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Wetland Forest STATISTICS for the South Atlantic States

Mark J. Brown, Greg M. Smith, Joseph McCollum

The Authors:

Mark J. Brown is a Resource Analyst, **Greg M. Smith** is a Forester, and **Joseph McCollum** is a Mathematical Statistician with the Forest Inventory and Analysis Research Work Unit, Southern Research Station, U.S. Department of Agriculture, Forest Service, Asheville, NC 28802.

Cover photos (left to right): (1) Bald cypress [*Taxodium distichum* (L.) Rich] forest, (2) blackgum [*Nyssa sylvatica* (Marsh)] forest, (3) mixed bottomland hardwoods forest, and (4) pond pine [*Pinus serotina* (Michx.)] forest.

Photos 1, 3, and 4 by Bill Lea; photo 2, USDA Forest Service.

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Southern Research Station
P.O. Box 2680
Asheville, NC 28802

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Mark J. Brown, Resource Analyst
Greg M. Smith, Forester
Joseph McCollum, Mathematical Statistician

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Introduction

Forested wetlands are a significant segment of forests in the South Atlantic States of Virginia, North Carolina, South Carolina, Georgia, and Florida. Nevertheless, most research has focused primarily on delineating wetlands (Hefner and Storrs 1991) and analyzing their functions and values (Walbridge 1993). Information quantifying and characterizing forested wetlands in the South Atlantic States is limited (Cubbage and Flather 1993), with little available on ownership, forest type and extent, species group volume, acreage harvested and planted, and stand size, age, and condition.

This dearth of information and a growing interest in the ecology and management of forested wetlands provide the impetus to identify the size and extent of the forested wetland segment. Multiresource data about this segment will help to describe the attributes of forested wetland stands and their value to society, the timber supply, and local economies.

The information for this bulletin was collected between 1989 and 1998 in conjunction with the multiresource inventory of forest ecosystems conducted by the Forest Inventory and Analysis Research Work Unit (FIA) of the USDA Forest Service, Southern Research Station. Because data collection was limited to timberland (forest land not restricted from commercial timber production), this bulletin does not contain information about the Okefenokee National Wildlife Refuge, the Everglades National Park, designated wilderness areas, and other reserved forested wetlands. The information collected largely followed existing definitions of a wetland that required the presence of hydric vegetation, hydric soil, and a wetland hydrology (Federal Interagency Committee for Wetland Delineation 1989, U.S. Army Corps of Engineers 1987). If all three hydric criteria occurred simultaneously, the stand was classified as forested wetland. The procedures or methods used in data collection as well as the statistical reliability of the processed data are more fully described in the appendix of this bulletin. The appendix also describes the August 1991 suspension of the 1989 Federal manual under which the study began, explains how the suspension was handled, and discusses the effect it may have had on acreage reported for some categories. The collection of this wetland related information permitted analysis, quantification, and characterization of forested wetlands in the South Atlantic States. The principle theme throughout the findings was to statistically describe wetland timberland using acreage and volume against multiple variables usually categorized by ownership. Consolidated findings for the South Atlantic States are presented in the following text, graphs, and tables. Individual findings for Virginia, North Carolina, South Carolina, Georgia, and Florida are presented in the appendix tables.

Photo—Bill Lea

Bald cypress [*Taxodium distichum* (L.) Rich] forest

Findings

Area, Distribution, and Ownership

Total timberland area for the South Atlantic States was 85.0 million acres, almost 21 percent of which were on wetland sites (table I). Figure 1 shows that Florida had the most wetland timberland—5.2 million acres—followed by North Carolina, which had 4.6 million acres. Although Georgia led in total timberland acreage, its wetland segment comprised only 4.3 million acres. Behind Georgia were South Carolina with 2.9 million acres and Virginia with 0.6 million acres. The proportion of timberland classified as wetland was 36 percent in Florida, 25 percent in North Carolina, 23 percent in South Carolina, 18 percent in Georgia, and only 4 percent in Virginia.

Table I—Area of timberland by wetland status and ownership class, South Atlantic States[a]

		Ownership class		
Wetland status	All classes	Public	Forest industry[b]	Nonindustrial private
		Thousand acres		
Wetlands	17,624.3	2,093.6	5,024.5	10,506.1
Other	67,435.4	7,589.2	10,836.9	49,009.3
Total	85,059.6	9,682.8	15,861.4	59,515.4

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

[a] States and dates of inventory: North Carolina, 1990; Virginia, 1992; South Carolina, 1993; Florida, 1995; and Georgia, 1997.

[b] Includes timberland under long-term lease from nonindustrial private owners.

Figure 2 maps the percent of timberland that occurred on wetland sites in each county of the five-State region. Although North Carolina was second overall in wetland timberland acreage, it led in wetland timberland density: 11 of its counties had two-thirds or more of their timberland acreage on wetland sites. The map shows that 97 percent of the wetland timberland in the five States occurred in the Coastal Plain province, followed by 3 percent in the Piedmont province, and a trace in the Mountain province. Overall timberland acreage on wetland sites was 32 percent for the Coastal Plain, 3 percent for the Piedmont, and only a fraction of a percent for the Mountains.

Sixty percent of the region's 17.6 million acres of wetland timberland were under nonindustrial private forest (NIPF) ownership, followed by 29 percent for forest industry, and 12 percent for various public ownerships (fig. 3). Wetland timberland as a proportion of total timberland was highest on forest industry land where 32 percent of the holdings were classified as wetland, followed by 22 percent for public timberland, and only 18 percent for NIPF timberland. However, these percentages were influenced by location of land holdings. Even though the majority of timberland in each major ownership category was found in the Coastal

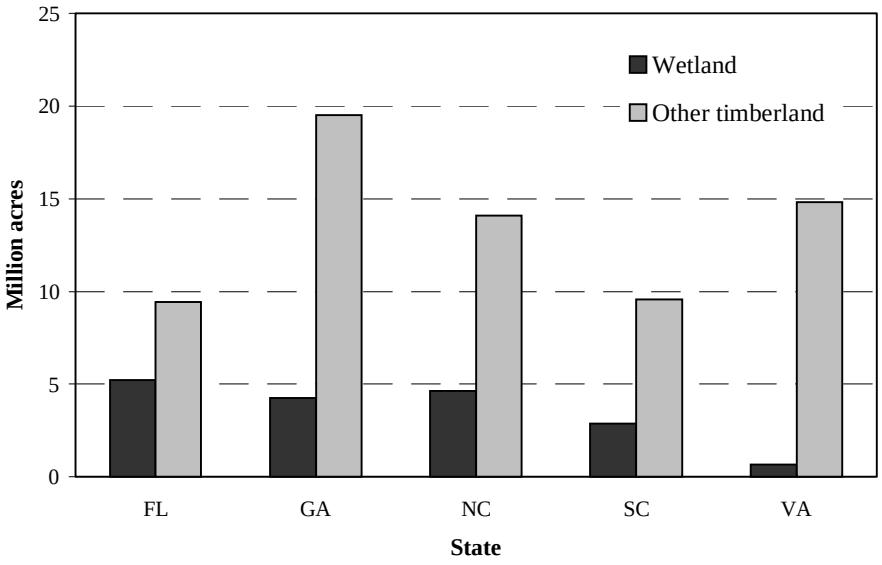

Figure 1—Wetland timberland versus other timberland by State in the South Atlantic States, circa 1990s.

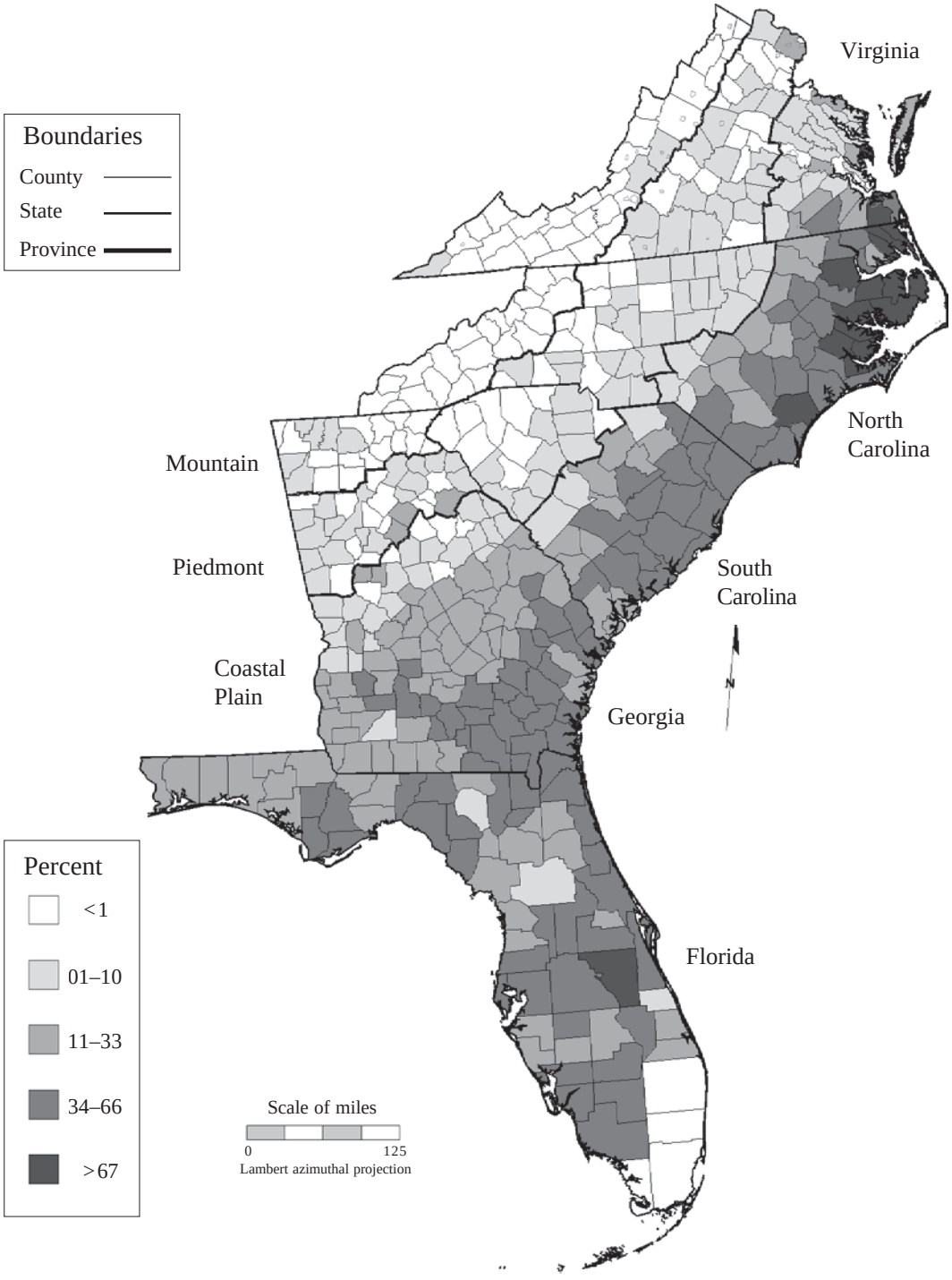

Figure 2—Map of percent wetland timberland by county in the Mountain, Piedmont, and Coastal Plain provinces (boundaries based on FIA units that most closely approximate physiographic divisions from the U.S. Geological Survey 1970) of the South Atlantic States, circa 1990s.

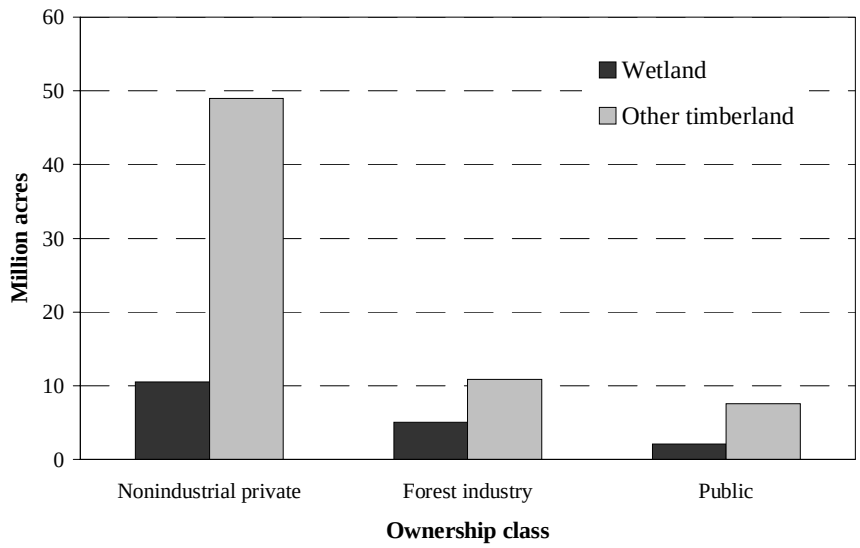

Figure 3—Wetland timberland by ownership class in the South Atlantic States, circa 1990s.

Plain, the proportion varied widely. For example, 85 percent of forest industry land was in the Coastal Plain province where there was a higher incidence of wetland. In contrast, only 56 percent of the public land was found in the Coastal Plain; 34 percent occurred in the Mountain province where there was much more relief and a much lower incidence of wetland.

Stand Size and Age Structure

Sawtimber comprised 48 percent of the region's wetland timberland, followed by 26 percent for sapling-seedling-sized stands, 24 percent for poletimber, and 2 percent for nonstocked areas (fig. 4). NIPF owners controlled the majority of each stand-size class (table II).

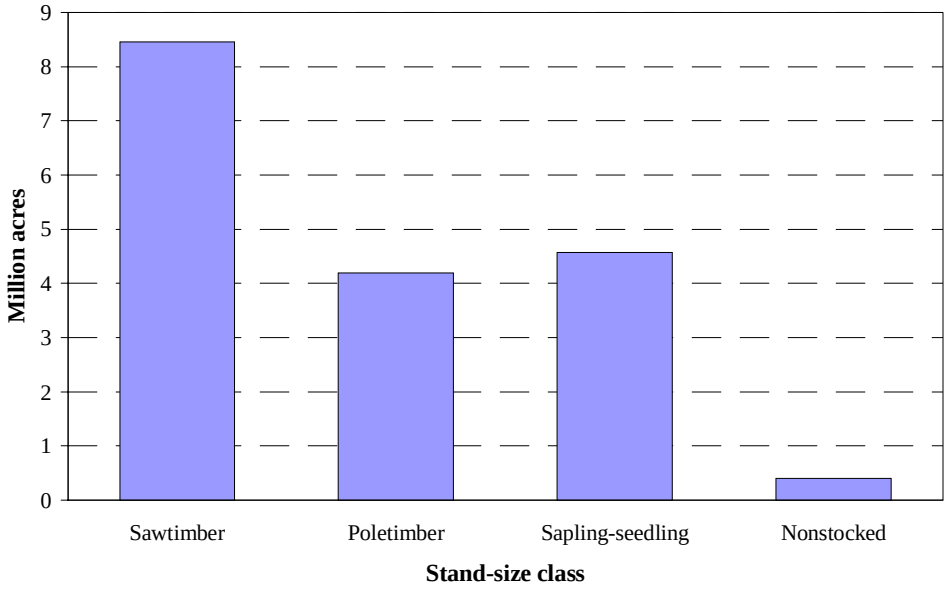

Figure 4—Wetland timberland by stand-size class in the South Atlantic States, circa 1990s.

Table II—Area of wetland timberland by stand-size and ownership classes, South Atlantic States[a]

Stand-size class	All classes	Ownership class		
		Public	Forest industry[b]	Nonindustrial private
		Thousand acres		
Sawtimber	8,460.3	1,188.7	1,932.5	5,339.0
Poletimber	4,190.0	489.1	1,370.3	2,330.6
Sapling-seedling	4,571.4	366.3	1,559.4	2,645.8
Nonstocked	402.6	49.6	162.4	190.7
All classes	17,624.3	2,093.6	5,024.5	10,506.1

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

[a] Dates of inventory: North Carolina, 1990; Virginia, 1992; South Carolina, 1993; Florida, 1995; and Georgia, 1997.

[b] Includes timberland under long-term lease from nonindustrial private owners.

More than a fifth of wetland timberland acreage (fig. 5) was categorized as having no manageable stand (NMS) present. This category applies to areas with less than 60 percent stocking of similarly sized and aged trees that can be grouped together under one management strategy. Inadequate regeneration, often found on sites made adverse by water levels or saturated soils, can result in insufficient stocking to form a manageable stand, causing acreage to be classified as NMS. For all ownership categories, NMS accounted for more of the wetland timberland than any individual age class. Two findings were notable: first, the relative paucity of wetland timberland in stands 21 to 30 years old; and second, the apparent accumulation of stands between 41 and 70 years old.

Stand-age differed by ownership class (table III). Forest industry had a higher proportion of wetland timberland in stands less than 31 years old, a result of pine plantings and a structure skewed toward younger stands. Public wetland timberland had the lowest proportion of stands below 31

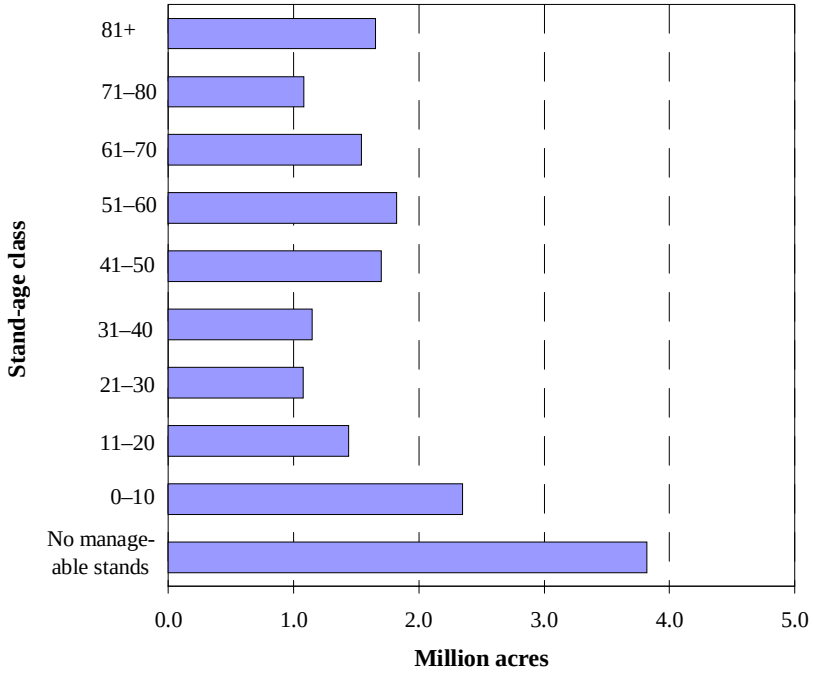

Figure 5—Wetland timberland by stand-age class in the South Atlantic States, circa 1990s.

Table III—Area of wetland timberland by stand-age and ownership classes, South Atlantic States[a]

Stand-age class	All classes	Ownership class		
		Public	Forest industry[b]	Nonindustrial private
Years		*Thousand acres*		
0–10	2,347.1	119.1	857.0	1,371.0
11–20	1,440.3	78.1	629.3	733.0
21–30	1,074.5	78.8	396.6	599.1
31–40	1,147.7	151.8	240.4	755.4
41–50	1,696.6	204.1	425.0	1,067.6
51–60	1,822.6	219.8	412.6	1,190.2
61–70	1,542.1	264.9	310.2	967.0
71–80	1,083.4	179.2	211.3	692.9
81+	1,653.5	300.3	466.0	887.2
No manageable stand	3,816.6	497.6	1,076.3	2,242.7
All classes	17,624.3	2,093.6	5,024.5	10,506.1

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

[a] States and dates of inventory: North Carolina, 1990; Virginia, 1992; South Carolina, 1993; Florida, 1995; and Georgia, 1997.

[b] Includes timberland under long-term lease from nonindustrial private owners.

years old and a structure skewed toward older stands. The NIPF wetland timberland had the most acreage in stands less than 11 years old, followed by a gap in the 11- through 40-year-old classes, and a large portion in stands 41 to 70 years old. The lower acreage in stands 11 to 40 years old could have resulted from periods of inadequate regeneration after harvest or natural disturbance.

Forest Management Types and Detailed Forest Types

Lowland hardwood forest management types accounted for 62 percent of the region's 17.6 million acres of wetland timberland, and pine plantation and natural pine types together accounted for 25 percent (fig. 6). In this instance, combining pine types makes more sense than separating

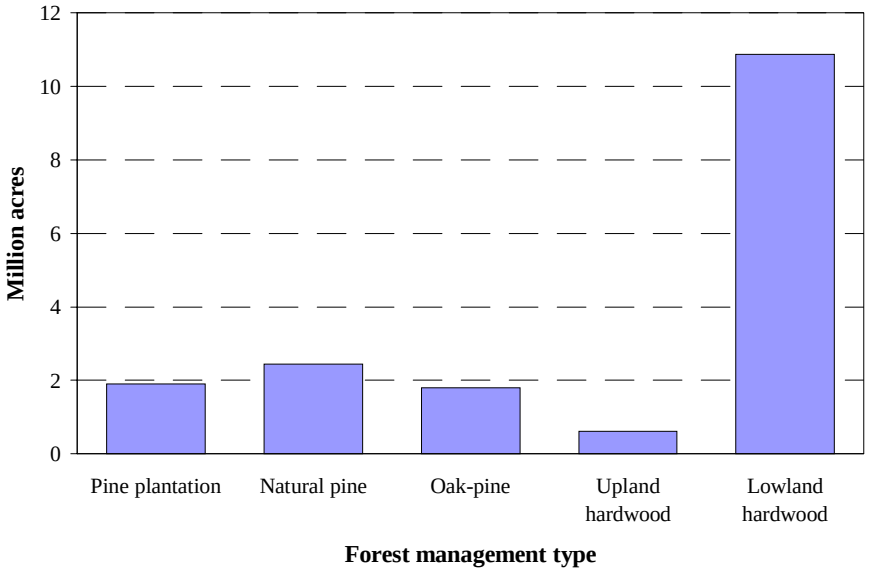

Figure 6—Wetland timberland by forest management type in the South Atlantic States, circa 1990s.

them. Although plantation pine accounted for 11 percent of the wetland timberland, much of its acreage has come from the planting of former natural pine stands after harvest. Oak-pine types represented 10 percent and the remaining 3 percent of the wetland timberland consisted of transitional areas classified as upland hardwood types.

The region had 16.9 million acres in pine plantations. Nearly 1.9 million acres or 11 percent of these were classified as wetlands ranging from 32 percent in North Carolina, 14 percent in Florida, 10 percent in South Carolina, 4 percent in Georgia, and just 3 percent in Virginia.

In four out of the five forest management type categories, the majority of the wetland timberland acreage was under NIPF ownership (table IV). The exception was pine plantations where 68 percent was in forest industry ownership, followed by 27 percent in NIPF ownership, and 5 percent in public ownership.

Figure 7 shows specific detailed forest-type groups that occurred in the region's wetland timberland. With nearly 4.8 million acres, sweetbay-blackgum-red maple was the most common individual forest type accounting for 27 percent of the region's wetland timberland. Second was sweetgum-water oak-willow oak with 14 percent (2.4 million acres). Cypress-water tupelo, frequently photographed to depict forested wetlands, occupied only 13 percent (2.2 million acres) of the wetland timberland. Loblolly and slash pine types with 10 percent each, and pond pine type with nearly 5 percent, together represented nearly 25 percent of the wetland timberland, almost as much as the predominant hardwood type. Pines were found on many other acres of wetland timberland, such as the combined 1.6 million acres of slash pine-hardwood and loblolly pine-hardwood types that accounted for nearly 9 percent of the wetland timberland. Individual types with less than 25,000 acres cumulatively across the region were condensed into a miscellaneous category. This category included longleaf pine, white oak-red oak-hickory, slash pine-hardwood, cottonwood, and yellow-poplar-white oak-red oak forest types.

Table IV—Area of wetland timberland by forest management type and ownership class, South Atlantic States[a]

Forest management type	All classes	Ownership class		
		Public	Forest industry[b]	Nonindustrial private
		Thousand acres		
Pine plantation	1,899.0	90.8	1,288.6	519.5
Natural pine	2,438.2	535.4	530.5	1,372.3
Oak-pine	1,802.4	177.1	431.0	1,194.3
Upland hardwood	606.1	26.4	93.3	486.4
Lowland hardwood	10,878.6	1,264.0	2,681.1	6,933.6
All types	17,624.3	2,093.6	5,024.5	10,506.1

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

[a] States and dates of inventory: North Carolina, 1990; Virginia, 1992; South Carolina, 1993; Florida, 1995; and Georgia, 1997.

[b] Includes timberland under long-term lease from nonindustrial private owners.

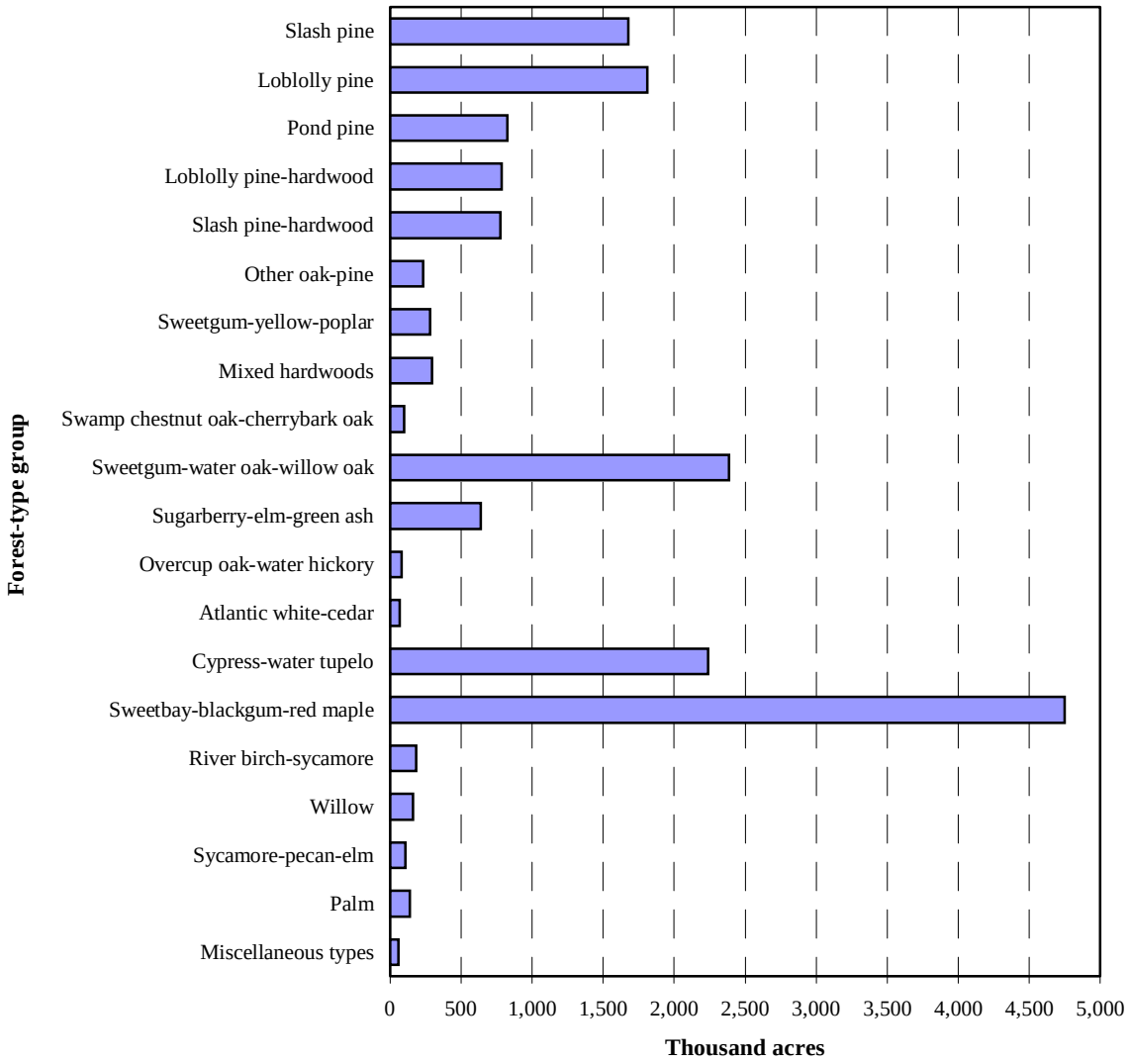

Figure 7—Wetland timberland by detailed forest-type group in the South Atlantic States, circa 1990s.

For most detailed forest types, NIPF ownerships held most of the wetland timberland (table V). Notable exceptions were the loblolly pine type—49 percent forest industry versus 45 percent NIPF—and slash pine type—46 percent forest industry versus 38 percent NIPF.

Physiography

Plots were assigned a physiographic class based on soil moisture and drainage, topography, aspect, and soil characteristics. To emphasize the importance of soil moisture availability, the classes were sorted into three categories: xeric, mesic, and hydric.[1]

Wetland timberland was found on all but the xeric physiographic classes. The majority of wetland timberland was in the flatwoods physiographic class (fig. 8). Flatwoods dominated the region's wetland timberland with 31 percent of the total, followed by small drains with 16 percent, and bays

[1] U.S. Department of Agriculture, Forest Service. 1985. Field instructions for the Southeast. 81 p. Unpublished data. On file with: USDA Forest Service, Southern Research Station, Forest Inventory and Analysis Research Work Unit, P.O. Box 2680, Asheville, NC 28802.

Table V—Area of wetland timberland by forest type and ownership class, South Atlantic States[a]

Forest type	All classes	Ownership class		
		Public	Forest industry[b]	Nonindustrial private
		Thousand acres		
Slash pine	1,678.8	272.8	771.3	634.7
Loblolly pine	1,812.5	97.6	893.5	821.4
Pond pine	826.0	242.0	148.4	435.7
Loblolly pine-hardwood	787.5	43.8	123.2	620.5
Slash pine-hardwood	779.0	90.5	259.8	428.7
Other oak-pine	233.1	42.7	45.4	145.0
Sweetgum-yellow-poplar	283.4	8.7	35.6	239.1
Mixed hardwoods	298.1	14.6	57.7	225.8
Swamp chestnut oak-cherrybark oak	101.1	15.4	15.9	69.7
Sweetgum-water oak-willow oak	2,385.9	152.7	538.7	1,694.4
Sugarberry-American elm-green ash	639.6	100.7	139.9	399.0
Overcup oak-water hickory	84.5	13.6	32.0	39.0
Atlantic white-cedar	67.8	16.5	19.9	31.5
Cypress-water tupelo	2,239.0	345.4	618.5	1,275.1
Sweetbay-blackgum-red maple	4,750.8	545.7	1,198.3	3,006.9
River birch-sycamore	185.1	9.5	23.0	152.6
Willow	161.3	5.7	39.2	116.3
Sycamore-pecan-American elm	109.9	10.8	28.3	70.8
Palm	139.9	47.9	21.5	70.4
Miscellaneous types[c]	61.0	16.9	14.6	29.5
All types	17,624.3	2,093.6	5,024.5	10,506.1

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

[a] States and dates of inventory: North Carolina, 1990; Virginia, 1992; South Carolina, 1993; Florida, 1995; and Georgia, 1997.

[b] Includes timberland under long-term lease from nonindustrial private owners.

[c] Individual types with less than 25,000 acres cumulatively across the region were condensed into the miscellaneous category. This category includes longleaf pine, white oak-red oak-hickory, cottonwood, yellow-poplar-white oak-northern red oak, and eastern redcedar-hardwood.

and wet pocosins with 13 percent. The other hydric physiographic class, which included cypress ponds, comprised 11 percent of the total wetland timberland. Broad and narrow floodplains when combined accounted for 19 percent of the wetland timberland. Surprisingly, deep swamps, a well-known physiographic class, comprised less than 7 percent of total wetland timberland. Based on operability within forest condition values (see footnote 1) collected in the study, only 2.1 million acres or 12 percent of the wetland timberland had year-round surface water, 8.4 million acres or 48 percent had seasonal surface water, and 0.4 million acres or 2 percent had mixed wet and dry areas. The remaining 6.6 million acres or 38 percent were classified as having no regular surface water conditions. These areas had soil saturation to the surface for some period during the growing season, enough to create anaerobic conditions, form hydric soils, and favor hydric vegetation.

NIPF owners held the largest portion of the wetland timberland in all physiographic classes (table VI). Ownership of wetland timberland was most equally distributed in bays and wet pocosins; here lay the largest portion of publicly owned wetland timberland, 29 percent. Forest industry ownership was greatest in the flatwoods class, which comprised 37 percent of all forest industry wetland timberland.

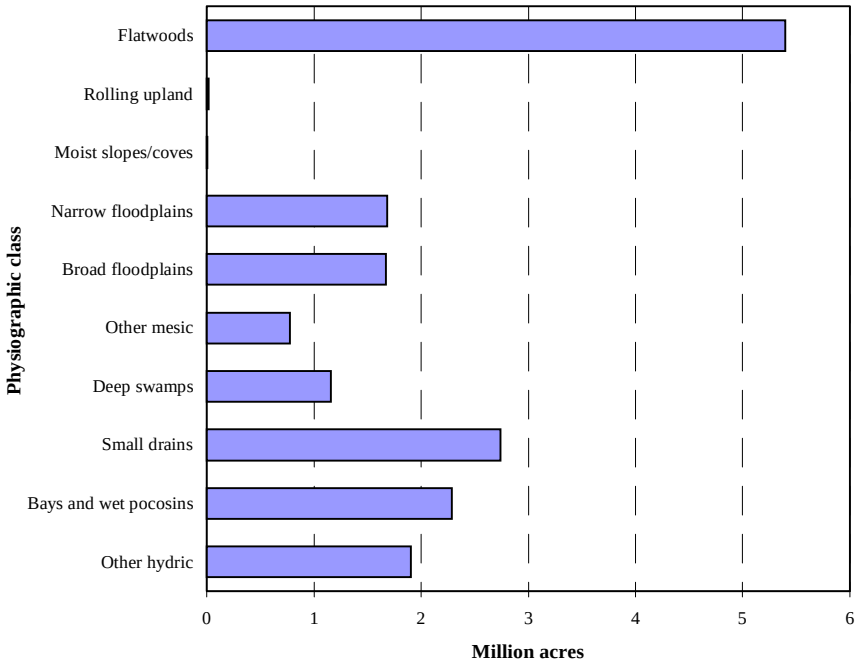

Figure 8—Wetland timberland by physiographic class in the South Atlantic States, circa 1990s.

Table VI—Area of wetland timberland by physiographic and ownership classes, South Atlantic States[a]

Physiographic class	All classes	Ownership class		
		Public	Forest industry[b]	Nonindustrial private
		Thousand acres		
Flatwoods	5,399.7	347.3	1,869.5	3,182.8
Rolling uplands	12.6	4.0	3.6	4.9
Moist mountain slopes/coves	3.9	—	—	3.9
Narrow floodplains	1,680.5	115.0	260.9	1,304.6
Broad floodplains	1,667.0	229.7	521.4	915.9
Other mesic	774.7	126.1	200.9	447.7
Deep swamps	1,156.6	233.8	310.4	612.4
Small drains	2,739.9	186.7	610.3	1,942.9
Bays and wet pocosins	2,288.1	611.9	695.3	980.9
Other hydric	1,901.4	239.1	552.2	1,110.1
All classes	17,624.3	2,093.6	5,024.5	10,506.1

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

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] States and dates of inventory: North Carolina, 1990; Virginia, 1992; South Carolina, 1993; Florida, 1995; and Georgia, 1997.

[b] Includes timberland under long-term lease from nonindustrial private owners.

Volume, Growth, Removals, and Mortality

At 30 billion cubic feet, the volume of growing-stock timber on wetland timberland accounted for 24 percent of total growing-stock volume on all timberland in the five-State region, 96 percent of which occurred in the Coastal Plain province. Within the Coastal Plain, wetland timberland volume was 43 percent of the total timberland volume. For

the region as a whole, 36 percent of the wetland timberland volume was in softwood species and 64 percent was in hardwood species (fig. 9).

NIPF ownerships contained 61 percent of the wetland timberland volume, forest industry had 25 percent, and public ownerships had 14 percent (table VII). Hardwood volume exceeded softwood volume in all ownership categories. NIPF land had twice as much volume in hardwood as in softwood and led the other ownerships in softwood and hardwood volume. Although forest industry had 28 percent of the total softwood volume, this percent may increase as its high proportion of young stands mature (table III).

Net annual growth of growing-stock timber on wetland timberland averaged 845 million cubic feet and accounted for 18 percent of the total growth for all timberland in the region. As with volume, 97 percent of the wetland net annual growth occurred in the region's Coastal Plain province, where growth on wetland timberland accounted for 27 percent of the province's total timberland growth. Softwood growth was slightly less than hardwood growth (fig. 10). NIPF ownerships accounted for 59 percent of the

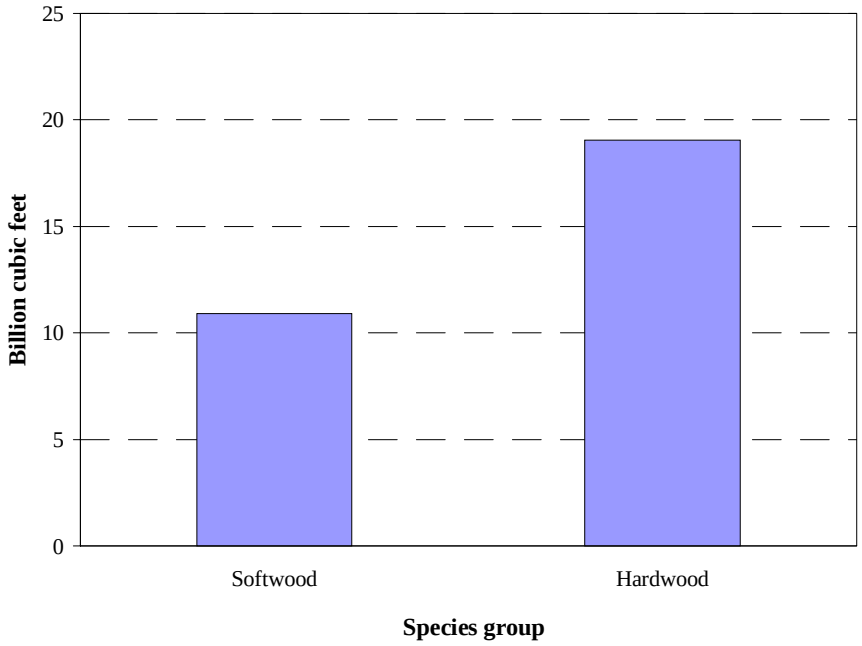

Figure 9—Volume on wetland timberland in the South Atlantic States, circa 1990s.

Table VII—Volume of growing stock on wetland timberland by species group and ownership class, South Atlantic States[a]

Species group	All classes	Ownership class		
		Public	Forest industry[b]	Nonindustrial private
		Million cubic feet		
Softwood	10,895.7	1,843.2	3,049.7	6,002.8
Hardwood	19,048.4	2,326.2	4,330.4	12,391.7
Total	29,944.1	4,169.5	7,380.1	18,394.5

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

[a] States and dates of inventory: North Carolina, 1990; Virginia, 1992; South Carolina, 1993; Florida, 1995; and Georgia, 1997.

[b] Includes timberland under long-term lease from nonindustrial private owners.

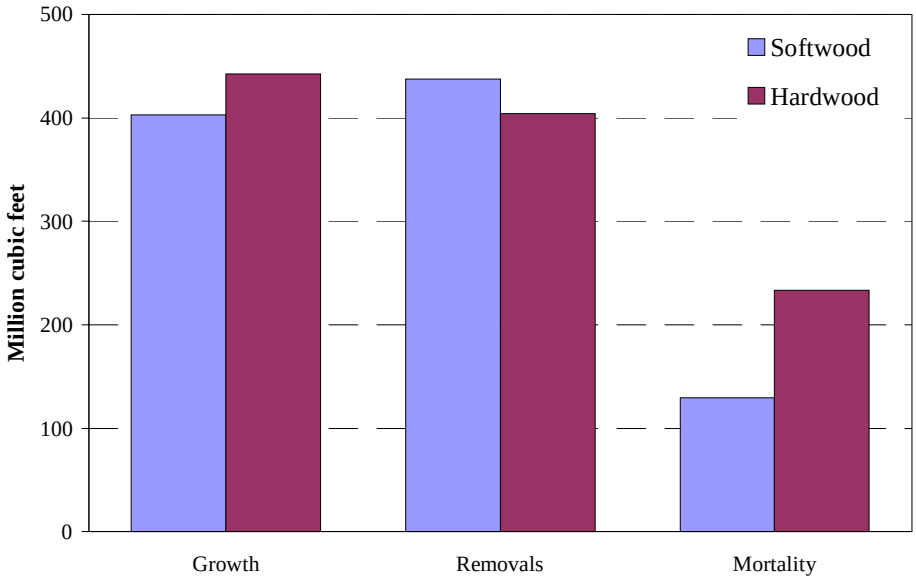

Figure 10—Growth, removals, and mortality on wetland timberland in the South Atlantic States, circa 1990s.

net growth, forest industry had 31 percent, and public ownerships had 10 percent (table VIII). Forest industry was the only owner category where softwood growth exceeded hardwood growth, and it did so by a wide margin of 1.9 to 1 compared to 0.63 to 1 for NIPF, and 0.77 to 1 for public ownerships.

Removals from wetland timberland averaged 842 million cubic feet annually, which accounted for 21 percent of the total removals from all timberland in the region. Similar to trends in volume and growth, 97 percent of the wetland timberland removals came from the Coastal Plain province, where wetland timberland removals accounted for 28 percent of all removals. Softwood species comprised 52 percent of the removals on wetland timberland (fig. 10). NIPF ownerships supplied 67 percent of the removals from wetland timberland, followed by forest industry with 28 percent, and public ownerships with 5 percent (table VIII). On both forest industry and public land, softwood removals exceeded hardwood removals, but the difference was more extreme on forest industry where twice as much softwood as hardwood was removed. Three-fourths of all hardwood removals clearly came from NIPF ownerships.

Growth on the region's wetland timberland exceeded removals by a narrow margin for all species and by a 1.10 to 1 margin for hardwoods, but removals slightly exceeded growth (1.09 to 1) for softwoods (fig. 10). In 1989, Hurricane Hugo severely damaged much of the timberland (wetland and other) in coastal South Carolina (Sheffield and Thompson 1992). Following this catastrophic event, extensive salvage operations undertaken to ameliorate losses resulted in removals greatly exceeding growth (see appendix), causing the regional disparity in softwoods. In contrast, growth on wetland timberland exceeded removals in the other South Atlantic States (see appendix) where the growth-to-removal relationship may be more indicative of long-term relationships in South Carolina and the region were it not for the hurricane disturbance in South Carolina.

Regional relationships showed some differences by ownership category. On NIPF ownerships wetland timberland removals exceeded growth (table VIII), but on forest industry and public lands, growth exceeded removals—an ownership trend that continued for softwoods when the data were analyzed by broad species groups. For hardwoods, the only difference was that growth nearly equaled removals on NIPF land. One explanation is that NIPF wetland timberland did not have the benefit of as many vigorous young pine plantations as forest industry had, which grew faster and survived Hurricane Hugo's effects better (Sheffield and Thompson 1992). Public lands had growth in excess of removals as a result of lower rates of harvest.

Mortality averaged 363 million cubic feet annually in the region's wetland timberland (fig. 10). However, mortality was inflated by Hurricane Hugo's damage in South Carolina, which experienced 44 percent of the region's total

Table VIII—Average net annual growth, average annual removals, and average annual mortality of growing stock on wetland timberland by ownership class and species group, South Atlantic States[a]

Ownership class	All species	Species group	
		Softwood	Hardwood
	Average net annual growth *(million cubic feet)*		
Public	80.6	35.0	45.6
Forest industry[b]	264.4	173.1	91.3
Nonindustrial private	500.5	194.9	305.6
All classes	845.5	403.0	442.5
	Average annual removals *(million cubic feet)*		
Public	40.0	21.5	18.4
Forest industry[b]	238.9	158.7	80.1
Nonindustrial private	562.9	257.6	305.3
All classes	841.7	437.9	403.8
	Average annual mortality *(million cubic feet)*		
Public	51.1	25.3	25.8
Forest industry[b]	85.3	30.9	54.5
Nonindustrial private	226.7	73.5	153.2
All classes	363.1	129.7	233.4

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

[a] Dates of inventory: North Carolina, 1990; Virginia, 1992; South Carolina, 1993; Florida, 1995; and Georgia, 1997.

[b] Includes timberland under long-term lease from nonindustrial private owners.

mortality. This was more than double the mortality in North Carolina, Georgia, and Florida, and many times higher than mortality in Virginia. Hardwoods comprised 64 percent of the region's total wetland timberland mortality with 66 percent occurring on NIPF land (table VIII). The Coastal Plain experienced 95 percent of the region's total wetland timberland mortality with 59 percent of Coastal Plain mortality occurring on NIPF land.

Disturbances, Condition, and Opportunities

One of the greatest impacts on timberland is conversion to cropland, urban development, or other land uses. Because conversion of wetland timberland is complicated by Federal regulations and by water, soil, and drainage problems, many of these acres tend to remain in a timberland status. Therefore, this bulletin only examines the treatments or disturbances that occurred on timberland remaining in the wetland timberland base. Of these, the largest was natural disturbance, which averaged 375,000 acres annually (fig. 11) and included damage from fire, weather, and animals with weather predominant because of Hurricane Hugo. In fact, 60 percent of the natural disturbance on the region's wetland timberland occurred in South Carolina (see appendix). In the absence of such a catastrophic event, natural disturbances probably would have had a much lower impact on wetland timberland. Rates of natural disturbance in Virginia, North Carolina, Georgia, and Florida (see appendix) were probably more indicative of the normal levels for South Carolina and the region.

Second in impact was final harvest, which took place on an annual average of 295,000 acres or 1.7 percent of total wetland timberland. North Carolina led in final harvests with 31 percent, followed by Georgia with 24 percent, Florida with 22 percent, South Carolina with 20 percent, and Virginia with only 3 percent (see appendix). Natural regeneration occurred on 171,000 acres annually, mostly on NIPF land (table IX), followed by site preparation on 107,000 acres, and artificial regeneration on 106,000 acres. Most site preparation and artificial regeneration (62 percent) and commercial thinning (72 percent) took place on forest industry land.

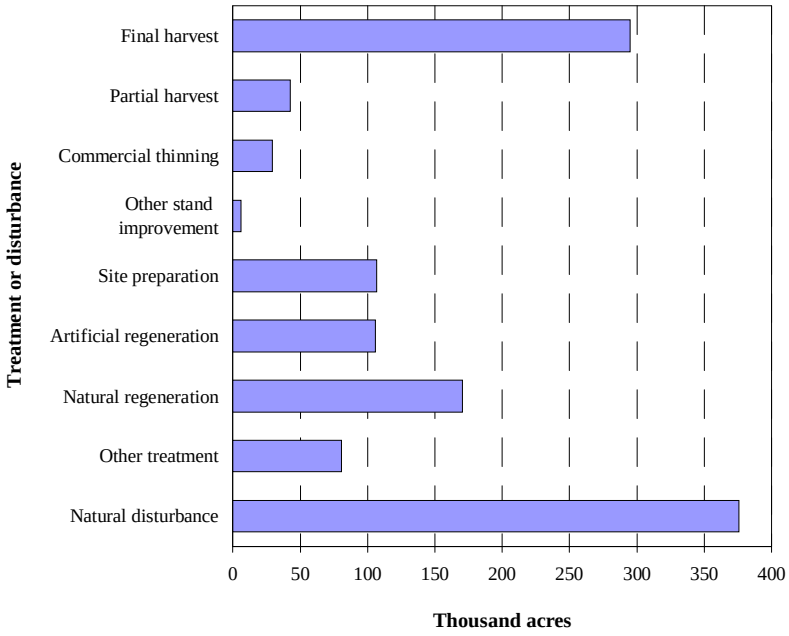

Figure 11—Past treatments and disturbances to wetland timberland in the South Atlantic States, circa 1990s.

Table IX—Area of wetland timberland treated or disturbed annually and retained in timberland by treatment or disturbance and ownership class, South Atlantic States[a]

Treatment or disturbance	All classes	Ownership class		
		Public	Forest industry[b]	Nonindustrial private
		Thousand acres		
Final harvest	294.8	7.8	101.7	185.4
Partial harvest	42.6	0.7	11.3	30.7
Commercial thinning	29.5	3.1	21.1	5.4
Other stand improvement	6.1	1.3	1.4	3.5
Site preparation	106.9	2.2	65.3	39.4
Artificial regeneration	105.8	2.1	66.1	37.6
Natural regeneration	170.6	9.7	33.6	127.3
Other treatment	80.9	5.1	22.6	53.2
Natural disturbance	375.4	39.3	86.8	249.4

Since some acres experience more than one treatment or disturbance, there are no column totals.

[a] States and dates of inventory: North Carolina, 1990; Virginia, 1992; South Carolina, 1993; Florida, 1995; and Georgia, 1997.

[b] Includes timberland under long-term lease from nonindustrial private owners.

Fifty-six percent of wetland timberland consisted of stands in relatively good condition (fig. 12), which was defined as not needing any traditional forest management practice to improve the stand. This was better than expected considering the degree of disturbance that Hurricane Hugo caused. Regeneration was identified as the most needed treatment on the region's wetland timberland to reverse the effects of poor stocking or the absence of a manageable stand. About 22 percent of the wetland timberland was judged to be inadequately stocked, with possible causes including high-grading harvesting and natural disturbances such as weather, flooding, and fire. Twelve percent of the

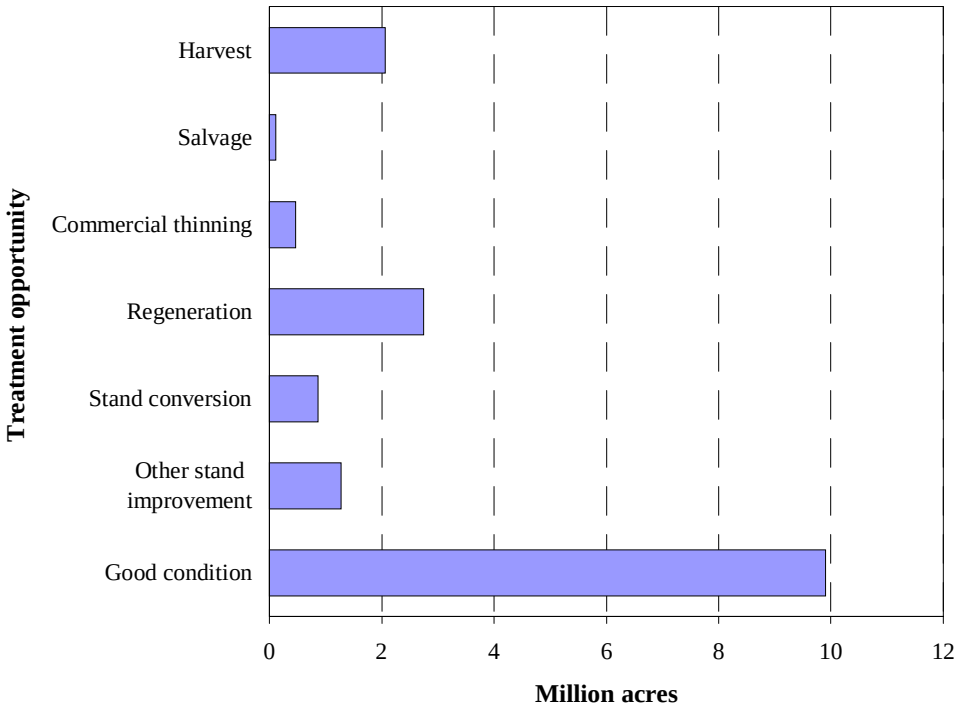

Figure 12—Condition and treatment opportunities on wetland timberland in the South Atlantic States, circa 1990s.

wetland timberland stands were determined to be mature or over mature and in need of harvesting. The NIPF ownership had the most acreage in all treatment opportunity groups (table X). However, forest industry nearly equaled the NIPF ownerships in acres needing a commercial thinning (table X) because of its high percentage (25) of wetland timberland in pine plantations (table IV).

Table X—Area of wetland timberland by treatment opportunity and ownership classes, South Atlantic States[a]

Treatment opportunity class	All classes	Ownership class		
		Public	Forest industry[b]	Nonindustrial private
		Thousand acres		
Salvage	119.8	12.3	24.4	83.1
Harvest	2,059.9	359.0	550.0	1,150.9
Commercial thinning	471.0	30.4	200.4	240.2
Other stand improvement	1,136.9	82.2	256.8	797.9
Stand conversion	120.3	12.0	26.0	82.3
Regeneration	3,816.6	497.6	1,076.3	2,242.7
Stands in relatively good condition	9,899.7	1,100.0	2,890.7	5,909.0
All classes	17,624.3	2,093.6	5,024.5	10,506.1

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

[a] States and dates of inventory: North Carolina, 1990; Virginia, 1992; South Carolina, 1993; Florida, 1995; and Georgia, 1997.

[b] Includes timberland under long-term lease from nonindustrial private owners.

Summary

The 17.6 million acres of wetland timberland accounted for 21 percent of all timberland in the South Atlantic States. The vast majority of wetland timberland, 97 percent, was found in the Coastal Plain. Florida alone had 30 percent of the wetland timberland, and 60 percent of the total wetland timberlands were under NIPF ownerships. Forty-eight percent of the wetland timberland was classified as sawtimber-sized stands. Although lowland hardwood stands accounted for 62 percent, pine stands surprisingly accounted for 25 percent of the wetland timberland. This was surprising because many perceive wet sites as dominated by hardwood or cypress. Pine plantations accounted for 11 percent of the wetland timberland or 44 percent of the pine wetland timberland. The individual forest types that comprised wetland timberland were diverse, but the sweetbay-blackgum-red maple type occupied the largest portion with 27 percent. Thirty-one percent of the wetland timberland occurred in the flatwoods physiographic class. Twenty-two percent did not have a manageable stand present and 13 percent had stands less than 11 years old. Almost 30 percent of the wetland timberland was in stands between 41 and 70 years old. Hardwood species comprised 64 percent of the 30 billion cubic feet of volume on wetland timberland. Growth averaged 846 million cubic feet annually and removals averaged 842 million cubic feet annually. Mortality averaged 363 million cubic feet annually, inflated by Hurricane Hugo in South Carolina where mortality more than doubled that in any of the other four States. Natural disturbance had the greatest impact, damaging 375,000 acres annually, again buoyed by the hurricane impact to South Carolina. Regeneration was recommended for 22 percent of the wetland timberland.

The data in this bulletin show that wetland timberland accounts for a significant portion of the timberland in the five South Atlantic States and an even larger component of the Coastal Plain province. Removal volumes suggest that the economic contributions of wetland timberland may have been vital to the viability of forestry operations in the Coastal Plain province. Because 32 percent of the Coastal Plain timberland was identified as wetland timberland and wetland timberland comprised 43 percent of all growing-stock timber volume in the Coastal Plain, much is at stake in this segment of the region. As shown, the majority of wetland timberland is privately owned and thus is a large part of the tax base in the counties where it occurs. The findings showed the large extent to which forest industry is vested in flatwoods and pine stands classified as wetland timberland.

Research suggests that forest management is compatible with maintaining nontimber wetland functions (Shepard and others 1993). In addition, Cubbage and others (1990) posed that any further legislation restricting these lands from traditional forest management practices, such as site preparation, stand conversion, or final harvest, would limit these lands to management in their natural state or not at all. The likely result would be reduced growth-and-output levels that would drastically alter both the ownerships and their local economies. The impact on local economies could mirror recent events in the Pacific Northwest, where restrictions on large segments of the timberland base suppressed many small town timber-based economies.

South Atlantic wetland timberlands have a preponderance of private ownerships that have depended on traditional forest management practices and view restrictions on traditional forestry as "taking without compensation." If new restrictions become necessary, an attractive countermeasure might be for regulatory agencies (U.S. Fish and Wildlife Service, Environmental Protection Agency, U.S. Army Corps of Engineers, and the Natural Resources and Conservation Service) to revisit the definitions of wetland components, which currently capture many acres typically not perceived as wetlands.

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Appendix

Procedures

The data for this study was derived from measurements recorded on forest survey plots visited between 1989 and 1998 during multiresource inventories of Virginia, North Carolina, South Carolina, Georgia, and Florida. The inventories were dated 1992 for Virginia, 1990 for North Carolina, 1993 for South Carolina, 1997 for Georgia, and 1995 for Florida. The multiresource inventory of these Southeastern States' timberland was conducted in accordance with guidelines described in "Field Instructions for the Southeast" (see footnote 1). A general summary of the inventory methods for each State can be found under the "How the Inventory is Made" section of Resource Bulletins SE–120 (Johnson 1991), SE–131 (Johnson 1992), SE–141 (Conner 1993), SRS–6 (Brown 1996), and SRS–36 (Thompson 1998).

Several steps were involved in the latest inventories of the five States forming the study area. Initial estimates of forest and nonforest area were based on the classification of 167,424 sample clusters systematically spaced on the latest aerial photographs available. A subsample of 36,306 of these 16-point clusters was ground checked.

Tree volume estimates and multiresource forest classifications were based on measurements recorded at 25,093 ground sample locations systematically distributed on timberland. Timberland was defined as land that either currently supports or previously supported live tree stocking of 16.7 percent and was not being developed for a nonforest land use or reserved from commercial timber production. Thus most parks, preserves, refuges, and wilderness areas are excluded from the data presented here.

In Virginia, North Carolina, South Carolina, and Florida the plot design at each ground location was based on a cluster of 10 points. Variable radius plots, based on a basal-area factor of 37.5 square feet per acre, were systematically spaced within a single forest condition at 5 of the 10 cluster points to sample trees with a diameter at breast height (d.b.h.) of 5 inches or larger. Trees less than 5 inches d.b.h. (1.0 to 4.9 inches) were tallied on a 6.8-foot fixed-radius plot around each of these points.

At the beginning of the Georgia survey, the USDA Forest Service implemented a new fixed-radius plot design to increase consistency among FIA units nationally. The new design employed a cluster of four points spaced 120 feet apart. Each point served as the center of a 1/24-acre circular subplot used to sample trees 5.0 inches d.b.h. and larger. A 1/300-acre circular microplot, located at the center of the subplot, was used to sample trees 1.0 through 4.9 inches d.b.h. and seedlings (trees less than 1.0 inch d.b.h.). These fixed-radius sample plots were established without regard to land use or forest cover. Forest and nonforest condition classes were delineated and recorded. Condition classes were defined by six attributes: land use, forest type, stand origin, stand size, stand density, and major ownership category. All trees tallied were assigned to their respective condition class.

In all five States, multiresource data including a ground and understory vegetation profile, snag and cover data for wildlife, access information, recreational use, slope and aspect,

water availability, and proximity of other land uses were collected at plot center. Ownership information was collected from correspondence, public records, and local contacts. Final estimates were based on statistical summaries of the data.

Procedures for collection of the wetland defining criteria were established in 1989 and are described in supplements titled "FIA Field Procedures for Wetland Identification."[2] Collection of the criteria was begun in April 1989 for the 1990 North Carolina survey. These procedures called for identifying the presence of the three diagnostic environmental characteristics pertaining to wetlands (hydric vegetation, hydric soils, and a wetland hydrology) as described in the "Federal Manual for Identifying and Delineating Jurisdictional Wetlands" (Federal Interagency Committee for Wetland Delineation 1989) and supplemented by the "Wetlands Delineation Manual" (U.S. Army Corps of Engineers 1987). The 1992 Virginia survey began in October 1990 and near its completion, the "Federal Manual for Identifying and Delineating Jurisdictional Wetlands" was suspended until a new manual was approved or the suspension lifted. The "Wetlands Delineation Manual" was to be used in the interlude. The principle difference between the manuals involved the wetland hydrology component of wetland definitions. The "Federal Manual for Identifying and Delineating Jurisdictional Wetlands" required soil saturation of 1 week or more during the growing season for the wetland hydrology component to be met, whereas the "Wetlands Delineation Manual" said that soil saturation from 5 through 12.5 percent of the growing season **might** constitute a wetland hydrology, and that saturation greater than 12.5 percent **did** constitute a wetland hydrology. Based upon an average growing season of 6 months, this meant soil saturation from 9 through 22 days during the growing season **might** constitute a wetland hydrology, and that saturation for at least 23 days **would** constitute a wetland hydrology. In practice, field crews sampled plots at different times of the year and had difficulty differentiating whether plots were saturated 7 days, 9 days, or 23 days. Professional judgment was often used to determine the presence of a wetland hydrology. Because of the difficulty of this time period differentiation, the indications that a new manual was being developed, the importance of two other wetland definition components (hydric soils and hydric vegetation), and the completion of almost two States of a five-State study, FIA elected to continue as begun. However, suspension of the "Federal Manual for Identifying and Delineating Jurisdictional Wetlands" was not lifted and a new manual was never developed. Hence, the "Wetlands Delineation Manual" remained in effect. The result is that some sites with less-duration soil saturation have been included in the wetland classification that could have overestimated acreage reported for some categories.

Vegetation was evaluated based on plant indicator status categories. These categories were obligate wetland, facultative wetland, facultative, facultative upland, and obligate upland (Reed 1988). Most trees, shrubs, vines, and grasses encountered were assigned to one of the indicator status categories. Vegetation was evaluated at the ground, understory, and overstory levels with equal weight given to each level. When 51 percent or more of the sample plot vegetation was facultative wetland or obligate, the hydric vegetation component was determined to be satisfied. Although the original instructions included facultative species as hydrophytic vegetation, FIA soon realized that including facultative species to meet the hydric vegetation component would misclassify many areas as having hydric vegetation that were not even borderline wetlands (Dubensky and others 1993). For example, loblolly pine is a facultative species and many areas in the Piedmont have over 50 percent loblolly pine, but these areas are clearly not wetlands. Soils were evaluated using a combination of USDA Soil Conservation Service (now Natural Resources Conservation Service) soil survey maps, a push tube soil corer, and the Munsel color chart. If indicators of anaerobic conditions were found within 1 foot of the soil surface, the hydric soil component was determined to be satisfied. The hydrology of the sample area was evaluated by evidence of inundation, sediment deposition, drift lines, topographic position, and drainage. If hydrology repeatedly caused soil saturation to the surface for at least 1 week during the growing season, then the wetland hydrology component was determined to be satisfied.

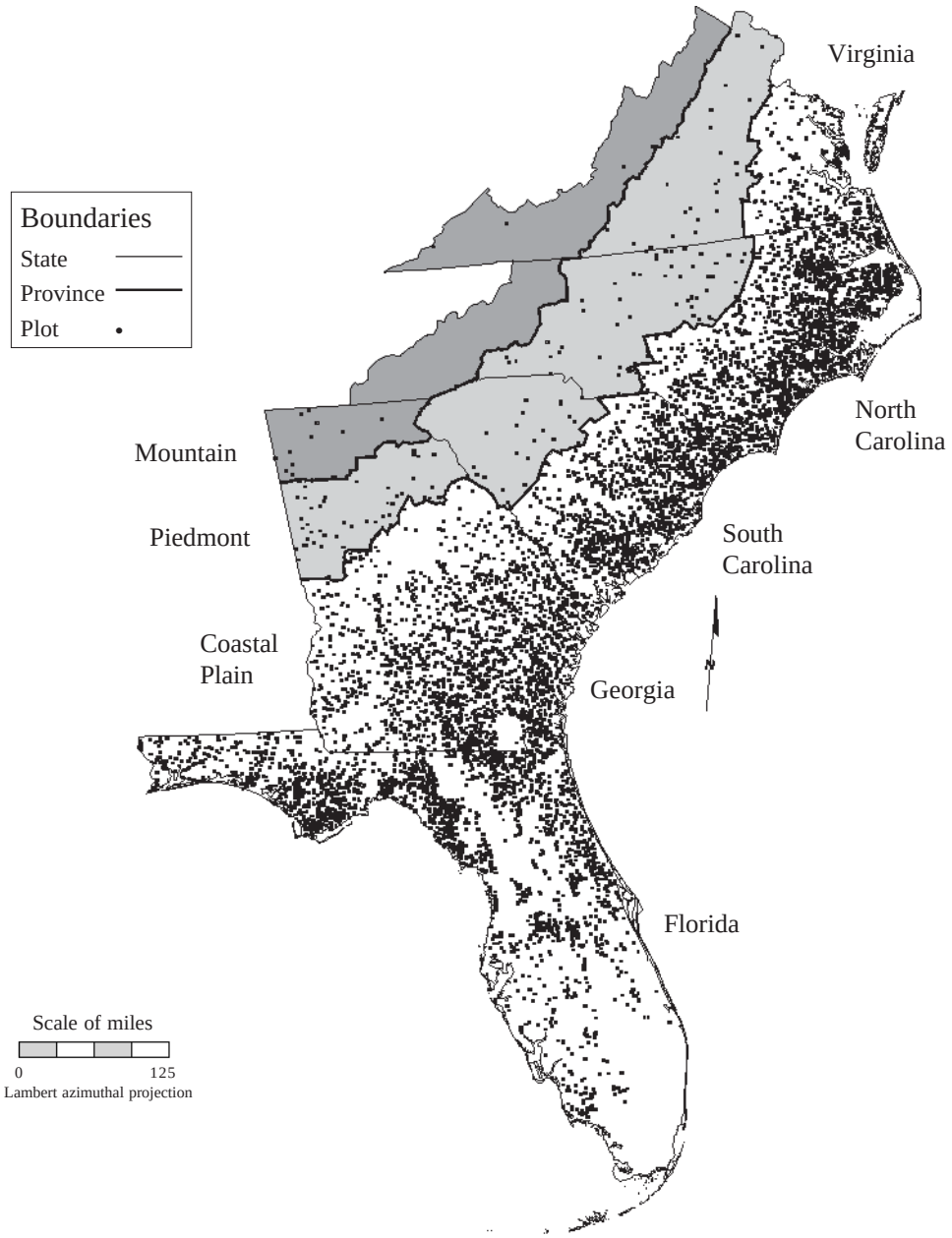
Those plots with all three wetland-defining criteria (hydric vegetation, hydric soils, and a wetland hydrology) present were pooled together into one data set and evaluated using established FIA techniques. The data set was comprised of 7,071 timberland plots classed as wetland across the five-State region. These plots and the resulting data were used to statistically quantify and describe wetland timberland. The distribution of these wetland timberland plots across the region was mapped (appendix fig. 1). Florida had the most with 1,967 plots and 28 percent of the total, followed by

[2] U.S. Department of Agriculture, Forest Service. 1989. FIA field procedures for wetland identification. 11 p. Unpublished data. On file with: USDA Forest Service, Southern Research Station, Forest Inventory and Analysis Research Work Unit, P.O. Box 2680, Asheville, NC 28802.

Georgia with 1,923 plots (27 percent), South Carolina with 1,175 plots (16 percent), North Carolina with 1,750 plots (25 percent), and Virginia with 256 plots (4 percent). Because statistical expansion factors used differed by State, unit, and county, the correlation between plots and number of acres presented is not directly proportional among the States. As might be expected, the majority of plots classified as wetland using this technique were concentrated in the Coastal Plain province of each State.

Statistical Reliability

In ordinary FIA surveys, double sampling methods are used. An initial estimate of forested acres is obtained through



Appendix figure 1—Map of plot distribution by region, State, and province (boundaries based on FIA units that most closely approximate physiographic divisions from U.S. Geological Survey 1970) in the South Atlantic States, circa 1990s.

photo interpretation, which is revised by field crew visits. In this study, only a field crew visit was used. Photo interpreters did not attempt to delineate wetlands, and although certain plots were checked, no data are available concerning the checks. Thus, an ordinary single sampling method was used:

$$\sigma(\bar{p}) = \sqrt{\frac{p(1-p)}{n}}$$

where

$\sigma(\bar{p})$ = the standard error for the mean proportion,

p = the probability of observing a wetland plot, and

n = the total number of plots for the geographic area (forest and nonforest).

For computing standard errors for volume, growth, removals, and mortality, the following formulae were used:

$$s^2(X) = \frac{\sum_{i=1}^{n}(X_i - \bar{X})^2}{(n-1)}$$

and

$$s(\bar{X}) = \sqrt{\frac{s^2(X)}{n}}$$

where

s = the sample standard deviation,

X = the variable of interest (in cubic feet per acre of volume, growth, removals, and mortality), and

n = the total number of wetland plots for the geographic area.

These equations build the following table:

Estimates and standard errors for key resource items of wetland timberland in the South Atlantic States

Item	Sample estimate and confidence interval	Sampling error
		Percent
Area[a]	17,624.275 ± 26.4	0.15
Volume[b]	29,944.109 ± 383.3	1.28
Growth[b]	845.458 ± 16.9	2.00
Removals[b]	841.708 ± 27.0	3.21
Mortality[b]	363.109 ± 11.9	3.27

[a] 1,000 acres.

[b] Million cubic feet.

The distribution of the sample mean converges to a normal distribution, and chances are two out of three that the true mean is within the confidence limit. There is over a 95 percent chance that the true mean is within two standard errors of the sample mean. Sampling error increases as the area or volume considered decreases. Sampling errors and associated confidence intervals are often unacceptably high for small components of the total resource. With these facts in mind, one may compute statistical confidence for any subdivision of survey unit or State totals using the following formula. Sampling errors obtained from this method are only approximations because this process assumes constant variance across all subdivisions of totals.

$$se_g = se_t\sqrt{\frac{X_t}{X_g}}$$

where

se_g = the standard error for the portion of the total desired,

se_t = the standard error for the total,

X_g = the variable of interest (area or volume) for the portion of the total desired, and

X_t = the total area or volume.

For example, the estimate of sampling error for volume of wetland timberland in North and South Carolina is:

$$se_g = 1.21\sqrt{\frac{29944}{(8107+5151)}} = 1.82\ .$$

Thus, the sampling error is 1.82 percent, and the resulting confidence interval (two times out of three) for volume on wetland timberland in North and South Carolina is 13,258 ± 241 million cubic feet.

Sampling errors for key resource items for individual States are provided in the following table. Users are cautioned that the precision of small area data is highly variable.

Standard error by State and region for volume, growth, removals, and mortality of wetland timberland

State	Volume	Growth	Removals	Mortality
		Percent		
Florida	2.34	3.00	6.50	6.01
Georgia	2.78	3.81	6.52	6.51
North Carolina	2.50	2.74	6.09	6.51
South Carolina	2.90	18.77	6.82	5.72
Virginia	6.07	6.12	16.67	19.27
Region	1.28	2.00	3.21	3.27

Definitions

Afforestation. Area of land previously classified as nonforest that is converted to forest by planting trees or by natural reversion to forest.

Average annual mortality. Average annual volume of trees 5.0 inches d.b.h. and larger that died from natural causes during the intersurvey period.

Average annual removals. Average annual volume of trees 5.0 inches d.b.h. and larger 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. and larger in the absence of cutting (gross growth minus mortality) during the intersurvey period.

Basal area. The area in square feet of the cross section at breast height of a single tree or of all the trees in a stand, usually expressed in square feet per acre.

Biomass. The aboveground fresh weight of solid wood and bark in live trees 1.0 inch d.b.h. and larger from the ground to the tip of the tree. All foliage is excluded. The weight of wood and bark in lateral limbs, secondary limbs, and twigs under 0.5 inch in diameter at the point of occurrence on sapling-size trees is included but is excluded on poletimber and sawtimber-size trees.

Bole. That portion of a tree between a 1-foot stump and a 4-inch top d.o.b. in trees 5.0 inches d.b.h. and larger.

Census water. Streams, sloughs, estuaries, canals, and other moving bodies of water 200 feet wide and greater, and lakes, reservoirs, ponds, and other permanent bodies of water 4.5 acres in area and greater.

Commercial species. Tree species currently or potentially suitable for industrial wood products.

D.b.h. Tree diameter in inches (outside bark) at breast height (4.5 feet aboveground).

Diameter class. A classification of trees based on tree d.b.h. Two-inch diameter classes are commonly used by Forest Inventory and Analysis, with the even inch as the approximate midpoint for a class. For example, the 6-inch class includes trees 5.0 through 6.9 inches d.b.h.

D.o.b. (diameter outside bark). Stem diameter including bark.

Forest land. Land at least 10 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use. The minimum area considered for classification is 1 acre. Forested strips must be at least 120 feet wide.

Forest management type. A classification of timberland based on forest type and stand origin.

Pine plantation. Stands that (a) have been artificially regenerated by planting or direct seeding, (b) are classed as a pine or other softwood forest type, and (c) have at least 10 percent stocking.

Natural pine. Stands that (a) have not been artificially regenerated, (b) are classed as a pine or other softwood forest type, and (c) have at least 10 percent stocking.

Oak-pine. Stands that have at least 10 percent stocking and classed as a forest type of oak-pine.

Upland hardwood. Stands that have at least 10 percent stocking and classed as an oak-hickory or maple-beech-birch forest type.

Lowland hardwood. Stands that have at least 10 percent stocking with a forest type of oak-gum-cypress, elm-ash-cottonwood, palm, or other tropical.

Nonstocked stands. Stands less than 10 percent stocked with live trees.

Forest type. A classification of forest land based on the species forming a plurality of live-tree stocking. Major eastern forest-type groups are:

White-red-jack pine. Forests in which eastern white pine, red pine, or jack pine, singly or in combination, constitute a plurality of the stocking. (Common associates include hemlock, birch, and maple.)

Spruce-fir. Forests in which spruce or true firs, singly or in combination, constitute a plurality of the stocking. (Common associates include maple, birch, and hemlock.)

Longleaf-slash pine. Forests in which longleaf or slash pine, singly or in combination, constitute a plurality of the stocking. (Common associates include oak, hickory, and gum.)

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.)

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.)

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 would be classified oak-pine. (Common associates include yellow-poplar, elm, maple, and black walnut.)

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, in which case the stand would be classified oak-pine. (Common associates include cottonwood, willow, ash, elm, hackberry, and maple.)

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.)

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.)

Nonstocked stands. Stands less than 10 percent stocked with live trees.

Forested tract size. The area of forest within the contiguous tract containing each Forest Inventory and Analysis sample plot.

Fresh weight. Mass of tree component at time of cutting.

Gross growth. Annual increase in volume of trees 5.0 inches d.b.h. and larger in the absence of cutting and mortality. (Gross growth includes survivor growth, ingrowth, growth on ingrowth, growth on removals before removal, and growth on mortality before death.)

Growing-stock trees. Living trees of commercial species classified as sawtimber, poletimber, saplings, and seedlings. Trees must contain at least one 12-foot or two 8-foot logs in the saw-log portion, currently or potentially (if too small to qualify), to be classed as growing stock. The log(s) must meet dimension and merchantability standards to qualify. Trees must also have, currently or potentially, one-third of the gross board-foot volume in sound wood.

Growing-stock volume. The cubic-foot volume of sound wood in growing-stock trees at least 5.0 inches d.b.h. from a 1-foot stump to a minimum 4.0-inch top d.o.b. of the central stem.

Hardwoods. Dicotyledonous trees, usually broadleaf and deciduous.

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

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

Industrial wood. All roundwood products except fuelwood.

Land area. The area of dry land and land temporarily or partly covered by water, such as marshes, swamps, and river floodplains (omitting tidal flats below mean high tide), streams, sloughs, estuaries, and canals less than 200 feet wide, and lakes, reservoirs, and ponds less than 4.5 acres in area.

Live trees. All living trees. All size classes, all tree classes, and both commercial and noncommercial species are included.

Log grade. A classification of logs based on external characteristics indicating quality or value.

Logging residues. The unused merchantable portion of growing-stock trees cut or destroyed during logging operations.

Net annual change. Increase or decrease in volume of live trees at least 5.0 inches d.b.h. Net annual change is equal to net annual growth minus average annual removals.

Noncommercial species. Tree species of typically small size, poor form, or inferior quality that normally do not develop into trees suitable for industrial wood products.

Nonforest land. Land that has never supported forests and land formerly forested where timber production is precluded by development for other uses.

Nonstocked stands. Stands less than 10 percent stocked with live trees.

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

Other removals. The growing-stock 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. The property owned by one ownership unit, including all parcels of land in the United States.

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. Land owned by companies or individuals operating primary wood-using plants.

Nonindustrial private forest (NIPF) land. Privately owned land excluding forest industry land or forest industry-leased 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.

Plant residues. Wood material generated in the production of timber products at primary manufacturing plants.

Coarse residues. Material, such as slabs, edgings, trim, veneer cores and ends, suitable for chipping.

Fine residues. Material, such as sawdust, shavings, and veneer chippings, not suitable for chipping.

Plant byproducts. Residues (coarse or fine) used in the manufacture of industrial products or for consumer use or as fuel.

Unused plant residues. Residues (coarse or fine) not used for any product, including fuel.

Poletimber-size trees. Softwoods 5.0 to 8.9 inches d.b.h. and hardwoods 5.0 to 10.9 inches d.b.h.

Primary wood-using plants. Industries receiving roundwood or chips from roundwood for the manufacture of products, such as veneer, pulp, and lumber.

Productive-reserved forest land. Forest land sufficiently productive to qualify as timberland but withdrawn from timber utilization through statute or administrative regulation.

Reforestation. Area of land previously classified as forest that is regenerated by planting trees or natural regeneration.

Rotten trees. Live trees of commercial species not containing at least one 12-foot saw log, or two noncontiguous saw logs, each 8 feet or longer, now or prospectively, primarily because of rot or missing sections, and with less than one-third of the gross board-foot tree volume in sound material.

Rough trees. Live trees of commercial species not containing at least one 12-foot saw log, or two noncontiguous saw logs, each 8 feet or longer, now or prospectively, primarily because

of roughness, poor form, splits, and cracks, and with less than one-third of the gross board-foot tree volume in sound material; and live trees of noncommercial species.

Roundwood (roundwood logs). Logs, bolts, or other round sections cut from trees for industrial or consumer uses.

Roundwood chipped. Any timber cut primarily for pulpwood, delivered to nonpulpmills, chipped, and then sold to pulpmills as residues, including chipped tops, jump sections, whole trees, and pulpwood sticks.

Roundwood products. Any primary product such as lumber, poles, pilings, pulp, or fuelwood, that is produced from roundwood.

Salvable dead trees. Standing or downed dead trees that were formerly growing stock and considered merchantable. Trees must be at least 5.0 inches d.b.h. to qualify.

Saplings. Live trees 1.0 to 5.0 inches d.b.h.

Saw log. A log meeting minimum standards of diameter, length, and defect, including logs at least 8 feet long, sound and straight, with a minimum diameter inside bark for softwoods of 6 inches (8 inches for hardwoods).

Saw-log portion. The part of the bole of sawtimber trees between a 1-foot stump and the saw-log top.

Saw-log top. The point on the bole of sawtimber trees above which a conventional saw log cannot be produced. The minimum saw-log top is 7.0 inches d.o.b. for softwoods and 9.0 inches d.o.b. for hardwoods.

Sawtimber-size trees. Softwoods 9.0 inches d.b.h. and larger and hardwoods 11.0 inches d.b.h. and larger.

Sawtimber volume. Growing-stock volume in the saw- log portion of sawtimber-size trees in board feet (International 1/4-inch rule).

Seedlings. Trees less than 1.0 inch d.b.h. and greater than 1 foot tall for hardwoods, greater than 6 inches tall for softwood, and greater than 0.5 inch in diameter at ground level for longleaf pine.

Select red oaks. A group of several red oak species composed of cherrybark, Shumard, and northern red oaks. Other red oak species are included in the "other red oaks" group.

Select white oaks. A group of several white oak species composed of white, swamp chestnut, swamp white, chinkapin, Durand, and bur oaks. Other white oak species are included in the "other white oaks" group.

Site class. A classification of forest land in terms of potential capacity to grow crops of industrial wood based on fully stocked natural stands.

Softwoods. Coniferous trees, usually evergreen, having leaves that are needles or scalelike.

Yellow pines. Loblolly, longleaf, slash, pond, shortleaf, pitch, Virginia, sand, spruce, and Table Mountain pines.

Other softwoods. Cypress, eastern redcedar, white-cedar, eastern white pine, eastern hemlock, spruce, and fir.

Stand age. The average age of dominant and codominant trees in the stand.

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.

Sawtimber stands. Stands at least 10 percent stocked with live trees, with half or more of total stocking in sawtimber and poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

Poletimber stands. Stands at least 10 percent stocked with live trees, of which half or more of total stocking is in poletimber and sawtimber trees, and with poletimber stocking exceeding that of sawtimber.

Sapling-seedling stands. Stands at least 10 percent stocked with live trees of which more than half of total stocking is saplings and seedlings.

Nonstocked stands. Stands less than 10 percent stocked with live trees.

Stocking. The degree of occupancy of land by trees, measured by basal area or the number of trees in a stand and spacing in the stand, compared with a minimum standard, depending on tree size, required to fully utilize the growth potential of the land.

Density of trees and basal area per acre required for full stocking

D.b.h. class	Trees per acre for full stocking	Basal area per acre
Seedlings	600	—
2	560	—
4	460	—
6	340	67
8	240	84
10	155	85
12	115	90
14	90	96
16	72	101
18	60	106
20	51	111

Timberland. Forest land capable of producing 20 cubic feet of industrial wood per acre per year and not withdrawn from timber utilization.

Timber products. Roundwood products and byproducts.

Tree. Woody plants having one erect perennial stem or trunk at least 3 inches d.b.h., a more or less definitely formed crown of foliage, and a height of at least 13 feet (at maturity).

Tree grade. A classification of the saw-log portion of sawtimber 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.

Upper-stem portion. The part of the main stem or fork of sawtimber trees above the saw-log top to minimum top diameter 4.0 inches outside bark or to the point where the main stem or fork breaks into limbs.

Volume of live trees. The cubic-foot volume of sound wood in live trees at least 5.0 inches d.b.h. from a 1-foot stump to a minimum 4.0-inch top d.o.b. of the central stem.

Volume of saw-log portion of sawtimber trees. The cubic-foot volume of sound wood in the saw-log portion of sawtimber trees. Volume is the net result after deductions for rot, sweep, and other defects that affect use for lumber.

Metric equivalents of units used in this report

1 acre = 4,046.86 square meters or 0.404686 hectare
1 cubic foot = 0.028317 cubic meter
1 inch = 2.54 centimeters or 0.0254 meter
Breast height = 1.4 meters above the ground
1 square foot = 929.03 square centimeters or 0.0929 square meter
1 square foot per acre basal area = 0.229568 square meter per hectare
1 pound = 0.454 kilogram
1 ton = 0.907 metric ton

Index of Detailed Tables

Table 1—Area of timberland by wetland status and ownership class, Virginia

Wetland status	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Thousand acres		
Wetlands	643.1	24.7	90.9	527.5
Other	14,804.5	1,958.6	1,463.9	11,382.0
Total	15,447.6	1,983.3	1,554.8	11,909.5

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 2—Area of wetland timberland by stand-size and ownership classes, Virginia

Stand-size class	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Thousand acres		
Sawtimber	326.2	22.0	43.8	260.4
Poletimber	175.2	—	17.0	158.3
Sapling-seedling	126.8	—	24.7	102.1
Nonstocked	14.8	2.7	5.4	6.7
All classes	643.1	24.7	90.9	527.5

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

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 3—Area of wetland timberland by stand-age and ownership classes, Virginia

Stand-age class	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
Years		*Thousand acres*		
0–10	49.0	—	6.2	42.8
11–20	62.0	—	17.5	44.5
21–30	42.2	—	11.5	30.7
31–40	32.2	—	—	32.2
41–50	53.4	0.5	9.4	43.5
51–60	50.8	1.1	8.4	41.3
61–70	57.8	2.7	5.0	50.1
71–80	49.9	4.0	2.2	43.6
81+	93.3	13.6	17.2	62.4
No manageable stand	152.6	2.7	13.5	136.4
All classes	643.1	24.7	90.9	527.5

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

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

Table 4—Area of wetland timberland by forest management type and ownership class, Virginia

Forest management type	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Thousand acres		
Pine plantation	41.9	—	15.2	26.7
Natural pine	70.9	2.7	15.9	52.3
Oak-pine	43.9	3.0	7.0	33.9
Upland hardwood	91.6	—	2.7	88.9
Lowland hardwood	394.8	19.0	50.2	325.7
All types	643.1	24.7	90.9	527.5

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

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 5—Area of wetland timberland by forest type and ownership class, Virginia

Forest type	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Thousand acres		
Slash pine	—	—	—	—
Loblolly pine	111.1	2.7	31.0	77.3
Pond pine	1.8	—	—	1.8
Loblolly pine-hardwood	38.6	3.0	7.0	28.6
Slash pine-hardwood	—	—	—	—
Other oak-pine	5.3	—	—	5.3
Sweetgum-yellow-poplar	31.2	—	—	31.2
Mixed hardwoods	54.4	—	2.7	51.7
Swamp chestnut oak-cherrybark oak	17.2	—	5.0	12.2
Sweetgum-water oak-willow oak	82.5	3.8	6.9	71.8
Sugarberry-American elm-green ash	61.1	1.9	9.8	49.5
Overcup oak-water hickory	2.8	—	—	2.8
Atlantic white-cedar	—	—	—	—
Cypress-water tupelo	40.2	0.2	4.9	35.0
Sweetbay-blackgum-red maple	94.0	2.0	12.5	79.6
River birch-sycamore	58.4	3.3	3.8	51.3
Willow	18.1	—	4.6	13.5
Sycamore-pecan-American elm	17.6	7.8	2.6	7.2
Palm	—	—	—	—
Miscellaneous types[b]	9.0	—	—	9.0
All types	643.1	24.7	90.9	527.5

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

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] Includes timberland under long-term lease from nonindustrial private owners.

[b] Individual types with less than 25,000 acres cumulatively across the region were condensed into the miscellaneous category. This category includes longleaf pine, white oak-red oak-hickory, cottonwood, yellow-poplar-white oak-northern red oak, and eastern redcedar-hardwood.

Table 6—Area of wetland timberland by physiographic and ownership classes, Virginia

Physiographic class	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Thousand acres		
Flatwoods	270.2	6.2	40.8	223.2
Rolling uplands	—	—	—	—
Moist mountain slopes/coves	3.9	—	—	3.9
Narrow floodplains	163.1	12.6	17.0	133.4
Broad floodplains	42.2	0.9	5.0	36.3
Other mesic	7.0	—	2.1	4.9
Deep swamps	48.0	2.1	—	46.0
Small drains	51.0	3.0	10.2	37.9
Bays and wet pocosins	13.3	—	2.7	10.5
Other hydric	44.5	—	13.1	31.4
All classes	643.1	24.7	90.9	527.5

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

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 7—Volume of growing stock on wetland timberland by species group and ownership class, Virginia

Species group	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Million cubic feet		
Softwood	300.4	10.6	70.4	219.4
Hardwood	921.1	82.6	91.5	746.9
Total	1,221.5	93.3	161.9	966.3

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 8—Average net annual growth, average annual removals, and average annual mortality of growing stock on wetland timberland by ownership class and species group, Virginia

Ownership class	All species	Species group	
		Softwood	Hardwood
	Average net annual growth *(million cubic feet)*		
Public	1.9	0.2	1.7
Forest industry[a]	5.5	2.8	2.7
Nonindustrial private	31.7	8.5	23.2
All classes	39.1	11.5	27.6
	Average annual removals *(million cubic feet)*		
Public	0.1	—	0.1
Forest industry[a]	6.4	2.0	4.4
Nonindustrial private	27.3	5.5	21.8
All classes	33.8	7.4	26.3
	Average annual mortality *(million cubic feet)*		
Public	0.5	—	0.5
Forest industry[a]	1.2	0.6	0.6
Nonindustrial private	8.1	0.8	7.3
All classes	9.8	1.4	8.4

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

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 9—Area of wetland timberland treated or disturbed annually and retained in timberland by treatment or disturbance and ownership class, Virginia

Treatment or disturbance	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Thousand acres		
Final harvest	7.1	0.5	1.3	5.4
Partial harvest	1.6	—	0.4	1.2
Commercial thinning	0.9	—	0.9	—
Other stand improvement	0.2	—	0.2	—
Site preparation	0.9	—	0.4	0.5
Artificial regeneration	0.9	—	—	0.9
Natural regeneration	6.0	—	0.7	5.3
Other treatment	1.3	—	—	1.3
Natural disturbance	13.0	—	2.8	10.2

Since some acres experience more than one treatment or disturbance, there are no column totals.

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 10—Area of wetland timberland by treatment opportunity and ownership classes, Virginia

Treatment opportunity class	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
	Thousand acres			
Salvage	—	—	—	—
Harvest	133.2	14.4	19.4	99.3
Commercial thinning	25.2	—	3.6	21.6
Other stand improvement	66.3	—	6.6	59.8
Stand conversion	—	—	—	—
Regeneration	152.6	2.7	13.5	136.4
Stands in relatively good condition	265.8	7.6	47.8	210.4
All classes	643.1	24.7	90.9	527.5

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

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 11—Area of timberland by wetland status and ownership class, North Carolina

Wetland status	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
	Thousand acres			
Wetlands	4,629.5	504.8	1,220.8	2,904.0
Other	14,080.9	1,497.9	1,199.6	11,383.4
Total	18,710.4	2,002.7	2,420.4	14,287.3

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 12—Area of wetland timberland by stand-size and ownership classes, North Carolina

Stand-size class	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
	Thousand acres			
Sawtimber	2,123.6	235.2	462.7	1,425.7
Poletimber	1,144.4	165.2	359.3	619.9
Sapling-seedling	1,267.7	100.0	363.8	804.0
Nonstocked	93.8	4.3	35.1	54.4
All classes	4,629.5	504.8	1,220.8	2,904.0

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 13—Area of wetland timberland by stand-age and ownership classes, North Carolina

Stand-age class	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
Years		*Thousand acres*		
0–10	715.2	20.2	246.9	448.2
11–20	513.6	29.2	246.0	238.5
21–30	358.9	30.6	146.5	181.8
31–40	341.3	60.6	62.6	218.1
41–50	459.8	68.7	81.2	310.0
51–60	480.5	59.3	69.8	351.4
61–70	343.2	57.4	58.9	227.0
71–80	260.9	33.9	52.8	174.2
81+	390.9	27.0	101.3	262.7
No manageable stand	765.0	118.0	154.8	492.2
All classes	4,629.5	504.8	1,220.8	2,904.0

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 14—Area of wetland timberland by forest management type and ownership class, North Carolina

Forest management type	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Thousand acres		
Pine plantation	677.5	34.2	513.2	130.2
Natural pine	999.4	221.2	184.9	593.4
Oak-pine	494.5	48.1	86.0	360.4
Upland hardwood	263.5	4.8	24.0	234.7
Lowland hardwood	2,194.5	196.6	412.7	1,585.3
All types	4,629.5	504.8	1,220.8	2,904.0

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 15—Area of wetland timberland by forest type and ownership class, North Carolina

Forest type	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Thousand acres		
Slash pine	29.3	—	24.5	4.7
Loblolly pine	1,059.8	51.9	575.9	431.9
Pond pine	574.0	192.3	94.9	286.9
Loblolly pine-hardwood	357.0	14.0	52.8	290.2
Slash pine-hardwood	8.3	—	5.3	3.0
Other oak-pine	129.2	34.1	27.9	67.2
Sweetgum-yellow-poplar	180.5	—	17.9	162.5
Mixed hardwoods	64.5	1.7	6.1	56.7
Swamp chestnut oak-cherrybark oak	25.1	2.9	1.5	20.7
Sweetgum-water oak-willow oak	463.9	18.5	44.8	400.6
Sugarberry-American elm-green ash	172.6	10.7	30.3	131.7
Overcup oak-water hickory	3.6	—	—	3.6
Atlantic white-cedar	33.6	8.8	5.9	18.9
Cypress-water tupelo	251.0	6.1	76.7	168.2
Sweetbay-blackgum-red maple	1,149.4	149.5	240.9	759.0
River birch-sycamore	45.0	—	7.3	37.7
Willow	25.0	—	5.4	19.6
Sycamore-pecan-American elm	22.9	—	—	22.9
Palm	—	—	—	—
Miscellaneous types[b]	34.9	14.2	2.8	18.0
All types	4,629.5	504.8	1,220.8	2,904.0

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

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] Includes timberland under long-term lease from nonindustrial private owners.

[b] Individual types with less than 25,000 acres cumulatively across the region were condensed into the miscellaneous category. This category includes longleaf pine, white oak-red oak-hickory, cottonwood, yellow-poplar-white oak-northern red oak, and eastern redcedar-hardwood.

Table 16—Area of wetland timberland by physiographic and ownership classes, North Carolina

Physiographic class	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
	Thousand acres			
Flatwoods	1,946.3	86.4	722.3	1,137.6
Rolling uplands	12.6	4.0	3.6	4.9
Moist mountain slopes/coves	—	—	—	—
Narrow floodplains	522.3	18.2	49.2	454.9
Broad floodplains	386.4	24.4	135.2	226.7
Other mesic	154.9	15.7	27.2	112.0
Deep swamps	239.2	18.9	74.1	146.2
Small drains	405.5	17.9	43.6	344.0
Bays and wet pocosins	893.0	304.2	152.9	436.0
Other hydric	69.4	15.0	12.7	41.7
All classes	4,629.5	504.8	1,220.8	2,904.0

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

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 17—Volume of growing stock on wetland timberland by species group and ownership class, North Carolina

Species group	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
	Million cubic feet			
Softwood	3,021.3	477.7	898.3	1,645.3
Hardwood	5,085.4	422.6	962.2	3,700.6
Total	8,106.7	900.3	1,860.5	5,345.9

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 18—Average net annual growth, average annual removals, and average annual mortality of growing stock on wetland timberland by ownership class and species group, North Carolina

Ownership class	All species	Species group	
		Softwood	Hardwood
	Average net annual growth *(million cubic feet)*		
Public	31.7	18.6	13.1
Forest industry[a]	100.2	72.1	28.2
Nonindustrial private	176.4	66.4	109.9
All classes	308.4	157.1	151.2
	Average annual removals *(million cubic feet)*		
Public	10.1	5.6	4.5
Forest industry[a]	63.2	49.3	13.8
Nonindustrial private	198.3	80.7	117.6
All classes	271.6	135.6	136.0
	Average annual mortality *(million cubic feet)*		
Public	6.5	3.9	2.6
Forest industry[a]	15.6	6.8	8.8
Nonindustrial private	43.6	15.4	28.2
All classes	65.7	26.1	39.5

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 19—Area of wetland timberland treated or disturbed annually and retained in timberland by treatment or disturbance and ownership class, North Carolina

Treatment or disturbance	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
	Thousand acres			
Final harvest	91.1	0.7	27.6	62.7
Partial harvest	10.1	—	0.4	9.7
Commercial thinning	17.3	2.1	14.1	1.1
Other stand improvement	1.2	—	0.4	0.8
Site preparation	41.1	—	22.9	18.2
Artificial regeneration	37.0	—	22.8	14.2
Natural regeneration	57.6	2.1	9.2	46.2
Other treatment	11.1	0.9	2.4	7.8
Natural disturbance	49.6	3.6	9.6	36.3

Since some acres experience more than one treatment or disturbance, there are no column totals.

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 20—Area of wetland timberland by treatment opportunity and ownership classes, North Carolina

Treatment opportunity class	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
	Thousand acres			
Salvage	13.4	1.6	—	11.8
Harvest	587.1	50.6	159.9	376.5
Commercial thinning	210.3	10.8	114.7	84.7
Other stand improvement	280.2	16.1	56.1	208.0
Stand conversion	29.7	2.3	11.3	16.1
Regeneration	765.0	118.0	154.8	492.2
Stands in relatively good condition	2,743.9	305.3	724.0	1,714.6
All classes	4,629.5	504.8	1,220.8	2,904.0

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

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 21—Area of timberland by wetland status and ownership class, South Carolina

Wetland status	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
	Thousand acres			
Wetlands	2,872.0	237.2	738.9	1,895.9
Other	9,582.9	876.8	1,655.3	7,050.8
Total	12,454.9	1,114.0	2,394.3	8,946.7

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 22—Area of wetland timberland by stand-size and ownership classes, South Carolina

Stand-size class	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
	Thousand acres			
Sawtimber	1,476.4	139.6	344.5	992.3
Poletimber	572.0	50.3	162.1	359.7
Sapling-seedling	797.2	45.3	221.1	530.8
Nonstocked	26.4	2.0	11.3	13.0
All classes	2,872.0	237.2	738.9	1,895.9

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 23—Area of wetland timberland by stand-age and ownership classes, South Carolina

Stand-age class	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
Years		*Thousand acres*		
0–10	531.2	30.2	153.4	347.5
11–20	218.8	7.6	81.3	129.9
21–30	136.8	7.6	45.9	83.2
31–40	170.8	16.2	27.8	126.8
41–50	230.3	20.8	55.4	154.2
51–60	306.1	27.1	66.0	213.0
61–70	283.0	26.7	55.4	201.0
71–80	194.2	15.9	36.8	141.5
81+	296.6	43.3	96.2	157.1
No manageable stand	504.1	41.8	120.6	341.7
All classes	2,872.0	237.2	738.9	1,895.9

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 24—Area of wetland timberland by forest management type and ownership class, South Carolina

Forest management type	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Thousand acres		
Pine plantation	261.8	2.5	183.1	76.2
Natural pine	327.4	41.9	63.7	221.9
Oak-pine	272.1	23.1	32.9	216.0
Upland hardwood	148.0	14.3	32.5	101.1
Lowland hardwood	1,862.8	155.4	426.7	1,280.6
All types	2,872.0	237.2	738.9	1,895.9

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 25—Area of wetland timberland by forest type and ownership class, South Carolina

Forest type	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Thousand acres		
Slash pine	18.4	4.0	5.3	9.1
Loblolly pine	462.5	29.7	213.9	218.9
Pond pine	108.2	10.6	27.6	70.1
Loblolly pine-hardwood	219.9	15.6	24.2	180.1
Slash pine-hardwood	7.3	—	2.2	5.2
Other oak-pine	44.9	7.6	6.5	30.7
Sweetgum-yellow-poplar	71.8	8.7	17.6	45.4
Mixed hardwoods	76.2	5.6	14.9	55.7
Swamp chestnut oak-cherrybark oak	43.7	5.0	4.9	33.8
Sweetgum-water oak-willow oak	735.8	41.7	158.5	535.7
Sugarberry-American elm-green ash	131.8	27.2	31.5	73.1
Overcup oak-water hickory	27.7	—	17.5	10.3
Atlantic white-cedar	—	—	—	—
Cypress-water tupelo	375.7	40.3	106.5	228.8
Sweetbay-blackgum-red maple	489.3	41.3	85.2	362.7
River birch-sycamore	16.3	—	4.4	11.8
Willow	12.3	—	5.5	6.8
Sycamore-pecan-American elm	19.7	—	6.8	13.0
Palm	2.1	—	—	2.1
Miscellaneous types[b]	8.4	—	5.9	2.5
All types	2,872.0	237.2	738.9	1,895.9

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

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] Includes timberland under long-term lease from nonindustrial private owners.

[b] Individual types with less than 25,000 acres cumulatively across the region were condensed into the miscellaneous category. This category includes longleaf pine, white oak-red oak-hickory, cottonwood, yellow-poplar-white oak-northern red oak, and eastern redcedar-hardwood.

Table 26—Area of wetland timberland by physiographic and ownership classes, South Carolina

Physiographic class	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Thousand acres		
Flatwoods	1,143.4	60.1	302.9	780.5
Rolling uplands	—	—	—	—
Moist mountain slopes/coves	—	—	—	—
Narrow floodplains	218.4	25.2	47.1	146.1
Broad floodplains	411.6	25.1	130.6	255.8
Other mesic	71.5	12.8	5.6	53.2
Deep swamps	275.4	29.0	81.8	164.6
Small drains	310.7	25.5	52.4	232.9
Bays and wet pocosins	277.1	43.5	89.8	143.8
Other hydric	163.8	16.0	28.7	119.0
All classes	2,872.0	237.2	738.9	1,895.9

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

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 27—Volume of growing stock on wetland timberland by species group and ownership class, South Carolina

Species group	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Million cubic feet		
Softwood	1,356.7	152.3	356.5	847.9
Hardwood	3,793.6	347.1	908.8	2,537.7
Total	5,150.4	499.4	1,265.4	3,385.6

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 28—Average net annual growth, average annual removals, and average annual mortality of growing stock on wetland timberland by ownership class and species group, South Carolina

Ownership class	All species	Species group	
		Softwood	Hardwood
	Average net annual growth *(million cubic feet)*		
Public	-10.4	-10.3	-0.0
Forest industry[a]	20.6	15.0	5.6
Nonindustrial private	40.2	9.1	31.0
All classes	50.4	13.8	36.6
	Average annual removals *(million cubic feet)*		
Public	9.5	4.0	5.4
Forest industry[a]	43.0	21.4	21.7
Nonindustrial private	114.5	49.9	64.6
All classes	166.9	75.3	91.6
	Average annual mortality *(million cubic feet)*		
Public	26.0	16.7	9.2
Forest industry[a]	37.1	12.8	24.3
Nonindustrial private	97.6	38.2	59.4
All classes	160.6	67.8	92.9

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 29—Area of wetland timberland treated or disturbed annually and retained in timberland by treatment or disturbance and ownership class, South Carolina

Treatment or disturbance	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Thousand acres		
Final harvest	59.2	1.7	13.6	43.9
Partial harvest	8.3	0.3	2.7	5.2
Commercial thinning	2.6	—	1.4	1.2
Other stand improvement	2.8	1.3	—	1.5
Site preparation	16.1	1.0	10.2	4.9
Artificial regeneration	17.4	0.8	11.4	5.2
Natural regeneration	50.9	3.1	6.9	40.9
Other treatment	19.3	2.3	3.2	13.8
Natural disturbance	225.0	25.0	59.0	141.0

Since some acres experience more than one treatment or disturbance, there are no column totals.

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 30—Area of wetland timberland by treatment opportunity and ownership classes, South Carolina

Treatment opportunity class	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
	Thousand acres			
Salvage	46.0	5.0	7.0	34.0
Harvest	350.0	49.4	106.4	194.2
Commercial thinning	51.4	2.7	25.6	23.2
Other stand improvement	190.7	11.2	29.8	149.8
Stand conversion	25.6	—	5.1	20.5
Regeneration	504.1	41.8	120.6	341.7
Stands in relatively good condition	1,704.1	127.2	444.4	1,132.5
All classes	2,872.0	237.2	738.9	1,895.9

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

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 31—Area of timberland by wetland status and ownership class, Georgia

Wetland status	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
	Thousand acres			
Wetlands	4,270.0	239.6	1,104.3	2,926.1
Other	19,526.1	1,511.5	3,786.2	14,228.4
Total	23,796.1	1,751.1	4,890.5	17,154.5

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 32—Area of wetland timberland by stand-size and ownership classes, Georgia

Stand-size class	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
	Thousand acres			
Sawtimber	2,097.5	150.0	440.9	1,506.6
Poletimber	897.0	32.4	273.2	591.3
Sapling-seedling	1,179.0	54.0	361.9	763.1
Nonstocked	96.5	3.2	28.3	65.1
All classes	4,270.0	239.6	1,104.3	2,926.1

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 33—Area of wetland timberland by stand-age and ownership classes, Georgia

Stand-age class	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
Years		*Thousand acres*		
0–10	566.5	19.4	182.5	364.5
11–20	290.2	11.8	73.6	204.9
21–30	252.0	6.8	68.1	177.1
31–40	343.3	26.4	76.7	240.2
41–50	479.9	30.9	115.4	333.6
51–60	499.2	18.8	116.8	363.6
61–70	349.7	16.0	54.0	279.7
71–80	214.4	23.0	34.0	157.5
81+	320.0	39.8	129.1	151.2
No manageable stand	954.8	46.8	254.2	653.8
All classes	4,270.0	239.6	1,104.3	2,926.1

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 34—Area of wetland timberland by forest management type and ownership class, Georgia

Forest management type	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Thousand acres		
Pine plantation	269.6	1.7	138.0	129.9
Natural pine	348.0	42.1	67.5	238.4
Oak-pine	525.8	32.7	144.3	348.8
Upland hardwood	36.4	—	13.2	23.2
Lowland hardwood	3,090.2	163.1	741.3	2,185.8
All types	4,270.0	239.6	1,104.3	2,926.1

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

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 35—Area of wetland timberland by forest type and ownership class, Georgia

Forest type	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Thousand acres		
Slash pine	428.6	25.0	134.4	269.3
Loblolly pine	142.2	11.4	59.8	71.0
Pond pine	46.8	7.3	11.4	28.1
Loblolly pine-hardwood	108.2	9.2	13.2	85.7
Slash pine-hardwood	387.1	22.5	125.6	239.1
Other oak-pine	30.5	1.0	5.5	24.0
Sweetgum-yellow-poplar	—	—	—	—
Mixed hardwoods	36.4	—	13.2	23.2
Swamp chestnut oak-cherrybark oak	13.7	6.1	4.6	3.0
Sweetgum-water oak-willow oak	717.7	38.3	154.0	525.4
Sugarberry-American elm-green ash	95.4	5.1	20.6	69.6
Overcup oak-water hickory	25.7	—	7.2	18.5
Atlantic white-cedar	—	—	—	—
Cypress-water tupelo	454.3	33.3	158.3	262.7
Sweetbay-blackgum-red maple	1,593.6	67.4	358.5	1,167.7
River birch-sycamore	60.1	3.8	7.4	48.9
Willow	80.0	3.0	11.9	65.1
Sycamore-pecan-American elm	46.8	3.0	18.9	24.9
Palm	3.1	3.1	—	—
Miscellaneous types[b]	—	—	—	—
All types	4,270.0	239.6	1,104.3	2,926.1

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

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] Includes timberland under long-term lease from nonindustrial private owners.

[b] Individual types with less than 25,000 acres cumulatively across the region were condensed into the miscellaneous category. This category includes longleaf pine, white oak-red oak-hickory, cottonwood, yellow-poplar-white oak-northern red oak, and eastern redcedar-hardwood.

Table 36—Area of wetland timberland by physiographic and ownership classes, Georgia

Physiographic class	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Thousand acres		
Flatwoods	748.3	35.4	210.9	502.0
Rolling uplands	—	—	—	—
Moist mountain slopes/coves	—	—	—	—
Narrow floodplains	515.8	18.3	89.4	408.1
Broad floodplains	503.6	36.9	162.1	304.6
Other mesic	159.0	19.1	44.4	95.4
Deep swamps	130.0	15.1	47.2	67.7
Small drains	1,343.4	53.7	249.1	1,040.6
Bays and wet pocosins	256.7	41.2	81.3	134.1
Other hydric	613.2	19.9	219.8	373.5
All classes	4,270.0	239.6	1,104.3	2,926.1

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

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 37—Volume of growing stock on wetland timberland by species group and ownership class, Georgia

Species group	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Million cubic feet		
Softwood	2,089.7	156.5	609.4	1,323.7
Hardwood	5,120.6	346.1	1,195.7	3,578.9
Total	7,210.3	502.6	1,805.1	4,902.6

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 38—Average net annual growth, average annual removals, and average annual mortality of growing stock on wetland timberland by ownership class and species group, Georgia

Ownership class	All species	Species group	
		Softwood	Hardwood
	Average net annual growth *(million cubic feet)*		
Public	13.5	4.5	9.0
Forest industry[a]	55.9	30.9	25.0
Nonindustrial private	151.3	52.5	98.7
All classes	220.7	88.0	132.7
	Average annual removals *(million cubic feet)*		
Public	2.1	0.4	1.7
Forest industry[a]	51.4	30.3	21.1
Nonindustrial private	155.6	71.1	84.5
All classes	209.1	101.9	107.2
	Average annual mortality *(million cubic feet)*		
Public	4.2	0.7	3.5
Forest industry[a]	15.2	3.5	11.6
Nonindustrial private	48.5	9.5	38.9
All classes	67.8	13.8	54.0

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 39—Area of wetland timberland treated or disturbed annually and retained in timberland by treatment or disturbance and ownership class, Georgia

Treatment or disturbance	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
	Thousand acres			
Final harvest	71.4	0.9	21.5	49.0
Partial harvest	13.8	—	2.3	11.5
Commercial thinning	4.0	—	2.0	2.0
Other stand improvement	1.5	—	0.3	1.2
Site preparation	20.1	0.0	9.5	10.6
Artificial regeneration	19.0	0.0	9.2	9.8
Natural regeneration	36.4	2.0	9.7	24.7
Other treatment	24.4	1.0	6.2	17.2
Natural disturbance	52.7	3.8	8.2	40.7

Since some acres experience more than one treatment or disturbance, there are no column totals.

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 40—Area of wetland timberland by treatment opportunity and ownership classes, Georgia

Treatment opportunity class	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
	Thousand acres			
Salvage	33.7	—	6.9	26.9
Harvest	377.3	41.2	123.7	212.4
Commercial thinning	84.6	6.2	25.4	53.0
Other stand improvement	364.0	5.8	77.9	280.4
Stand conversion	42.7	8.2	2.0	32.6
Regeneration	954.8	46.8	254.2	653.8
Stands in relatively good condition	2,412.8	131.5	614.3	1,667.0
All classes	4,270.0	239.6	1,104.3	2,926.1

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

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 41—Area of timberland by wetland status and ownership class, Florida

Wetland status	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
	Thousand acres			
Wetlands	5,209.7	1,087.4	1,869.7	2,252.7
Other	9,440.9	1,744.4	2,731.8	4,964.7
Total	14,650.7	2,831.8	4,601.5	7,217.4

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 42—Area of wetland timberland by stand-size and ownership classes, Florida

Stand-size class	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
	Thousand acres			
Sawtimber	2,436.6	641.9	640.7	1,154.0
Poletimber	1,401.3	241.1	558.8	601.4
Sapling-seedling	1,200.7	167.0	587.9	445.8
Nonstocked	171.1	37.4	82.3	51.4
All classes	5,209.7	1,087.4	1,869.7	2,252.7

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 43—Area of wetland timberland by stand-age and ownership classes, Florida

Stand-age class	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
Years		*Thousand acres*		
0–10	485.2	49.2	267.9	168.1
11–20	355.7	29.6	211.0	115.2
21–30	284.6	33.7	124.5	126.4
31–40	260.0	48.7	73.3	138.0
41–50	473.2	83.2	163.6	226.4
51–60	486.0	113.4	151.6	221.0
61–70	508.3	162.2	136.9	209.3
71–80	364.0	102.5	85.5	176.1
81+	552.7	176.6	122.2	253.8
No manageable stand	1,440.0	288.3	533.2	618.5
All classes	5,209.7	1,087.4	1,869.7	2,252.7

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 44—Area of wetland timberland by forest management type and ownership class, Florida

Forest management type	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Thousand acres		
Pine plantation	648.2	52.5	439.1	156.5
Natural pine	692.5	227.6	198.5	266.3
Oak-pine	466.2	70.1	160.9	235.2
Upland hardwood	66.6	7.3	20.9	38.4
Lowland hardwood	3,336.4	729.9	1,050.2	1,556.3
All types	5,209.7	1,087	1,869.7	2,252.7

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 45—Area of wetland timberland by forest type and ownership class, Florida

Forest type	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Thousand acres		
Slash pine	1,202.4	243.7	607.1	351.6
Loblolly pine	37.0	1.8	12.8	22.4
Pond pine	95.3	31.8	14.6	48.8
Loblolly pine-hardwood	63.9	2.1	25.9	35.9
Slash pine-hardwood	376.3	68.1	126.7	181.5
Other oak-pine	23.2	—	5.4	17.8
Sweetgum-yellow-poplar	—	—	—	—
Mixed hardwoods	66.6	7.3	20.9	38.4
Swamp chestnut oak-cherrybark oak	1.4	1.4	—	—
Sweetgum-water oak-willow oak	386.0	50.5	174.6	160.9
Sugarberry-American elm-green ash	178.6	55.8	47.6	75.2
Overcup oak-water hickory	24.7	13.6	7.3	3.8
Atlantic white-cedar	34.2	7.6	14.0	12.6
Cypress-water tupelo	1,118.0	265.5	272.1	580.4
Sweetbay-blackgum-red maple	1,424.6	285.5	501.2	637.9
River birch-sycamore	5.3	2.5	—	2.9
Willow	26.0	2.7	11.9	11.3
Sycamore-pecan-American elm	2.9	—	—	2.9
Palm	134.7	44.9	21.5	68.3
Miscellaneous types[b]	8.7	2.7	5.9	—
All types	5,209.7	1,087.4	1,869.7	2,252.7

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

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] Includes timberland under long-term lease from nonindustrial private owners.

[b] Individual types with less than 25,000 acres cumulatively across the region were condensed into the miscellaneous category. This category includes longleaf pine, white oak-red oak-hickory, cottonwood, yellow-poplar-white oak-northern red oak, and eastern redcedar-hardwood.

Table 46—Area of wetland timberland by physiographic and ownership classes, Florida

Physiographic class	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Thousand acres		
Flatwoods	1,291.4	159.3	592.6	539.5
Rolling uplands	—	—	—	—
Moist mountain slopes/coves	—	—	—	—
Narrow floodplains	260.8	40.6	58.2	162.1
Broad floodplains	323.2	142.4	88.4	92.4
Other mesic	382.4	78.6	121.6	182.2
Deep swamps	463.9	168.7	107.3	187.9
Small drains	629.3	86.6	255.1	287.6
Bays and wet pocosins	848.1	223.1	368.6	256.5
Other hydric	1,010.6	188.1	277.9	544.5
All classes	5,209.7	1,087.4	1,869.7	2,252.7

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

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 47—Volume of growing stock on wetland timberland by species group and ownership class, Florida

Species group	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Million cubic feet		
Softwood	4,127.6	1,046.1	1,115.1	1,966.4
Hardwood	4,127.6	1,127.9	1,172.1	1,827.6
Total	8,255.2	2,173.9	2,287.2	3,794.1

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 48—Average net annual growth, average annual removals, and average annual mortality of growing stock on wetland timberland by ownership class and species group, Florida

Ownership class	All species	Species group	
		Softwood	Hardwood
	Average net annual growth *(million cubic feet)*		
Public	43.8	22.0	21.8
Forest industry[a]	82.1	52.3	29.9
Nonindustrial private	101.0	58.3	42.7
All classes	227.0	132.6	94.4
	Average annual removals *(million cubic feet)*		
Public	18.2	11.4	6.7
Forest industry[a]	74.9	55.7	19.1
Nonindustrial private	67.3	50.4	16.8
All classes	160.3	117.6	42.7
	Average annual mortality *(million cubic feet)*		
Public	14.0	4.0	10.1
Forest industry[a]	16.3	7.1	9.2
Nonindustrial private	28.9	9.5	19.4
All classes	59.2	20.6	38.6

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 49—Area of wetland timberland treated or disturbed annually and retained in timberland by treatment or disturbance and ownership class, Florida

Treatment or disturbance	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Thousand acres		
Final harvest	66.0	4.0	37.6	24.4
Partial harvest	8.9	0.3	5.4	3.1
Commercial thinning	4.6	1.0	2.7	1.0
Other stand improvement	0.4	—	0.4	—
Site preparation	28.8	1.2	22.4	5.3
Artificial regeneration	31.4	1.3	22.7	7.5
Natural regeneration	19.9	2.5	7.1	10.2
Other treatment	24.8	1.0	10.8	13.1
Natural disturbance	35.2	6.8	7.1	21.3

Since some acres experience more than one treatment or disturbance, there are no column totals.

A dash (—) indicates no sample for the cell; 0.0 indicates a value of >0.0 but <0.05 for the cell.

[a] Includes timberland under long-term lease from nonindustrial private owners.

Table 50—Area of wetland timberland by treatment opportunity and ownership classes, Florida

Treatment opportunity class	All classes	Ownership class		
		Public	Forest industry[a]	Nonindustrial private
		Thousand acres		
Salvage	26.7	5.7	10.5	10.5
Harvest	612.4	203.4	140.5	268.4
Commercial thinning	99.6	10.8	31.1	57.7
Other stand improvement	235.6	49.2	86.5	99.9
Stand conversion	22.3	1.5	7.6	13.1
Regeneration	1,440.0	288.3	533.2	618.5
Stands in relatively good condition	2,773.1	528.4	1,060.2	1,184.5
All classes	5,209.7	1,087.4	1,869.7	2,252.7

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

[a] Includes timberland under long-term lease from nonindustrial private owners.

Brown, Mark J.; Smith, Greg M.; McCollum, Joseph. 2001. Wetland forest statistics for the South Atlantic States. Resour. Bull. SRS–62. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 52 p.

Twenty-one percent, or 17.6 million acres, of the timberland in the South Atlantic States was classified as wetland timberland. Sixty percent of the region's wetland timberland was under nonindustrial private forest ownership. Forty-eight percent of the region's wetland timberland was classified as sawtimber-sized stands. Lowland hardwood types made up 62 percent of the wetland timberland. Thirty-one percent of the wetland timberland occurred on a flatwoods physiography. Wetland timberland contained 30 billion cubic feet of growing-stock volume, 24 percent of the region's total. Removals from wetland timberland averaged 842 million cubic feet, 20 percent of the region's total. The two greatest impacts to wetland timberland were natural disturbance and final harvest, which averaged 375 and 295 thousand acres annually, respectively.

Keywords: Disturbance, forest type, harvest, ownership, physiography, removals, stand size, timberland, volume, wetland.

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