hard maple	5.0	0.9	0.2	0.4	1.1	1.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0
Soft maple	538.1	76.4	83.0	75.7	62.0	65.4	51.4	26.3	38.3	39.0	14.8	5.6	0.0	0.0
Beech	28.9	2.5	2.3	4.0	7.3	0.8	3.9	5.7	2.5	0.0	0.0	0.0	0.0	0.0
Sweetgum	1,859.8	189.8	243.2	272.6	242.4	232.7	207.7	162.5	131.2	130.2	30.4	5.1	0.0	12.0
Tupelo and blackgum	999.8	59.8	96.8	134.3	143.4	160.5	129.3	105.4	78.0	64.3	20.0	0.0	8.1	0.0
Ash	190.2	15.9	21.0	25.2	23.5	23.6	24.2	28.1	8.0	12.2	0.0	8.3	0.0	0.0
Cottonwood and aspen	54.0	1.1	3.2	2.7	4.1	2.9	5.4	3.6	1.8	13.4	5.6	0.0	10.1	0.0
Basswood	0.9	0.0	0.3	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow-poplar	917.3	36.4	55.8	77.0	80.2	89.5	109.3	120.6	83.7	141.5	76.1	20.2	27.1	0.0
Black walnut	11.4	0.8	2.2	1.5	0.0	2.1	0.0	1.5	0.0	3.2	0.0	0.0	0.0	0.0
Other eastern soft hardwoods	435.2	61.5	69.1	53.3	45.1	39.9	49.4	33.5	19.2	24.5	22.1	10.3	7.4	0.0
Other eastern hard hardwoods	33.9	12.4	9.9	7.8	2.5	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total hardwoods	8,934.6	689.3	890.2	1,029.8	1,053.5	1,055.7	1,017.8	873.0	692.0	846.8	410.0	197.0	90.8	88.8
All species	20,185.0	1,740.4	2,702.7	3,007.8	2,883.6	2,590.9	2,130.1	1,572.9	1,182.4	1,319.9	600.5	260.3	104.8	88.8

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

0.0 = no sample for the cell or a value of >0.0 but <0.05.

[a] Excludes rotten, missing, and form cull defects volume.

Table C.18—Net[a] volume of sawtimber trees on timberland by species group and diameter class, South Carolina, 2011

Species group	All classes	Diameter class (*inches*) 9.0–10.9	11.0–12.9	13.0–14.9	15.0–16.9	17.0–18.9	19.0–20.9	21.0–24.9	25.0–28.9	29.0–32.9	33.0–36.9	37.0+
						million board feet[b]						
Softwood												
Longleaf and slash pines	2,931.4	304.2	539.1	749.3	707.6	332.2	219.0	80.0	0.0	0.0	0.0	0.0
Loblolly and shortleaf pines	35,269.2	6,460.5	7,158.3	6,515.0	4,813.9	3,423.5	2,668.5	2,545.3	1,205.2	408.1	70.8	0.0
Other yellow pines	1,228.0	178.2	233.7	226.8	253.5	195.5	71.5	43.1	25.7	0.0	0.0	0.0
Eastern white and red pines	418.2	22.6	27.6	71.5	73.0	33.2	15.0	142.2	33.1	0.0	0.0	0.0
Eastern hemlock	70.4	9.3	5.8	8.1	0.0	19.7	0.0	0.0	27.5	0.0	0.0	0.0
Cypress	1,779.0	160.4	242.6	311.1	373.1	182.5	114.9	288.4	34.3	43.2	28.6	0.0
Other eastern softwoods	95.1	44.5	32.9	17.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total softwoods	41,791.4	7,179.7	8,239.9	7,899.5	6,221.3	4,186.5	3,088.9	3,099.0	1,325.8	451.3	99.4	0.0
Hardwood												
Select white oaks	3,447.9	0.0	322.4	479.5	479.0	551.0	492.9	482.8	336.7	196.9	106.8	0.0
Select red oaks	1,646.5	0.0	66.7	106.6	113.6	106.0	233.9	313.1	284.5	188.3	0.0	233.7
Other white oaks	1,013.7	0.0	119.2	139.4	149.2	104.8	83.8	221.7	77.8	29.0	30.0	58.9
Other red oaks	7,094.7	0.0	860.9	838.5	999.5	919.6	821.8	1,158.7	721.4	451.7	107.8	214.8
Hickory	1,152.8	0.0	217.5	240.0	254.1	210.1	72.1	106.9	0.0	52.1	0.0	0.0
Yellow birch	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hard maple	14.0	0.0	3.7	4.1	0.0	6.2	0.0	0.0	0.0	0.0	0.0	0.0
Soft maple	1,277.5	0.0	203.3	247.3	217.1	118.6	183.4	197.3	79.6	30.9	0.0	0.0
Beech	77.5	0.0	26.7	3.0	15.2	22.5	10.2	0.0	0.0	0.0	0.0	0.0
Sweetgum	5,532.5	0.0	869.7	998.3	1,001.8	850.2	733.4	770.3	189.6	33.8	0.0	85.5
Tupelo and blackgum	3,015.2	0.0	449.7	612.3	560.5	496.6	388.9	342.2	114.0	0.0	51.1	0.0
Ash	556.7	0.0	76.8	90.3	105.4	131.2	39.8	63.5	0.0	49.7	0.0	0.0
Cottonwood and aspen	255.2	0.0	14.8	11.2	25.6	18.1	9.7	77.9	33.4	0.0	64.5	0.0
Basswood	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow-poplar	4,034.2	0.0	289.7	389.7	534.1	648.1	478.6	868.4	495.7	137.8	192.1	0.0
Black walnut	27.3	0.0	0.0	7.7	0.0	6.0	0.0	13.7	0.0	0.0	0.0	0.0
Other eastern soft hardwoods	1,134.8	0.0	153.3	156.0	215.2	156.2	94.7	126.1	125.1	62.9	45.1	0.0
Other eastern hard hardwoods	13.7	0.0	8.5	5.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total hardwoods	30,294.3	0.0	3,682.8	4,329.2	4,670.3	4,345.0	3,643.2	4,742.5	2,457.7	1,233.2	597.4	593.0
All species	72,085.7	7,179.7	11,922.7	12,228.8	10,891.5	8,531.6	6,732.1	7,841.5	3,783.5	1,684.5	696.8	593.0

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

0.0 = no sample for the cell or a value of >0.0 but <0.05.

[a] Excludes rotten, missing, and form cull defects volume.

[b] International ¼-inch rule.

Table C.19—Net[a] volume of sawtimber trees on timberland by species group and ownership group, South Carolina, 2011

Species group	All ownerships	Ownership group				
		U.S. Forest Service	Other Federal	State and local government	Forest industry	Nonindustrial private
	million board feet[b]					
Softwood						
Longleaf and slash pines	2,931.4	109.4	628.9	355.7	4.3	1,833.1
Loblolly and shortleaf pines	35,269.2	3,408.5	1,897.5	840.8	917.4	28,205.0
Other yellow pines	1,228.0	56.3	69.0	138.7	8.1	956.0
Eastern white and red pines	418.2	132.5	0.0	146.8	0.0	139.0
Eastern hemlock	70.4	23.8	0.0	0.0	0.0	46.6
Cypress	1,779.0	22.6	53.9	166.1	263.4	1,272.9
Other eastern softwoods	95.1	5.3	2.6	12.9	0.0	74.3
Total softwoods	41,791.4	3,758.4	2,652.0	1,661.0	1,193.2	32,526.8
Hardwood						
Select white oaks	3,447.9	178.5	41.6	237.8	62.8	2,927.2
Select red oaks	1,646.5	92.7	39.2	101.1	60.3	1,353.1
Other white oaks	1,013.7	28.6	50.3	168.8	8.2	757.9
Other red oaks	7,094.7	229.4	299.1	475.5	175.7	5,915.0
Hickory	1,152.8	52.5	12.5	86.6	2.5	998.7
Yellow birch	0.0	0.0	0.0	0.0	0.0	0.0
Hard maple	14.0	0.0	0.0	0.0	0.0	14.0
Soft maple	1,277.5	67.8	13.5	108.8	54.3	1,033.1
Beech	77.5	9.7	0.0	5.4	0.0	62.4
Sweetgum	5,532.5	159.2	219.3	300.7	189.7	4,663.6
Tupelo and blackgum	3,015.2	111.4	107.3	210.7	202.2	2,383.5
Ash	556.7	61.9	45.6	60.5	93.5	295.1
Cottonwood and aspen	255.2	0.0	0.0	18.9	0.0	236.3
Basswood	0.0	0.0	0.0	0.0	0.0	0.0
Yellow-poplar	4,034.2	227.4	207.8	196.7	0.0	3,402.2
Black walnut	27.3	0.0	0.0	0.0	0.0	27.3
Other eastern soft hardwoods	1,134.8	80.1	14.8	79.8	68.1	891.9
Other eastern hard hardwoods	13.7	4.4	0.0	0.0	0.0	9.3
Total hardwoods	30,294.3	1,303.8	1,051.2	2,051.3	917.2	24,970.8
All species	72,085.7	5,062.2	3,703.1	3,712.3	2,110.4	57,497.6

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

0.0 = no sample for the cell or a value of >0.0 but <0.05.

[a] Excludes rotten, missing, and form cull defects volume.

[b] International ¼-inch rule.

Table C.20—Aboveground dry weight[a] of live trees on forest land by ownership class and land status, South Carolina, 2011

Ownership class	All forest land	Land status					
		Unreserved			Reserved		
		Total	Timberland	Un-productive	Total	Productive	Un-productive
		thousand tons					
U.S. Forest Service							
National forest	36,757.0	35,481.3	35,481.3	0.0	1,275.7	1,275.7	0.0
Other Forest Service	399.4	399.4	399.4	0.0	0.0	0.0	0.0
Total	37,156.4	35,880.7	35,880.7	0.0	1,275.7	1,275.7	0.0
Other Federal							
National Park Service	2,630.3	0.0	0.0	0.0	2,630.3	2,630.3	0.0
U.S. Fish and Wildlife Service	5,213.1	0.0	0.0	0.0	5,213.1	5,213.1	0.0
Dept. of Defense/Dept. of Energy	23,786.2	23,152.2	23,152.2	0.0	634.1	634.1	0.0
Other Federal	129.2	129.2	129.2	0.0	0.0	0.0	0.0
Total	31,758.8	23,281.4	23,281.4	0.0	8,477.4	8,477.4	0.0
State and local government							
State	21,902.2	21,902.2	21,902.2	0.0	0.0	0.0	0.0
Local	12,454.3	9,250.2	9,250.2	0.0	3,204.1	3,204.1	0.0
Total	34,356.5	31,152.4	31,152.4	0.0	3,204.1	3,204.1	0.0
Forest industry							
Corporate	18,157.0	18,157.0	18,157.0	0.0	0.0	0.0	0.0
Total	18,157.0	18,157.0	18,157.0	0.0	0.0	0.0	0.0
Nonindustrial private							
Corporate	168,107.1	168,107.1	168,018.1	89.0	0.0	0.0	0.0
Conservation/natural resources organization	2,831.4	2,831.4	2,831.4	0.0	0.0	0.0	0.0
Unincorporated local partnership/ association/club	4,530.1	4,530.1	4,530.1	0.0	0.0	0.0	0.0
Native American	183.7	183.7	183.7	0.0	0.0	0.0	0.0
Individual	342,017.9	342,017.9	342,014.8	3.1	0.0	0.0	0.0
Total	517,670.2	517,670.2	517,578.1	92.1	0.0	0.0	0.0
All classes	639,099.0	626,141.8	626,049.7	92.1	12,957.3	12,957.3	0.0

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

0.0 = no sample for the cell or a value of >0.0 but <0.05.

[a] Excludes rotten, missing, and form cull defects volume.

Table C.21—Total carbon[a] of live trees on forest land by ownership class and land status, South Carolina, 2011

Ownership class	All forest land	Land status					
		Unreserved			Reserved		
		Total	Timberland	Unproductive	Total	Productive	Unproductive
	thousand tons						
U.S. Forest Service							
National forest	18,378.5	17,740.7	17,740.7	0.0	637.8	637.8	0.0
Other Forest Service	199.7	199.7	199.7	0.0	0.0	0.0	0.0
Total	18,578.2	17,940.4	17,940.4	0.0	637.8	637.8	0.0
Other Federal							
National Park Service	1,315.2	0.0	0.0	0.0	1,315.2	1,315.2	0.0
U.S. Fish and Wildlife Service	2,606.5	0.0	0.0	0.0	2,606.5	2,606.5	0.0
Dept. of Defense/Dept. of Energy	11,893.1	11,576.1	11,576.1	0.0	317.0	317.0	0.0
Other Federal	64.6	64.6	64.6	0.0	0.0	0.0	0.0
Total	15,879.4	11,640.7	11,640.7	0.0	4,238.7	4,238.7	0.0
State and local government							
State	10,951.1	10,951.1	10,951.1	0.0	0.0	0.0	0.0
Local	6,227.2	4,625.1	4,625.1	0.0	1,602.1	1,602.1	0.0
Total	17,178.3	15,576.2	15,576.2	0.0	1,602.1	1,602.1	0.0
Forest industry							
Corporate	9,078.5	9,078.5	9,078.5	0.0	0.0	0.0	0.0
Total	9,078.5	9,078.5	9,078.5	0.0	0.0	0.0	0.0
Nonindustrial private							
Corporate	84,053.6	84,053.6	84,009.1	44.5	0.0	0.0	0.0
Conservation/natural resources organization	1,415.7	1,415.7	1,415.7	0.0	0.0	0.0	0.0
Unincorporated local partnership/ association/club	2,265.0	2,265.0	2,265.0	0.0	0.0	0.0	0.0
Native American	91.9	91.9	91.9	0.0	0.0	0.0	0.0
Individual	171,009.0	171,009.0	171,007.4	1.6	0.0	0.0	0.0
Total	258,835.1	258,835.1	258,789.1	46.1	0.0	0.0	0.0
All classes	319,549.5	313,070.9	313,024.8	46.1	6,478.6	6,478.6	0.0

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.
[a] Excludes rotten, missing, and form cull defects volume.

Table C.22—Average annual net growth of live trees by ownership class and land status, South Carolina, 2011 (2002–06 to 2007–11)

Ownership class[a]	Land status	
	Timberland	Forest land
	million cubic feet	
U.S. Forest Service		
National forest	47.6	48.4
Other Forest Service	1.8	1.8
Total	49.3	50.2
Other Federal		
National Park Service	0.0	1.4
U.S. Fish and Wildlife Service	0.4	3.1
Dept. of Defense/ Dept. of Energy	24.6	25.5
Other Federal	-0.3	-0.3
Total	24.7	29.7
State and local government		
State	26.6	26.6
Local	14.5	16.0
Total	41.1	42.6
Forest industry		
Corporate	46.4	46.4
Total	46.4	46.4
Nonindustrial private		
Corporate	411.5	411.5
Conservation/natural resources organization	3.4	3.4
Unincorporated partnership/ association/club	5.5	5.5
Native American	0.8	0.8
Individual	704.0	699.2
Total	1,125.3	1,120.6
All classes	1,286.9	1,289.5

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.
[a] Based on current conditions.

Table C.23—Average annual net growth of live trees on forest land by forest-type group and stand-size class, South Carolina, 2011 (2002–06 to 2007–11)

Forest-type group[a]	All classes	Stand-size class: Large diameter	Medium diameter	Small diameter	Non-stocked
	million cubic feet				
Softwood types					
White-red-jack pine	3.1	2.9	0.2	0.0	0.0
Longleaf-slash pine	26.9	14.7	6.1	6.1	0.0
Loblolly-shortleaf pine	790.5	287.5	380.8	122.3	0.0
Other eastern softwoods	2.0	0.3	1.2	0.5	0.0
Total softwoods	822.4	305.3	388.3	128.8	0.0
Hardwood types					
Oak-pine	116.4	42.9	38.7	34.8	0.0
Oak-hickory	186.7	106.2	45.7	34.8	0.0
Oak-gum-cypress	133.5	83.3	34.5	15.8	0.0
Elm-ash-cottonwood	27.4	20.3	3.6	3.5	0.0
Other hardwoods	0.1	0.0	0.0	0.1	0.0
Tropical hardwoods	0.1	0.1	0.0	0.0	0.0
Exotic hardwoods	1.6	0.0	0.6	1.0	0.0
Total hardwoods	465.7	252.7	123.0	90.0	0.0
Nonstocked	1.4	0.0	0.0	0.0	1.4
All groups	1,289.5	558.0	511.3	218.8	1.4

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.
[a] Based on current conditions.

Table C.24—Average annual net growth of live trees on forest land by species group and ownership group, South Carolina, 2011 (2002–06 to 2007–11)

Species group[a]	All ownerships	Ownership group				
		U.S. Forest Service	Other Federal	State and local government	Forest industry	Nonindustrial private
	million cubic feet					
Softwood						
Longleaf and slash pines	29.4	0.6	4.5	3.9	0.2	20.2
Loblolly and shortleaf pines	837.8	35.7	14.2	12.3	33.1	742.5
Other yellow pines	17.1	1.2	0.2	0.7	0.5	14.5
Eastern white and red pines	3.0	0.9	0.0	1.2	0.0	0.9
Eastern hemlock	0.9	0.3	0.0	0.3	0.0	0.3
Cypress	11.8	0.3	0.8	2.2	1.2	7.3
Other eastern softwoods	5.8	0.2	0.2	0.4	0.1	4.8
Total softwoods	905.9	39.2	19.9	21.1	35.1	790.6
Hardwood						
Select white oaks	31.9	0.9	0.5	1.0	0.7	28.8
Select red oaks	10.1	0.8	-0.2	1.1	0.4	8.0
Other white oaks	11.8	0.4	0.7	1.9	0.3	8.6
Other red oaks	95.6	2.0	2.9	5.9	1.9	82.8
Hickory	11.9	0.4	0.5	0.7	-0.6	10.8
Yellow birch	0.0	0.0	0.0	0.0	0.0	0.0
Hard maple	0.4	0.0	0.0	0.1	0.0	0.3
Soft maple	34.4	2.1	0.8	2.8	0.9	27.9
Beech	1.9	0.1	0.0	0.1	0.0	1.7
Sweetgum	82.8	1.5	2.5	3.8	2.7	72.3
Tupelo and blackgum	24.1	0.7	0.6	0.8	3.5	18.5
Ash	7.3	0.0	-0.2	0.3	0.9	6.3
Cottonwood and aspen	2.6	0.0	0.5	0.1	0.0	2.0
Basswood	0.1	-0.1	0.0	0.0	0.0	0.2
Yellow-poplar	38.6	1.8	0.7	2.2	0.0	33.8
Black walnut	0.6	0.0	0.0	0.0	0.0	0.5
Other eastern soft hardwoods	22.8	0.1	0.5	0.9	0.3	21.0
Other eastern hard hardwoods	1.9	0.1	-0.1	-0.6	0.0	2.5
Eastern noncommercial hardwoods	5.0	0.2	0.0	0.5	0.3	3.9
Total hardwoods	383.7	10.9	9.8	21.5	11.4	330.0
All species	1,289.5	50.2	29.7	42.6	46.4	1,120.6

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.
[a] Based on current conditions.

Table C.25—Average annual mortality of live trees by ownership class and land status, South Carolina, 2011 (2002–06 to 2007–11)

Ownership class[a]	Land status	
	Timberland	Forest land
	million cubic feet	
U.S. Forest Service		
National forest	11.4	11.5
Other Forest Service	0.0	0.0
Total	11.4	11.5
Other Federal		
National Park Service	0.0	0.7
U.S. Fish and Wildlife Service	0.0	1.1
Dept. of Defense/ Dept. of Energy	5.1	5.2
Other Federal	0.4	0.4
Total	5.5	7.5
State and local government		
State	6.4	6.4
Local	3.0	3.2
Total	9.4	9.6
Forest industry		
Corporate	3.9	3.9
Total	3.9	3.9
Nonindustrial private		
Corporate	42.6	42.6
Conservation/natural resources organization	0.9	0.9
Unincorporated partnership/ association/club	2.2	2.2
Native American	0.1	0.1
Individual	92.9	92.9
Total	138.7	138.7
All classes	168.9	171.3

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.
[a] Based on current conditions.

Table C.26—Average annual mortality of live trees on forest land by forest-type group and stand-size class, South Carolina, 2011 (2002–06 to 2007–11)

Forest-type group[a]	All classes	Stand-size class: Large diameter	Medium diameter	Small diameter	Non-stocked
	million cubic feet				
Softwood types					
White-red-jack pine	0.6	0.2	0.3	0.0	0.0
Longleaf-slash pine	3.2	2.7	0.4	0.1	0.0
Loblolly-shortleaf pine	67.4	44.6	20.7	2.1	0.0
Other eastern softwoods	0.1	0.0	0.0	0.1	0.0
Total softwoods	71.3	47.6	21.5	2.3	0.0
Hardwood types					
Oak-pine	16.6	10.9	4.2	1.6	0.0
Oak-hickory	37.9	30.1	5.9	1.9	0.0
Oak-gum-cypress	37.5	29.9	5.8	1.7	0.0
Elm-ash-cottonwood	7.9	6.4	1.2	0.3	0.0
Other hardwoods	0.0	0.0	0.0	0.0	0.0
Tropical hardwoods	0.0	0.0	0.0	0.0	0.0
Exotic hardwoods	0.0	0.0	0.0	0.0	0.0
Total hardwoods	100.0	77.3	17.2	5.5	0.0
Nonstocked	0.0	0.0	0.0	0.0	0.0
All groups	171.3	124.9	38.6	7.8	0.0

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.
[a] Based on current conditions.

Table C.27—Average annual mortality of live trees on forest land by species group and ownership group, South Carolina, 2011 (2002–06 to 2007–11)

Species group[a]	All ownerships	Ownership group				
		U.S. Forest Service	Other Federal	State and local government	Forest industry	Nonindustrial private
	million cubic feet					
Softwood						
Longleaf and slash pines	3.8	0.0	1.1	0.1	0.0	2.6
Loblolly and shortleaf pines	68.1	6.9	2.1	3.0	1.2	54.8
Other yellow pines	5.0	0.0	0.0	0.2	0.0	4.7
Eastern white and red pines	0.7	0.1	0.0	0.2	0.0	0.4
Eastern hemlock	0.0	0.0	0.0	0.0	0.0	0.0
Cypress	1.8	0.0	0.0	0.4	0.2	1.2
Other eastern softwoods	1.5	0.1	0.0	0.0	0.0	1.5
Total softwoods	80.9	7.1	3.2	4.0	1.4	65.1
Hardwood						
Select white oaks	4.1	0.2	0.0	0.5	0.0	3.3
Select red oaks	4.0	0.0	0.8	0.0	0.0	3.2
Other white oaks	1.6	0.0	0.1	0.1	0.0	1.4
Other red oaks	21.5	1.0	1.0	1.2	0.2	18.1
Hickory	2.3	0.0	0.1	0.0	0.7	1.4
Yellow birch	0.0	0.0	0.0	0.0	0.0	0.0
Hard maple	0.0	0.0	0.0	0.0	0.0	0.0
Soft maple	11.7	0.6	0.5	1.3	0.2	9.1
Beech	0.0	0.0	0.0	0.0	0.0	0.0
Sweetgum	12.6	0.8	0.2	0.3	0.2	11.2
Tupelo and blackgum	7.1	0.4	0.6	0.1	0.2	5.8
Ash	2.3	0.3	0.1	0.4	0.0	1.4
Cottonwood and aspen	0.3	0.0	0.0	0.1	0.0	0.2
Basswood	0.1	0.1	0.0	0.0	0.0	0.0
Yellow-poplar	3.9	0.0	0.0	0.5	0.0	3.3
Black walnut	0.0	0.0	0.0	0.0	0.0	0.0
Other eastern soft hardwoods	13.5	0.5	0.4	0.9	0.8	10.8
Other eastern hard hardwoods	2.0	0.0	0.2	0.0	0.2	1.5
Eastern noncommercial hardwoods	3.3	0.2	0.3	0.2	0.0	2.6
Total hardwoods	90.4	4.4	4.3	5.6	2.5	73.6
All species	171.3	11.5	7.5	9.6	3.9	138.7

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.
[a] Based on current conditions.

Table C.28—Average annual net removals of live trees by ownership class and land status, South Carolina, 2011 (2002–06 to 2007–11)

Ownership class[a]	Land status	
	Timberland	Forest land
	million cubic feet	
U.S. Forest Service		
National forest	10.4	10.4
Total	10.4	10.4
Other Federal		
U.S. Fish and Wildlife Service	2.7	3.7
Dept. of Defense/Dept. of Energy	22.7	22.7
Total	26.3	27.3
State and local government		
State	4.2	4.2
Local	9.4	9.4
Total	13.6	13.6
Forest industry		
Corporate	30.5	30.5
Total	30.5	30.5
Nonindustrial private		
Corporate	318.3	317.7
Conservation/natural resources organization	2.6	2.6
Unincorporated partnership/ association/club	17.8	17.8
Individual	434.5	434.5
Total	773.1	772.5
All classes	837.5	834.0

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.
[a] Based on current conditions.

Table C.29—Average annual removals of live trees on forest land by forest-type group and stand-size class, South Carolina, 2011 (2002–06 to 2007–11)

Forest-type group[a]	All size classes	Stand-size class			Non-stocked
		Large diameter	Medium diameter	Small diameter	
	million cubic feet				
Softwood types					
White-red-jack pine	0.0	0.0	0.0	0.0	0.0
Longleaf-slash pine	15.1	10.8	4.3	0.0	0.0
Loblolly-shortleaf pine	585.7	342.6	237.7	5.3	0.0
Other eastern softwoods	0.4	0.1	0.2	0.1	0.0
Total softwoods	601.3	353.5	242.3	5.4	0.0
Hardwood types					
Oak-pine	43.5	29.0	11.5	3.0	0.0
Oak-hickory	73.7	60.4	10.6	2.7	0.0
Oak-gum-cypress	111.8	97.6	13.5	0.7	0.0
Elm-ash-cottonwood	3.6	2.7	0.0	1.0	0.0
Other hardwoods	0.0	0.0	0.0	0.0	0.0
Tropical hardwoods	0.0	0.0	0.0	0.0	0.0
Exotic hardwoods	0.0	0.0	0.0	0.0	0.0
Total hardwoods	232.6	189.6	35.6	7.4	0.0
Nonstocked	0.1	0.0	0.0	0.0	0.1
All groups	834.0	543.2	277.8	12.9	0.1

Numbers in rows and columns may not sum to totals due to rounding.
0.0 = no sample for the cell or a value of >0.0 but <0.05.
[a] Based on current conditions.

Table C.30—Average annual removals of live trees on forest land by species group and ownership group, South Carolina, 2011 (2002–06 to 2007–11)

Species group[a]	All ownerships	Ownership group				
		U.S. Forest Service	Other Federal	State and local government	Forest industry	Nonindustrial private
	million cubic feet					
Softwood						
Longleaf and slash pines	18.0	0.0	1.2	1.1	0.0	15.6
Loblolly and shortleaf pines	572.9	8.8	4.9	9.0	21.8	528.3
Other yellow pines	16.1	0.3	0.0	0.0	0.0	15.8
Eastern white and red pines	1.4	0.0	0.0	0.0	0.0	1.4
Eastern hemlock	0.0	0.0	0.0	0.0	0.0	0.0
Cypress	10.7	0.0	0.0	0.0	2.8	7.9
Other eastern softwoods	1.9	0.3	0.0	0.0	0.0	1.6
Total softwoods	621.0	9.4	6.2	10.1	24.6	570.8
Hardwood						
Select white oaks	16.5	0.1	0.0	0.2	0.0	16.2
Select red oaks	2.2	0.0	0.0	0.0	0.1	2.0
Other white oaks	4.8	0.0	0.4	0.1	0.0	4.3
Other red oaks	43.0	0.1	0.3	3.0	0.8	38.8
Hickory	6.1	0.0	0.0	0.0	0.0	6.1
Yellow birch	0.0	0.0	0.0	0.0	0.0	0.0
Hard maple	0.1	0.0	0.0	0.0	0.0	0.1
Soft maple	14.6	0.0	0.0	0.0	1.0	13.6
Beech	2.9	0.0	0.0	0.0	0.0	2.9
Sweetgum	51.9	0.4	0.0	0.1	0.9	50.6
Tupelo and blackgum	29.7	0.1	0.0	0.0	0.1	29.5
Ash	6.0	0.1	0.0	0.0	0.0	5.9
Cottonwood and aspen	0.3	0.0	0.0	0.0	0.0	0.3
Basswood	0.0	0.0	0.0	0.0	0.0	0.0
Yellow-poplar	17.6	0.0	0.0	0.0	0.3	17.4
Black walnut	0.1	0.0	0.0	0.0	0.0	0.1
Other eastern soft hardwoods	11.0	0.2	0.0	0.1	0.0	10.6
Other eastern hard hardwoods	2.1	0.0	0.0	0.0	0.0	2.1
Eastern noncommercial hardwoods	4.1	0.1	0.0	0.0	2.6	1.4
Total hardwoods	213.0	1.0	0.8	3.5	5.9	201.8
All species	834.0	10.4	6.9	13.6	30.5	772.5

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

0.0 = no sample for the cell or a value of >0.0 but <0.05.

[a] Based on current conditions.

Rose, Anita K. 2016. South Carolina's forests, 2011. Resour. Bull. SRS–208. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 71 p.

Between 2007 and 2011, the U.S. Department of Agriculture Forest Service's Forest Inventory and Analysis (FIA) program conducted the tenth inventory of the forests of South Carolina. The inventory estimated that 13.1 million acres, or 68 percent of the State, was forested. The majority of South Carolina's forest land was in private ownership. Many private individuals rely on family-owned forests and value their biologic as well as their economic value. This survey revealed a growing forest with a volume of 24.1 billion cubic feet, the most ever reported. Forests in South Carolina are maturing; area of large-diameter stands in 2011 was the highest ever recorded by FIA. While loblolly pine continued to be the most dominant single species, hardwoods and softwoods contributed to the overall volume equally. Sweetgum was the leading hardwood species. Both growth and removals increased over the previous survey period. However, harvesting did not appear to be outpacing growth, indicating a thriving yet sustainable forest industry at the State level. Mortality declined statewide by 13.5 percent since the previous survey. Nonnative invasive plants were recorded on 58 percent of forested plots, with Japanese honeysuckle being the most often occurring species recorded. On a positive note, crews found almost no ozone-induced foliar injury. The Forest Service's FIA is the only program that conducts forest assessments across all land in the United States. Increasing demands on the resource and anthropogenic-related impacts on forests have intensified the need to conduct ecosystem-based inventories such as these.

Keywords: FIA, forest health, forest inventory, forest survey, invasive species, ozone, South Carolina.

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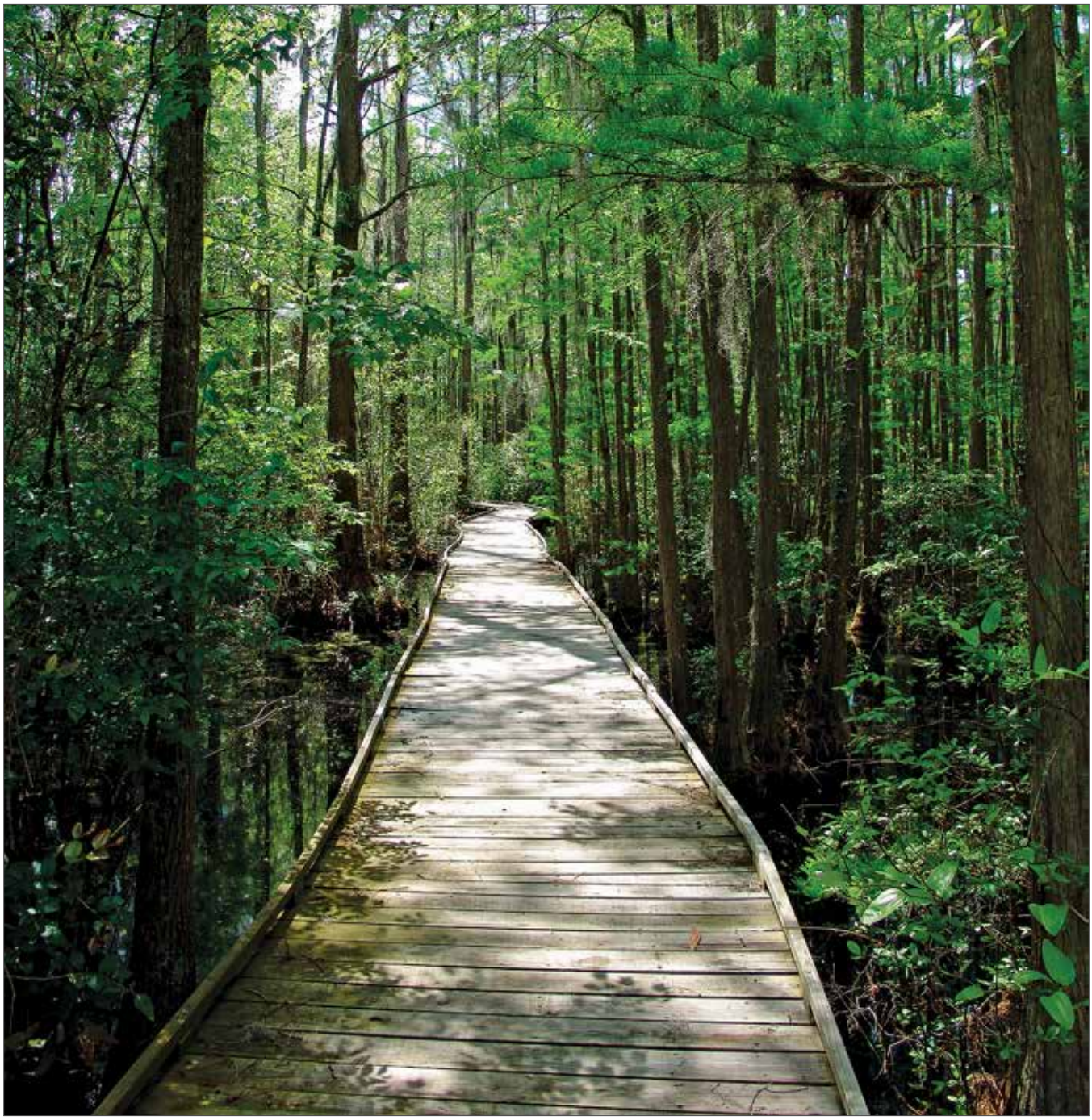

The 500-foot boardwalk at Woods Bay State Natural Area in Sumter and Clarendon Counties, SC, offers visitors a look at the diversity of South Carolina's bottomland forests.

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