Summary Table: Characteristics of the Ecoregions of North Carolina and South Carolina

45. PIEDMONT

Level IV Ecoregion		Physiography		Geology	Soil			Climate			Potential Natural Vegetation	Land Use and Land Cover
	Area (square miles)		Elevation/ Local Relief (feet)	Surficial Material and Bedrock	Order (Great Group)	Common Soil Series	Temperature / Moisture Regimes	Precipitation Mean annual (inches)	Frost Free Mean annual (days)	Mean Temperature January min/max; July min/max (°F)		
45a. Southern Inner Piedmont	1320	Dissected irregular plains, some low to high hills, ridges, and isolated monadnocks; low to moderate gradient streams with mostly cobble, gravel, and sandy substrates.	730-1912 / 100-400	Quaternary to Tertiary clayey, micaceous clay, quartz-rich, and sandy clay saprolite; Precambrian, Cambrian, and Ordovician gneiss, schist, granite, and amphibolite.	Ultisols (Kanhapludults, Hapludults); on floodplains Inceptisols (Dystrudepts) and Entisols (Udifluvents, Fluvaquents)	Cecil, Pacolet, Madison, Rion, Grover, Cataula, Hiwassee; on floodplains Chewacla, Cartecay, Toccoa, Enoree.	Thermic / Udic	52-65	185-220	29/49; 65/87	Mixed oak forest, oak-hickory-pine forest. Mostly white oak, southern red oak, black oak, mockernut and pignut hickories, some Virginia pine and shortleaf pine; on more mesic sites beech, northern red oak, tulip poplar, red maple, some hemlock.	Deciduous forest, mixed forest, pasture, some cattle and hay production, apple orchards.
45b. Southern Outer Piedmont	12708	Dissected irregular plains, some low rounded hills and ridges; low to moderate gradient streams with mostly cobble, gravel, and sandy substrates.	180-1510 / 100-300	Quaternary to Tertiary clay, micaceous clay, sandy clay and sandy saprolite, with rock outcrops and joint-block boulders; Precambrian to Paleozoic schist, gneiss, granite, metavolcanic rock, amphibolite, metagabbro, metadiorite, phyllite, and quartzite.	Ultisols (Kanhapludults, Hapludults, Kandiudults), Alfisols (Hapludalfs); on floodplains Inceptisols (Dystrudepts) and Entisols (Udifluvents, Fluvaquents)	Cecil, Appling, Madison, Pacolet; on more mafic rocks Wilkes, Mecklenburg, Iredell, Enon, Davidson, Lloyd, Winnsboro; on floodplains Chewacla, Toccoa, Enoree, Cartecay.	Thermic / Udic	44-56	190-230	29/50; 67/89	Mixed oak forest, oak-hickory-pine forest. Mostly white oak, southern red oak, black oak, mockernut and pignut hickories, some Virginia pine and shortleaf pine; on more mesic sites beech, northern red oak, tulip poplar, red maple.	Mixed forest, deciduous forest, pine plantations, pasture, urban; hay, cattle, dairy, and poultry production; some barley, oats, and wheat.
45c. Carolina Slate Belt	6454	Dissected irregular plains, some hills, linear ridges, and isolated monadnocks; low to moderate gradient streams with mostly boulder and cobble substrates.	165-1188 / mostly 100-300, some areas to 500	Quaternary to Tertiary silty to clayey saprolite; Precambrian to Cambrian felsic to mafic metavolcanic rock, metamudstone, meta-argillite, phyllite, schist, some Paleozoic gabbro, diorite, and granite.	Ultisols (Kanhapludults, Hapludults), Inceptisols (Dystrudepts)	Georgeville, Herndon, Tatum, Badin, Goldston, Misenheimer, Cid	Thermic / Udic	44-49	185-210 in north, 200-230 in south	29/51; 67/89	Mixed oak forest, oak-hickory-pine forest. Mostly white oak, southern red oak, black oak, southern shagbark hickory, mockernut and pignut hickories, some Virginia pine and shortleaf pine; on monadnocks (Uwharries) chestnut oak; near coastal plain boundary some longleaf pine-shortleaf pine-loblolly pine-hardwoods forest.	Mixed forest, deciduous forest, pine plantations, pasture; cattle, hay, and poultry production, some public land (Uwharrie and Sumter National Forests).
45e. Northern Inner Piedmont	4266	Dissected irregular plains, low to high hills, ridges, and isolated monadnocks; low to moderate gradient streams with mostly cobble, gravel, and sandy substrates.	360-2035 / 150-700	Quaternary to Tertiary sandy clay saprolite and micaceous clay to silty clay saprolite; Cambrian gneiss, schist, and amphibolite, some Ordovician and Precambrian gneiss and granite.	Ultisols (Kanhapludults, Hapludults), Inceptisols (Dystrudepts)	Clifford, Fairview, Halifax, Toast, Bannertown, Stott Knob, Rhodhiss, Westfield, Woolwine	Mesic / Udic	45-55	170-200	25/48; 65/87	Mixed oak forest, oak-hickory-pine forest. Mostly white oak, southern red oak, black oak, mockernut and pignut hickories, some Virginia pine and shortleaf pine; on monadnocks chestnut oak; on more mesic sites beech, northern red oak, tulip poplar, red maple, hemlock.	Mixed forest, deciduous forest, pasture; hay, cattle, poultry, and tobacco production.
45f. Northern Outer Piedmont	2705	Dissected irregular plains, some low rounded hills and ridges; low to moderate gradient streams with mostly cobble, gravel, and sandy substrates.	130-600 / 100-250	Quaternary to Tertiary sandy clay and sandy saprolite with rock outcrops and joint-block boulders; Cambrian gneiss, schist, metavolcanic rock, and metamudstone, some Pennsylvanian to Permian granite.	Ultisols (Kanhapludults, Hapludults); on floodplains Inceptisols (Endoaquepts, Dystrudepts)	Cecil, Pacolet, Madison, Wedowee, Rion, some Georgeville and Nason in Eastern Slate Belt area; on floodplains Wehadkee, Chewacla; some coastal plain soils on uplands near 65m.	Thermic / Udic	44-46	185-210	28/49; 67/89	Mixed oak forest, oak-hickory-pine forest. Mostly white oak, southern red oak, black oak, mockernut and pignut hickories, some shortleaf pine and loblolly pine; near coastal plain boundary some longleaf pine-shortleaf pine-loblolly pine-hardwoods forest.	Mixed forest, deciduous forest, pine plantations, pasture; tobacco, cattle, hay, and poultry production; urban.
45g. Triassic Basins	1418	Dissected irregular plains, some low rounded hills and ridges; low to moderate gradient streams with mostly sand and clay substrates; relatively wider floodplains than other Piedmont ecoregions.	190-1000 / 100-300	Quaternary to Tertiary red sandy loam to silty clay decomposition residuum; Triassic sandstone, conglomerate, mudstone, shale, some minor coal, Jurassic diabase dikes and sills.	Ultisols (Hapludults), Alfisols (Hapludalfs); on floodplains Inceptisols (Dystrudepts)	Mayodan, Creedmoor, White Store, Pinkston, Polkton, Spray, Chewacla; in Dan River Basin Clover, Lackstown, Easthamlet, Wolftrap, Dan River.	Thermic (Mesic in Dan River Basin) / Udic	44-48	180-220	27/49; 66/88	Mixed oak forest, oak-hickory-pine forest. Mostly white oak, southern red oak, black oak, mockernut and pignut hickories, some Virginia pine and shortleaf pine; on more mesic sites beech, northern red oak, tulip poplar, red maple; some bottomland hardwood forest (bottomland oaks, red maple, sweetgum, green ash, American elm).	Mixed forest, deciduous forest, pine plantations, pasture, urban.
45i. Kings Mountain	289	Hills and linear ridges, some irregular plains; moderate gradient streams with bedrock, boulder, cobble, gravel, and sand substrates.	490-1690 / 200-500	Quaternary to Tertiary micaceous saprolite, quartz-rich saprolite; Precambrian quartz-sericite schist, metavolcanic rock, quartz-pebble metaconglomerate, quartzite, Cambrian sericite schist, phyllite, quartzite, marble, amphibolite.	Ultisols (Hapludults, Kanhapludults), Inceptisols (Dystrudepts)	Tatum, Georgeville, Herndon, Badin, Goldston, Manteo	Thermic / Udic	47-49	190-220	28/50; 66/88	Mixed oak forest and oak-hickory-pine forest; Piedmont monadnock forest (chestnut oak, white oak, scarlet oak, post oak, mockernut and pignut hickories, Virginia pine, shortleaf pine); some Virginia pine-dominated woodlands on high ridges.	Mixed forest, deciduous forest, some pine plantations and pasture.

63. MIDDLE ATLANTIC COASTAL PLAIN

Level IV Ecoregion		Physiography		Geology	Soil			Climate			Potential Natural Vegetation	Land Use and Land Cover
	Area (square miles)		Elevation/ Local Relief (feet)	Surficial Material and Bedrock	Order (Great Group)	Common Soil Series	Temperature / Moisture Regimes	Precipitation Mean annual (inches)	Frost Free Mean annual (days)	Mean Temperature January min/max; July min/max (°F)		
63b. Chesapeake-Pamlico Lowlands and Tidal Marshes	2226	Low, flat plains and peninsulas; poorly drained with swamps, some low gradient streams with sandy and silty substrates, a few large lakes; estuaries and sounds.	0-25 / 5-20	Late Pleistocene marine sand, silt, and clay.	Ultisols (Endoaquults, Umbraquults), Inceptisols (Humaquepts), Alfisols (Endoaqualfs), Histosols (Haplosaprists)	Tomotley, Roanoke, Perquimans, Pasquotank, Hyde, Deloss, Portsmouth, Cape Fear, Wasda, Roper, Arapahoe, Yonges, Argent, Dorovan, Currituck	Thermic / Aquic	48-55	210-230	32/52; 69/88	Wet hardwood forest (bottomland oaks, tulip poplar, sweetgum, maple, swamp tupelo); mesic mixed hardwood forest (beech, tulip poplar, maple, oaks, sweetgum); some pond pine woodlands and longleaf pine; tidal and nonriverine cypress-gum swamps.	Cropland with wheat, corn, soybeans, potatoes, cotton, and peanuts; evergreen forest, mixed forest, forested wetlands, pine plantations, pasture, marsh.
63c. Nonriverine Swamps and Peatlands	1692	Low, broad flats and interstream divides, poorly drained, a few lakes, low stream density; channelized drainage is common.	5-50 / 5-25	Holocene peat and silty to clayey swamp deposits, Pleistocene marine sand, silt, and clay.	Histosols (Haplosaprists), Inceptisols (Humaquepts)	Pungo, Dare, Belhaven, Ponzer, Dorovan, Wasda, Scuppernong, Roper, Torhunta, Croatan	Thermic / Aquic	50-56	210-235	32/54; 69/89	Pocosins (fetterbush, ti-ti, inkberry, pond pine); pond pine woodland; Atlantic white cedar forest; nonriverine swamp forest (bald cypress, pond cypress, swamp tupelo, loblolly pine, red maple).	Forested wetlands, evergreen forest, mixed forest, some cropland and pine plantations.
63d. Virginian Barrier Islands and Coastal Marshes	63	Barrier islands, dunes, beaches, lagoons, estuaries, tidal marshes.	0-30, some dunes to 60 / 5-30	Holocene beach and dune sand, saline marsh deposits of sand, silt, clay, and peat.	Entisols (Sulfaquents, Psammaquents, Quartzipsamments), Histosols (Haplosaprists)	Bohicket, Carteret, Currituck in tidal marshes; Corolla, Newhan, Duckston on beach dunes and flats.	Thermic / Aquic	48	220-230	33/52; 69/87	Salt and brackish marshes (cordgrass, saltgrass, rushes); tidal freshwater marsh (cordgrass, sawgrass, cattail, wild rice); maritime shrub (wax myrtle, yaupon); maritime dry grassland (saltmeadow cordgrass); maritime evergreen forest (live oak, sand laurel oak, loblolly pine); dune grass (beach grass, sea oats).	Marsh, forested wetland, evergreen forest, urban, wildlife habitat, beaches, recreation, fish and shellfish production.
63e. Mid-Atlantic Flatwoods	2755	Flat plains on lightly dissected marine terraces; swamps, low gradient streams with sandy and silty substrates.	2-100 / 5-75	Pleistocene and Pliocene marine sand, silt, and clay.	Ultisols (Paleaquults, Paleudults, Albaquults, Hapludults)	Rains, Lynchburg, Goldsboro, Leaf, Craven, Lenoir, Noboco, Pantego	Thermic / Aquic, Udic	46-50	200-230	30/52; 68/89	Mesic pine flatwoods (longleaf pine, loblolly pine, oaks, hickories, bluestem); wet pine flatwoods (longleaf pine with loblolly or pond pine); pine savanna (longleaf pine, pond pine, bluestem); pond pine woodland; some oak-hickory and mixed forest.	Pine plantations, cropland with peanuts, cotton, corn, soybeans, tobacco, wheat, chickens, and hogs; pasture, mixed and deciduous forest.
63g. Carolinian Barrier Islands and Coastal Marshes	557	Barrier islands, dunes, beaches, lagoons, estuaries, tidal marshes.	0-30, some dunes to 100 / 5-30	Holocene beach and dune sand, saline marsh deposits of sand, silt, clay, and peat.	Entisols (Sulfaquents, Psammaquents, Hydraquents, Quartzipsamments)	Bohicket, Carteret, Hobucken in tidal marshes; Corolla, Newhan, Duckston, Fripp on beach dunes and flats.	Thermic / Aquic	50-56	240-260	35/53; 72/86	Salt and brackish marshes (cordgrass, saltgrass, rushes); maritime shrub (wax myrtle, yaupon); maritime dry grassland (saltmeadow cordgrass); maritime evergreen forest (live oak, sand laurel oak, loblolly pine); dune grass (sea oats, bitter panic grass, cordgrass, beach grass).	Marsh, forested wetland, evergreen forest, urban, wildlife habitat, beaches, tourism, recreation, fish and shellfish production.
63h. Carolina Flatwoods	11510	Flat plains on lightly dissected marine terraces; swamps, low gradient streams with sandy and silty substrates; Carolina bays.	2-195 / 5-75	Pleistocene and Pliocene marine sand, silt, and clay; Tertiary sand, silt, clay, and limestone, some Cretaceous sand, silt and clay.	Ultisols(Paleaquults, Paleudults, Endoaquults, Albaquults, Hapludults), Alfisols (Endoaqualfs), Spodosols (Alaquods), Entisols (Quartzipsamments), Histosols (Haplosaprists)	Goldsboro, Lynchburg, Rains, Coxville, Wahee, Bladen, Argent, Coosaw, Noboco, Baymeade, Woodington, Leon, Kureb, Yauhannah, Yemassee, Ogeechee, Croatan	Thermic / Aquic, Udic	46-53	210-240 in the north, 230-250 in the south	33/55; 70/90	Longleaf pine-wiregrass; xeric sandhill scrub (longleaf pine-turkey oak-wiregrass); pond pine forest and woodland; some oak-hickory and mixed forest.	Pine plantations, mixed forest, forested wetlands, cropland of cotton, corn, soybeans, wheat, peanuts, tobacco, blueberries; production of hogs, broilers, and turkeys; some public land, wildlife habitat.
63n. Mid-Atlantic Floodplains and Low Terraces	2193	Major river floodplains and associated low terraces; low gradient streams with sandy and silty substrates, oxbow lakes, ponds, swamps.	2-130 / 5-25	Holocene alluvial silt, clay, and gravelly sand, local swamp deposits and organic muck; some late Pleistocene alluvial and estuarine sand and silt.	Inceptisols (Endoaquepts, Dystrudepts, Humaquepts), Entisols (Udifluvents), Ultisols (Hapludults, Umbraquults, Endoaquults), Alfisols (Albaqualfs)	Johnston, Muckalee, Masontown, Congaree, Dorovan, Chastain, Johns, Kenansville, Roanoke, Lumbee, Paxville, Meggett, Tawcaw, Chewacla, Hobcaw	Thermic / Aquic, some Udic	46-54	210-240 in the north, 230-250 in the south	32/54; 69/90	Southern floodplain forest. Includes cypress-gum swamp (water tupelo, swamp tupelo, bald cypress, pond cypress) and bottomland hardwood forest (bottomland oaks, red maple, sweetgum, green ash, bitternut hickory).	Forested wetlands, deciduous forest, some cropland on larger terraces.

65. SOUTHEASTERN PLAINS

Level IV Ecoregion		Physiography		Geology	Soil			Climate			Potential Natural Vegetation	Land Use and Land Cover
	Area (square miles)		Elevation/ Local Relief (feet)	Surficial Material and Bedrock	Order (Great Group)	Common Soil Series	Temperature / Moisture Regimes	Precipitation Mean annual (inches)	Frost Free Mean annual (days)	Mean Temperature January min/max; July min/max (°F)		
65c. Sand Hills	5147	Dissected irregular plains; moderate to steep side slopes; low to moderate gradient sandy bottomed streams. Seepage and groundwater support steady streamflows and some small, saturated wetlands.	100-720 / 100-300	Quaternary medium to coarse sand decomposition residuum, loamy sand, sandy loam and sandy clay decomposition residuum; Cretaceous sand, sandstone, and mudstone, Tertiary sand and clayey sand.	Ultisols (Paleudults, Hapludults, Kanhapludults, Kandiudults), Entisols (Quartzipsamments)	Blaney, Candor, Lakeland, Gilead, Vaucluse, Ailey, Dothan, Fuquay, Blanton, Wagram, Pelion, Alpin, Troup, Lucy	Thermic / Udic	44-48	200-220 in north, 215-240 in south	30/52; 68/90	Pine/scrub oak sandhill (longleaf pine, turkey oak, blackjack oak, bluejack oak, wiregrass); xeric sandhill scrub (longleaf pine, turkey oak, wiregrass); streamhead pocosin (pond pine, red maple, tulip poplar, evergreen shrubs).	Pine plantations, mixed forest, pasture, recreation, some cropland and peach orchards.
65l. Atlantic Southern Loam Plains	6459	Dissected smooth plains and irregular plains; broad interstream divides and mostly gentle side slopes dissected by many small, low to moderate gradient sandy bottomed streams; Carolina bays.	50-660 / 100-200	Quaternary sand and clay decomposition residuum, marine sand, silt, and clay; Tertiary and Cretaceous sand, clay, and gravel.	Ultisols (Kandiudults, Paleudults, Paleaquults)	Norfolk, Lynchburg, Goldsboro, Rains, Wagram, Aycock, Coxville, Orangeburg, Dothan, Fuquay, Varina, Faceville, Noboco, Troup, Marlboro, Blanton	Thermic / Udic, some Aquic	44-49	200-240	31/55; 68/90	Mesic pine flatwoods (longleaf pine, loblolly pine, oaks, hickories, wiregrass); pine/scrub oak sandhill (longleaf pine, turkey oak, blackjack oak, bluejack oak, wiregrass); oak-hickory forest (southern red oak, post oak, hickories, pines); some mesic mixed hardwood forest (beech, tulip poplar, maple, white oak, red oak, sweetgum).	Cropland and pasture with soybeans, corn, wheat, cotton, tobacco, hogs, and hay; in SC, peach orchards on The Ridge (Edgefield & Saluda counties); some pine plantations, mixed forest, forested wetlands, and urban.
65m. Rolling Coastal Plain	5182	Dissected irregular plains and smooth plains; broad interstream divides with gentle to steep side slopes dissected by numerous small, low to moderate gradient sandy bottomed streams.	30-460 / 100-200	Quaternary sand and clay decomposition residuum, middle and early Pleistocene marine sand, silt, and clay; Pliocene clay and sand; saprolite and some Piedmont rock outcrops on side slopes near 45f.	Ultisols (Kandiudults, Paleudults, Hapludults, Paleaquults; some Kanhapludults on side slopes near 45f)	Norfolk, Goldsboro, Rains, Wagram, Emporia, Coxville, Lynchburg, Autryville, Caroline; Cecil, Appling on side slopes near 45f.	Thermic / Udic, some Aquic	44-51	200-220	29/51; 68/89	Mesic pine flatwoods (longleaf pine, loblolly pine, oaks, hickories, wiregrass); oak-hickory forest (southern red oak, post oak, hickories, pines); some mesic mixed hardwood forest (beech, tulip poplar, maple, white oak, red oak, sweetgum).	Cropland and pasture with cotton, soybeans, corn, wheat, sweetpotatoes, peanuts, tobacco, hogs, and chickens; some pine plantations, mixed forest, and forested wetlands.
65p. Southeastern Floodplains and Low Terraces	2458	Major river floodplains and associated low terraces; low gradient streams with sandy and silty substrates, oxbow lakes, ponds, swamps.	15-200 / 5-35	Quaternary alluvial gravelly sand, sandy gravel, silt, and clay.	Inceptisols (Endoaquepts, Dystrudepts, Humaquepts), Entisols (Fluvaquents, Udifluvents), Ultisols (Hapludults, Umbraquults, Endoaquults)	Johnston, Bibb, Kinston, Chewacla, Wehadkee, Chastain, Riverview, Congaree, Roanoke, Wickham, Altavista, State, Cape Fear, Wahee, Tawcaw, Rutlege	Thermic / Aquic, some Udic	45-50	200-240	31/54; 68/89	Southern floodplain forest. Includes bottomland hardwood forest (bottomland oaks, red maple, sweetgum, green ash, bitternut hickory) and cypress-gum swamp (water tupelo, swamp tupelo, bald cypress, pond cypress).	Forested wetlands, deciduous forest; cropland and pasture where drained and protected from flooding.

66. BLUE RIDGE

Level IV Ecoregion		Physiography		Geology	Soil			Climate			Potential Natural Vegetation	Land Use and Land Cover
	Area (square miles)		Elevation/ Local Relief (feet)	Surficial Material and Bedrock	Order (Great Group)	Common Soil Series	Temperature / Moisture Regimes	Precipitation Mean annual (inches)	Frost Free Mean annual (days)	Mean Temperature January min/max; July min/max (°F)		
66c. New River Plateau	443	Hilly, high plateau, some low mountains. Moderate gradient streams with bedrock, boulder, cobble, and gravel substrates.	2350-4175 / 500-1200	Quaternary to Tertiary sandy to clayey saprolite, some mafic-boulder loamy colluvium; Precambrian gneiss, schist, and amphibolite.	Inceptisols (Dystrudepts, Humaquepts), Ultisols (Hapludults, Kanhapludults), Entisols (Udifluvents)	Evard, Ashe, Hayesville, Clifton, Chandler, Watauga on uplands; Colvard, Toxaway on floodplains.	Mesic / Udic	45-55	150-170	21/42; 58/80	Appalachian oak forest. Includes northern red oak, white oak, and chestnut oak forests; montane oak-hickory forest; cove forests (tulip poplar, basswood, buckeye, yellow birch, beech, hemlock, northern red oak).	Deciduous forest, mixed forest, pasture and cropland with hay, cattle, tobacco, and Christmas trees.
66d. Southern Crystalline Ridges and Mountains	4432	Low to high mountains, gently rounded to steep slopes, narrow valleys. Steep escarpment at eastern boundary. High gradient, bedrock and boulder-bottomed cool, clear streams.	850-5500 / 1000-3500	Quaternary to Tertiary granitic boulder colluvium, loamy colluvium, sandy to clayey saprolite; Precambrian granite, gneiss, schist, quartzite, metagraywacke, metavolcanic rock, and amphibolite, some Paleozoic gneiss and quartz diorite.	Inceptisols (Dystrudepts, Humaquepts), Ultisols (Hapludults, Kanhapludults)	Ashe, Evard, Cowee, Chandler, Fannin, Watauga, Plott, Edneyville, Chestnut, Edneytown, Porters, Hayesville, Cashiers, Saluda, Talladega, Walhalla on uplands; Tate, Tusquitee, Cullasaja on colluvium; Dellwood, Nikwasi on floodplains.	Mesic / Udic, some Aquic in narrow floodplains	45-60 in north, 50-100 in south	145-190	19-26/38-48; 55-62/75-84	Appalachian oak forest. Includes northern red oak, white oak, and chestnut oak forests; montane oak-hickory forest; pine-oak/heath woodlands (Virginia pine, table-mountain pine, pitch pine, scarlet oak); cove forests (tulip poplar, basswood, buckeye, yellow birch, beech, hemlock, northern red oak). At high elevations, northern hardwoods forest (beech, yellow birch, yellow buckeye, maples).	Deciduous and mixed forest; large areas of public land (Pisgah, Nantahala, and Sumter National Forests) with some private land; small clearings for pasture or orchards on less steep land; tourism, recreation, hunting, and forestry.
66e. Southern Sedimentary Ridges	37	Low to high mountains, gently rounded to steep slopes, narrow valleys. High gradient, bedrock and boulder-bottomed cool, clear streams.	1280-5085 / 1500-3000	Quaternary to Tertiary sandy shaly colluvium and colluvium with boulders or huge blocks; Cambrian sandstone, siltstone, shale, dolomite, and conglomerate.	Inceptisols (Dystrudepts), Ultisols (Hapludults)	Ditney, Unicoi, Cataska, Junaluska, Spivey, Tsali	Mesic / Udic	45-50	150-170	20-26/43-47; 56-62/76-82	Appalachian oak forest. Includes northern red oak, white oak, and chestnut oak forests; montane oak-hickory forest; cove forests (tulip poplar, basswood, buckeye, yellow birch, beech, hemlock, northern red oak). At high elevations, northern hardwoods forest (beech, yellow birch, yellow buckeye, maples).	Deciduous and mixed forest, mostly public land (Pisgah National Forest); tourism, recreation, hunting, and forestry.
66g. Southern Metasedimentary Mountains	1677	Low to high mountains, gently rounded to steep slopes, narrow valleys. High gradient, bedrock and boulder-bottomed cool, clear streams.	1200-5400 / 2000-3500	Quaternary to Tertiary arkosic metasedimentary bouldery colluvium; Pre-Cambrian metagraywacke, metasiltstone, metasandstone, metaconglomerate, slate, schist and sulfidic schist, meta-arkose, and phyllite, some Cambrian sulfidic schists.	Inceptisols (Dystrudepts, Haplumbrepts); Ultisols (Hapludults)	Brasstown, Junaluska, Soco, Stecoah, Cheoah, Sylco on uplands; Spivey, Whiteoak on colluvium.	Mesic / Udic	55-80	150-190	20-27/41-48; 55-63/76-85	Appalachian oak forest. Includes northern red oak, white oak, and chestnut oak forests; montane oak-hickory forest; pine-oak/heath woodlands (Virginia pine, table-mountain pine, pitch pine, scarlet oak), cove forests (tulip poplar, basswood, buckeye, yellow birch, beech, hemlock, northern red oak). At high elevations, northern hardwoods forest (beech, yellow birch, yellow buckeye, maples).	Deciduous and mixed forest; large areas of public land (Nantahala and Pisgah National Forests, Great Smoky Mountains National Park); tourism, recreation, hunting, some forestry.
66i. High Mountains	316	High mountain ridges and moderate to steep slopes. A few small high gradient, bedrock and boulder-bottomed streams.	4500-6684 / 1500-2100	Quaternary to Tertiary granitic or metasedimentary bouldery colluvium; Precambrian metagraywacke, schist, metasiltsone, slate, quartzite, and gneiss.	Inceptisols (Haplumbrepts)	Wayah, Oconaluftee, Burton, Craggey, Clingman, Tanasee, Balsam	Frigid / Udic	75-100+	130-140	18/36; 54/69	Southeastern spruce-fir forest (Fraser fir, red spruce, yellow birch, rhododendron); northern hardwoods forest (beech, yellow birch, yellow buckeye, maples); grass balds (mountain oat grass) and heath balds (rhododendron).	Evergreen forest, deciduous forest; mostly public land (Nantahala and Pisgah National Forests, Great Smoky Mountains National Park); tourism, recreation.
66j. Broad Basins	986	Intermountain basins with low mountains, rolling foothills, and moderately broad mountain valleys. Moderate gradient streams with cobble and boulders, low to moderate gradient rivers with sand and bedrock substrates.	1575-3280 / 250-700	Quaternary to Tertiary sandy, silty, and clayey saprolite with some rock outcrops and joint-block boulders, quartz-rich saprolite; Precambrian gneiss, schist, amphibolite, and quartzite; in southwest, metasandstone, metasiltstone, schist, metaconglomerate, quartzite, slate.	Ultisols (Hapludults, Kanhapludults), Inceptisols (Dystrudepts, Humaquepts)	Evard, Cowee, Fannin, Hayesville on uplands; Brevard, Braddock, Saunook, Dillsboro on terraces and footslopes; Rosman, Toxaway, Dellwood on floodplains.	Mesic / Udic, some Aquic in narrow floodplains	40-55	155-190	24/47; 61/84	Appalachian oak forest. Mostly dry-mesic oak-hickory forest (white oak, southern red oak, black oak, hickories, pines), some chestnut oak forest (chestnut oak, scarlet oak, northern red oak, hickories, hemlock, red maple, pines); pine-oak/heath woodlands (Virginia pine, shortleaf pine, pitch pine, scarlet oak).	Pasture and cropland with hay, cattle, corn for silage, apples, and tobacco; urban and suburban, deciduous forest, mixed forest.
66k. Amphibolite Mountains	130	Low to high mountains, gently rounded to steep slopes, narrow valleys. High gradient, bedrock and boulder-bottomed cool, clear streams.	2950-5400 / 1000-2000	Quaternary to Tertiary mafic boulder loamy colluvium, granitic boulder colluvium; Precambrian amphibolite, gneiss, and schist.	Inceptisols (Dystrudepts), Ultisols (Hapludults)	Porters, Fannin, Evard, Edneyville, Ashe, Tusquitee, Thunder, Spivey	Mesic / Udic	52-65	150-160	21/42; 58/79	Appalachian oak forest. Includes northern red oak, white oak, and chestnut oak forests; montane oak-hickory forest; cove forests (tulip poplar, basswood, buckeye, yellow birch, beech, hemlock, northern red oak). At high elevations, northern hardwoods forest (beech, yellow birch, yellow buckeye, maples).	Deciduous forest, mixed forest, recreation, hunting, wildlife habitat.
66l. Eastern Blue Ridge Foothills	652	Low mountains and rolling foothills, gently rounded to steep slopes. Moderate gradient streams with bedrock, boulder, cobble, and gravel substrates.	980-2890 / 800-1300	Quaternary to Tertiary silty to sandy clay saprolite; Cambrian biotite, gneiss, mica schist, quartzite, amphibolite, and Ordovician granite.	Ultisols (Hapludults, Kanhapludults), Inceptisols (Dystrudepts)	Evard, Cowee, Fannin, Cliffield, Hayesville, Saluda on uplands; Greenlee, Tate, on colluvium; Chewacla on small floodplains.	Mesic / Udic	50-60	170-195	25/48; 65/86	Appalachian oak forest. Mostly chestnut oak forest (chestnut oak, scarlet oak, hickories, pines); pine-oak/heath woodlands (Virginia pine, table-mountain pine, pitch pine, scarlet oak); cove forests (beech, buckeye, basswood, tulip poplar, hemlock). Some dry-mesic oak-hickory forest (white oak, northern and southern red oak, black oak, hickories, pines, tulip poplar).	Deciduous forest, mixed forest, recreation, hunting, some pasture with cattle, hay, some public land (South Mountains State Park).
66m. Sauratown Mountains	25	Low mountains and ridges, isolated monadnock, rounded to steep slopes. High gradient, bedrock and boulder-bottomed cool, clear streams.	1000-2595 / 1000-1400	Quaternary to Tertiary quartz-rich saprolite; Cambrian quartzite, quartz-muscovite schist, and biotite gneiss.	Ultisols (Hapludults, Kanhapludults), Inceptisols (Dystrudepts)	Pilot Mountain, Sauratown, Hayesville, Cowee, Ashe, Brevard, Greenlee	Mesic / Udic	48-50	165-185	24/46; 64/86	Appalachian oak forest. Mostly pine-oak/heath woodlands (Virginia pine, table-mountain pine, pitch pine, scarlet oak); chestnut oak forest (chestnut oak, scarlet oak, northern red oak, hickories, hemlock, red maple, pines).	Deciduous forest, mixed forest, public land recreation (Hanging Rock and Pilot Mountain State Parks).

75. SOUTHERN COASTAL PLAIN

Level IV Ecoregion		Physiography		Geology	Soil			Climate			Potential Natural Vegetation	Land Use and Land Cover
	Area (square miles)		Elevation/ Local Relief (feet)	Surficial Material and Bedrock	Order (Great Group)	Common Soil Series	Temperature / Moisture Regimes	Precipitation Mean annual (inches)	Frost Free Mean annual (days)	Mean Temperature January min/max; July min/max (°F)		
75i. Floodplains and Low Terraces	146	Major river floodplains and associated low terraces; low gradient streams with sandy and silty substrates, oxbow lakes, ponds, swamps.	2-80 / 5-25	Holocene alluvial silt and clay.	Inceptisols (Endoaquepts, Dystrudepts)	Chastain, Tawcaw, Chewacla	Thermic / Aquic	48-50	240-260	35/58; 69/91	Southern floodplain forest. Includes cypress-gum swamp (water tupelo, swamp tupelo, bald cypress, pond cypress) and bottomland hardwood forest (bottomland oaks, red maple, sweetgum, green ash, bitternut hickory).	Forested wetlands, deciduous forest.
75j. Sea Islands / Coastal Marsh	1987	Barrier islands, dunes, beaches, lagoons, estuaries, tidal marshes.	0-30 / 5-20	Holocene saline marsh deposits of silt, sand, peat, and clay; Holocene beach and dune sand; Pleistocene beach and near-shore marine sand.	Entisols (Quartzipsamments, Udipsamments, Sulfaquents, Hydraquents), Spodosols (Alaquods, Alorthods)	Seabrook, Wando, Cainhoy, Fripp, Ridgeland, Baritari, Levy; in tidal marshes Bohicket and Capers.	Thermic / Aquic	48-53	260-280	37/58; 72/89	Salt and brackish marshes (cordgrass, saltgrass, rushes); maritime swamp forest (tupelo, red maple, sweetgum, bald cypress); maritime evergreen forest (live oak, sand laurel oak, slash pine, loblolly pine); dune grass (sea oats, bitter panic grass, cordgrass, beach grass).	Marsh, forested wetlands, evergreen forest, urban, wildlife habitat, beaches, recreation, fish and shellfish production.

SOURCES:

Ainsley, W.F., and Florin, J.W., 1988, North Carolina-land and its people: Morristown, N.J., Silver Burdett & Ginn Company, 392 p.

Anderson, J.R., 1970, Major land uses: *in* The national atlas of the United States of America: Washington, D.C., U.S. Geological Survey, p. 158-159, scale 1:7,500,000.

Baden J., III, Batson. W.T., and Stalter, R., 1975, Factors affecting the distribution of vegetation of abandoned rice fields, Georgetown County, South Carolina: Castanea, v. 40, no. 3, p. 171-184.

Bailey, R.G., 1995, Description of the ecoregions of the United States (2d ed.): Miscellaneous Publication No. 1391, U.S. Department of Agriculture, Forest Service, 108 p. + map.

Bailey, R.G., Avers, P.E., King, T., and McNab, W.H., eds., 1994, Ecoregions and subregions of the United States (map) (supplementary table of map unit descriptions compiled and edited by McNab, W.H. and Bailey, R.G.): Washington, D.C., U.S. Department of Agriculture, Forest Service, scale 1:7,500,000.

Barden, L.S., 1997, Historic prairies in the Piedmont of North and South Carolina, USA: Natural Areas Journal, v. 17, no. 2, p. 149-152.

Barnes, C.P., and Marschner, F.J., 1933, Natural land-use areas of the United States: U.S. Department of Agriculture, scale 1:4,000,000.

Barry, J.M., 1980, Natural vegetation of South Carolina: Columbia, S.C., University of South Carolina Press, 214 p.

Bayer, K.C., 1983, Generalized structural lithologic and physiographic provinces in the fold and thrust belts of the United States: U.S. Geological Survey, scale 1:2,500,000.

Bellis, V.J., 1995, Ecology of maritime forests of the southern Atlantic coast-a community profile: Washington, D.C., U.S. Department of the Interior, National Biological Service, Biological Report 30, 95 p.

Bourdeau, P.F., and Oosting, H.J., 1959, The maritime live oak forest in North Carolina: Ecology, v. 40, p. 148-152.

Braun, E.L., 1950, Deciduous forests of eastern North America: New York, Hafner Publishing Company, 596 p.

Brown, M.J., 1997, Distribution and characterization of forested wetlands in the Carolinas and Virginia: Southern Journal of Applied Forestry, v. 21, no. 2, p. 64-70.

Bryant, W.S., McComb, W.C., and Fralish, J.S., 1993, Oak-hickory forests (western mesophytic/oak-hickory forests), *in* Martin, W.H., Boyce, S.G., and Echternacht, A.C., eds., Biodiversity of the southeastern United States: upland terrestrial communities: New York, John Wiley and Sons, p. 143-201.

Carson, H.A., 1989, The ecoregions of North Carolina: Durham, Duke University, School of Forestry and Environmental Studies, Master's thesis, 38 p.

Christensen, N.L., 1988, Vegetation of the southeastern Coastal Plain, *in* Barbour, M.G., and Billings, W.D., eds., North American terrestrial vegetation: Cambridge, U.K., Cambridge University Press, p. 317-363.

Clay, J.W., Orr, D.M., Jr., and Stuart, A.W., 1975, North Carolina-portrait of a changing southern state: Chapel Hill, University of North Carolina Press, 331 p.

Cleaves, E.T., Glaser, J.D., Howard, A.D., Johnson, G.H., Wheeler, W.H., Sevon, W.D., Judson, S., Owens, J.P., and Peebles, P.C., 1987, Quaternary geologic map of the Chesapeake Bay 4° x 6° quadrangle, United States: U.S. Geological Survey, Quaternary Geologic Atlas of the United States, Miscellaneous Investigations Series Map I-1420 (NJ-18), scale 1:1,000,000.

Cogbill, C.V., White, P.S., and Wiser, S.K., 1997, Predicting treeline in the Southern Appalachian high peaks: Castanea, v. 62, no. 3, p. 137-146.

Cogbill, C.V., and White, P.S., 1991, The latitude-elevation relationship for spruce-fir forest and treeline along the Appalachian Mountain chain: Vegetatio, v. 94, p. 153-175.

Colquhoun, D.J., Friddell, M.S., Wheeler, W.H., Daniels, R.B., Gregory, J.P., Miller, R.A., and Van Nostrand, A.K., 1987, Quaternary geologic map of the Savannah 4° x 6° quadrangle, United States: U.S. Geological Survey, Quaternary Geologic Atlas of the United States, Miscellaneous Investigations Series Map I-1420 (NI-17), scale 1:1,000,000.

Copeland, B.J., and Hodson, R.G., 1983, The ecology of Albemarle Sound, North Carolina-an estuarine profile: U.S. Fish and Wildlife Service Biological Services Program FWS/OBS-83/01, 68 p.

Copeland, B.J., Hodson, R.G., and Riggs, S.R., 1984, The ecology of the Pamlico River, North Carolina-an estuarine profile: U.S. Fish and Wildlife Service Biological Services Program FWS/OBS-82/06, 83 p.

Cowdrey, A.E., 1996, This land, this South-an environmental history: Lexington, Ky., University Press of Kentucky, 240 p.

Daniels, R.B., and Gamble, E.E., 1978, Relations between stratigraphy geomorphology and soils in Coastal Plain areas of southeastern USA: Geoderma, v. 21, p. 41-65.

Daniels, R.B., Buol, S.W., Kleiss, H.J., and Ditzler, C.A., 1999, Soil systems in North Carolina: Raleigh, N.C., North Carolina State University, Soil Science Department, 118 p.

Daniels, R.B., Kleiss, H.J., Buol, S.W., Byrd, H.J., and Phillips, J.A., 1984, Soil systems of North Carolina: Raleigh, N.C., North Carolina Agricultural Research Service, Bulletin 467, 77 p.

Dayton, B.R., 1966, The relationships of vegetation to Iredell and other Piedmont soils in Granville County, North Carolina: Journal of the Elisha Mitchell Scientific Society, v. 82, no. 2, p. 108-118.

Earley, L.S., ed., 1993, North Carolina wild places-a closer look: Raleigh, N.C., North Carolina Wildlife Resources Commission, 81 p.

Fenneman, N.M., 1938, Physiography of eastern United States: New York, McGraw-Hill, 714 p.

Fields, M., and Lynch, I.P., 2000, A guide to Nature Conservancy projects in North Carolina: Durham, N.C., The Nature Conservancy, 132 p.

Frost, C.C., 1993, Four centuries of changing landscape patterns in the longleaf pine ecosystem, *in* Hermann, S.M., ed., 18th Tall Timbers Fire Ecology Conference, the longleaf pine ecosystem: ecology, restoration and management, Tallahassee, Fla., 1991, Proceedings, Tall Timbers Research Station, p. 17-43.

Frost, C.C., 1995, Presettlement fire regimes in southeastern marshes, peatlands, and swamps, *in* Cerulean, S.I., and Engstrom, R.T., eds., 19th Tall Timbers Fire Ecology Conference, fire in wetlands: a management perspective, Tallahassee, Fla., 1995, Proceedings, Tall Timbers Research Station, p. 39-60.

Giese, G.L., and Mason, R.R., Jr., 1991, Low flow characteristics of streams in North Carolina: U.S. Geological Survey Open-File Report 90-399, 3 sheets.

Godfrey, M.A., 1997, Field guide to the Piedmont-the natural habitats of America's most lived in region, from New York City to Montgomery, Alabama: Chapel Hill, N.C., University of North Carolina Press, 524 p.

Godfrey, P.J., and Godfrey, M.M., 1976, Barrier island ecology of Cape Lookout National Seashore and vicinity North Carolina: U.S. National Park Service Scientific Monograph Series 9, 160 p.

Griffith, G.E., Omernik, J.M., and Azevedo, S.H., 1997, Ecoregions of Tennessee: Corvallis, Ore., U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, EPA/600/R-97/022, 51 p.

Griffith, G.E., Omernik, J.M., Comstock, J.A., Lawrence, S., Martin, G., Goddard, A., Hulcher, V.J., and Foster, T., 2002, Ecoregions of Alabama and Georgia (color poster with map, descriptive text, summary tables, and photographs): Reston, Va., U.S. Geological Survey, scale 1:1,700,000.

Hack, J.T., 1982, Physiographic divisions and differential uplift in the Piedmont and Blue Ridge: U.S. Geological Survey Professional Paper 1265, 49 p.

Hackney, C.T., Adams, S.M., and Martin, W.H., eds., 1992, Biodiversity of the southeastern United States-aquatic communities: New York, John Wiley and Sons, 779 p.

Hamel, P., LeGrand, H., Lennartz, M., and Gauthreaux, S., Jr., 1982, Bird-habitat relationships on southeastern forest lands: U.S. Forest Service General Technical Report SE-22, 417 p.

Hammond, E.H., 1970, Classes of land-surface form: *in* The national atlas of the United States of America: Washington, D.C., U.S. Geological Survey, p. 62-63, scale 1:7,500,000.

Hardin, J.W., and Cooper, A.W., 1967, Mountain disjuncts in the eastern Piedmont of North Carolina: Journal of the Elisha Mitchell Scientific Society, v. 83, no. 3, p. 139-150.

Hardy, A.V., 1974, The climate of North Carolina, *in* U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Climates of the States, v. 1: Port Washington, N.Y., Water Information Center, Inc., p. 281-299.

Hartshorn, G.S., 1972, Vegetation and soil relationships in southern Beaufort County, North Carolina: Journal of the Elisha Mitchell Scientific Society, v. 88, no. 4, p. 226-238.

Henderson, B.M. and Walsh, S.J., 1995, Plowed, paved, or in succession-landcover change on the North Carolina Piedmont: Southeastern Geographer, v. 35, no. 2, p. 132-149.

Hill, S.R., 1992, Calciphiles and calcareous habitats of South Carolina: Castanea, v. 57, no. 1, p. 25-33.

Howard, A.D., Behling, R.E., Wheeler, W.H., Daniels, R.B., Swadley, W.C., Richmond, G.M., Goldthwait, R.P., Fullerton, D.S., Sevon, W.D., and Miller, R.A., 1991, Quaternary geologic map of the Blue Ridge 4° x 6° quadrangle, United States: U.S. Geological Survey, Quaternary Geologic Atlas of the United States, Miscellaneous Investigations Series Map I-1420 (NJ-17), scale 1:1,000,000.

Hunt, C.B., 1974, Natural regions of the United States and Canada: San Francisco, W.H. Freeman, 725 p.

Hutto, C.J., Shelburne, V.J., and Jones, S.M., 1999, Preliminary ecological land classification of the Chauga Ridges Region in South Carolina: Journal of Forest Ecology and Management, v. 114, p. 385-393.

Johnson, G.H., and Peebles, P.C., 1986, Quaternary geologic map of the Hatteras 4° x 6° quadrangle, United States: U.S. Geological Survey, Quaternary Geologic Atlas of the United States, Miscellaneous Investigations Series Map I-1420 (NI-18), scale 1:1,000,000.

Jones, S.M., 1988, Old-growth forests within the Piedmont of South Carolina: Natural Areas Journal, v. 8, p. 31-37.

Jones, S.M., Van Lear, D.H., and Cox, S.K., 1984, A vegetation-landform classification of forest sites within the upper Coastal Plain of South Carolina: Bulletin of the Torrey Botanical Club, v. 111, no. 3, p. 349-360.

Kendeigh, S.C., and Fawver, B.J., 1981, Breeding bird populations in the Great Smoky Mountains, Tennessee and North Carolina: Wilson Bulletin, v. 93, no. 2, p. 218-242.

Kesel, R.H., 1974, Inselbergs on the Piedmont of Virginia, North Carolina, and South Carolina-types and characteristics: Southeastern Geology, v. 16, no. 1, p. 1-30.

Keys, J., Jr., Carpenter, C., Hooks, S., Koenig, F., McNab, W.H., Russell, W.E., and Smith, M-L., 1995, Ecological units of the eastern United States-first approximation: Atlanta, U.S. Department of Agriculture, Forest Service, Technical Publication R8-TP 21, scale 1:3,500,000.

King, P.B., and Beikman, H.M., 1974, Geologic map of the United States: U.S. Geological Survey, scale 1:2,500,000.

King, P.B., Neuman, R.B., and Hadley, J.B., 1968, Geology of the Great Smoky Mountains National Park, Tennessee and North Carolina: U.S. Geological Survey Professional Paper 587, 23 p.

Kovacik, C.F., and Winberry, J.J., 1987, South Carolina-the making of a landscape: Boulder, Colorado, Westview Press, Inc., 235 p.

Kuchler, A.W., 1964, Potential natural vegetation of the conterminous United States: New York, American Geographical Society, Special Publication no. 36, 116 p., scale 1:3,168,000.

Landers, H., 1974, The climate of South Carolina, *in* U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Climates of the States, v. 1: Port Washington, N.Y., Water Information Center, Inc., p. 353-369.

Lee, W.D., 1955, The soils of North Carolina, their formation, identification and use: North Carolina Agricultural Experiment Station Technical Bulletin, no. 115, 187 p.

Lenat, D.R., and Crawford, J.K., 1994, Effects of land use on water quality and fauna of three North Carolina streams: Hydrobiologia, v. 294, p. 185-199.

Lide, R.F., 1997, When is a depression wetland a carolina bay?: Southeastern Geographer, v. 37, no. 1, p. 90-98.

Lilly, J.P., 1981, The blackland soils of North Carolina-their characteristics and management for agriculture, North Carolina Agricultural Experiment Station Technical Bulletin 270, 70 p.

Lonsdale, R.E., 1967, Atlas of North Carolina: Chapel Hill, N.C., The University of North Carolina Press, 158 p.

Lord, J.D., 1996, The new geography of cotton production in North Carolina: Southeastern Geographer, v. 36, no. 2, p. 93-112.

Loveland, T.R., Merchant, J.W., Brown, J.F., Ohlen, D.O., Reed, B.C., Olsen, P., and Hutchinson, J., 1995, Seasonal land-cover regions of the United States: Annals of the Association of American Geographers, v. 85, no. 2, p. 339-355.

MacKenzie, M.D., and White, P.S., 1998, The vegetation of Great Smoky Mountains National Park-1935-1938: Castanea, v. 63, p. 323-336.

Markewich, H.W., Pavich, M.J., and Buell, G.R., 1990, Contrasting soils and landscapes of the Piedmont and Coastal Plain, eastern United States: Geomorphology, v. 3, p. 417-447.

Marshall, W.D., 1993, Assessing change in the Edisto River basin-an ecological characterization: Columbia, S.C., South Carolina Water Resources Commission, Report no.177, 149 p.

Martin, W.H., Boyce, S.G., and Echternacht, A.C., eds., 1993a, Biodiversity of the southeastern United States-lowland terrestrial communities: New York, John Wiley and Sons, 502 p.

Martin, W.H., Boyce, S.G., and Echternacht, A.C., eds., 1993b, Biodiversity of the southeastern United States-upland terrestrial communities: New York, John Wiley and Sons, 373 p.

Maybin, A.H., III, and Nystrom, P.G., Jr., 1995, Geologic map of South Carolina: Columbia, S.C., South Carolina Department of Natural Resources, scale 1:1,000,000.

McCaleb, S.B., and Lee, W.D., 1956, Soils of North Carolina-I. Factors of soil formation and distribution of great soil groups: Soil Science, v. 82, p. 419-431.

McCartan, L., Lemon, E.M., Jr., and Weems, R.E., 1984, Geologic map of the area between Charleston and Orangeburg, South Carolina: U.S. Geological Survey, Miscellaneous Investigations Series Map I-1472, scale 1:250,000.

McMahon, G., and Harned, D.A., 1998, Effect of environmental setting on sediment, nitrogen, and phosphorus concentrations in Albemarle-Pamlico drainage basin, North Carolina and Virginia, USA: Environmental Management, v. 22, no. 6, p. 887-903.

McNab, W.H., and Avers, P.E., comps., 1994, Ecological subregions of the United States: section descriptions: Washington, D.C., U.S. Department of Agriculture, Forest Service Administrative Publication WO-WSA-5, 267 p.

Miller, R.A., Maher, S.W., Copeland, C.W., Jr., Rheams, K.F., LeNeathery, T., Gilliland, W.A., Friddell, M.S., Van Nostrand, A.K., Wheeler, W.H., Holbrook, D.F., and Bush, W.V., 1988, Quaternary geologic map of the Lookout Mountain 4° x 6° quadrangle, United States: U.S. Geological Survey, Quaternary Geologic Atlas of the United States, Miscellaneous Investigations Series Map I-1420 (NI-16), scale 1:1,000,000.

Monk, C.D., Imm, D.W., and Potter, R.L., 1990, Oak forests of eastern North America: Castanea, v. 55, no. 2, p. 77-96.

Moorhead, K.K., 1992, Wetland resources of coastal North Carolina: Wetlands, v. 12, p. 184-191.

Mulholland, P.J., and Lenat, D.R., 1992, Streams of the southeastern Piedmont, Atlantic drainage, *in* Hackney, C.T., Adams, S.M., and Martin, W.H., eds., Biodiversity of the southeastern United States-aquatic communities: New York, John Wiley and Sons, p. 193-231.

Murphy, C.H., 1995, Carolina rocks!-the geology of South Carolina: Orangeburg, S.C., Sandlapper Publishing Co., 261 p.

Myers, R.K., Zahner, R., and Jones, S.M., 1986, Forest habitat regions of South Carolina: Clemson, S.C., Department of Forestry, Clemson University, Forest Research Series No. 42, 31 p. + map.

Newell, C.L., and Peet, R.K., 1998, Vegetation of Linville Gorge Wilderness, North Carolina: Castanea, v. 63, no. 3, p. 275-322.

North Carolina Geological Survey, 1985, Geologic map of North Carolina: Raleigh, N.C., Department of Natural Resources and Community Development, Division of Land Resources, scale 1:500,000.

Orr, D.M., Jr., and Stuart, A.W., eds., 2000, The North Carolina Atlas: portrait for a new century: Chapel Hill, N.C., University of North Carolina Press, 461 p.

Owens, J.P., 1989, Geologic map of the Cape Fear region, Florence 1° x 2° quadrangle and northern half of the Georgetown 1° x 2° quadrangle, North Carolina and South Carolina: U.S. Geological Survey, Miscellaneous Investigations Series Map I-1948-A, scale 1:250,000.

Peet, R.K., and Allard, D.J., 1993, Longleaf pine vegetation of the Southern Atlantic and Eastern Gulf Coast regions: a preliminary classification, *in* Herman, S.M., ed., 18th Tall Timbers Fire Ecology Conference, the longleaf pine ecosystem: ecology, restoration and management, Tallahassee, Fla., 1991, Proceedings, Tall Timbers Research Station, p. 45-81.

Phillips, J.D., 1994, Forgotten hardwood forests of the Coastal Plain: Geographical Review, vol. 84, no. 2, p. 162-171.

Pittillo, J.D., Hatcher, R.D., Jr., and Buol, S.W., 1998, Introduction to the environment and vegetation of the southern Blue Ridge Province: Castanea, vol. 63, no. 3, p. 202-216.

Prunty, M.C., and Aiken, C.S., 1972, The demise of the Piedmont cotton region: Annals of the Association of American Geographers, v. 62, no. 2, p. 283-306.

Pyle, C., 1988, The type and extent of anthropogenic vegetation disturbance in the Great Smoky Mountains before National Park Service acquisition: Castanea, v. 53, no. 3, p. 183-196.

Pyle, C., and Schafale, M.P., 1988, Land use history of three spruce-fir forest sites in southern Appalachia: Journal of Forest History, vol. 32, p. 4-21.

Quarterman, E., and Keever, C., 1962, Southern mixed hardwood forest: climax in the southeastern coastal plain, USA: Ecological Monographs, v. 32, p. 167-185.

Quarterman, E., Burbanck, M.P., and Shure, D.J., 1993, Rock outcrop communities: limestone, sandstone, and granite, in Martin, W.H., Boyce, S.G., and Echternacht, A.C., eds., Biodiversity of the Southeastern United States, Upland Terrestrial Communities: New York, John Wiley and Sons, p. 35-86.

Rankin, D.W., Espenshade, G.H., and Newman, R.B., 1972, Geologic map of the west half of the Winston-Salem quadrangle, North Carolina, Virginia, and Tennessee: U.S. Geological Survey Miscellaneous Investigations Series Map I-709-A, scale 1:250,000.

Reed, R. A., Peet, R.K., Palmer, M.W., and White, P.S., 1993, Scale dependence of vegetation-environment correlations: a case study of a North Carolina piedmont woodland: Journal of Vegetation Science, vol. 4, p. 329-340.

Rheinhardt, M.C., and Rheinhardt, R.D., 2000, Canopy and woody subcanopy composition of wet hardwood flats in eastern North Carolina and southeastern Virginia: Journal of the Torrey Botanical Society, vol. 127, no. 1, p. 33-43.

Richardson, C.J., ed., 1981, Pocosin wetlands: an integrated analysis of coastal plain freshwater bogs in North Carolina: Stroudsburg, Pa., Hutchinson Ross Publishing Company, 364 p.

Ross, T.E., 1996, Carolina bays: coastal plain enigma, *in* Bennet, D.G., ed., Snapshots of the Carolinas: Landscapes and Cultures: Washington, D.C., Association of American Geographers, p. 77-81.

Savage, H., 1982, The mysterious Carolina Bays: Columbia, S.C., University of South Carolina Press, 121 p.

Schafale, M.P., and Weakley, A.S., 1990, Classification of natural communities of North Carolina, third approximation: Raleigh, N.C., North Carolina Natural Heritage Program, Division of Parks and Recreation, N.C. Department of Environment, Health, and Natural Resources, 325 p.

Sharitz, R.R., and Gibbons, J.W., 1982, The ecology of evergreen shrub bogs, pocosins and carolina bays of the Southeast-a community profile: Washington, D.C., U.S. Fish and Wildlife Service Biological Services Program, FWS/OBS-82/04, 93 p.

Sharitz, R.R., and Mitsch, W.J., 1993, Southern floodplain forests, *in* Martin, W.H., Boyce, S.G., and Echternacht, A.C., eds., Biodiversity of the southeastern United States-lowland terrestrial communities: New York, John Wiley and Sons, p. 311-372.

Smith, B.R., and Hallbick, D.C., 1979, General soil map, South Carolina: Clemson, S.C., South Carolina Agricultural Experiment Station, Clemson University, in cooperation with U.S. Department of Agriculture, Soil Conservation Service, scale 1:750,000.

South Carolina Department of Natural Resources, Land, Water and Conservation Division, Geological Survey, 1997, Generalized geologic map of South Carolina 1997: Columbia, S.C., South Carolina Department of Natural Resources, scale 1:1,000,000.

South Carolina Department of Natural Resources, Land Resources and Conservation Districts Division, 1997, General soil map of South Carolina: Columbia, S.C., South Carolina Department of Natural Resources, scale 1:594,000.

South Carolina Department of Natural Resources, State Climatology Office, 2002, General descriptions of South Carolina's climate, http://water.dnr.state.sc.us/climate/sco/sc_climate.html.

South Carolina Land Resources Conservation Commission, 1992, Land use/land cover of South Carolina, 1990: Columbia, S.C., South Carolina Land Resources Conservation Commission, scale 1:500,000.

Southeast Regional Climate Center, 1999, Climatological normals for North Carolina and South Carolina, 1961-1990: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.

Stuckey, J.L., 1965, North Carolina-its geology and mineral resources: Raleigh, N.C., North Carolina Department of Conservation and Development, 550 p.

Stuckey, J.L., and Conrad, S.G., 1958, Explanatory text for geologic map of North Carolina: North Carolina Division of Mineral Resources Bulletin 71, 51 p.

U.S. Department of Agriculture, Forest Service, 1969, A forest atlas of the South: New Orleans, Southern Forest Experiment Station, and Asheville, N.C., Southeastern Forest Experiment Station, 27 p.

U.S. Department of Agriculture, Forest Service, 1997, Forest type groups of the United States, scale 1:7,500,000, *in* Powell, D.S., Faulkner, J.L., Darr, D.R., Zhu, Z., and MacCleery, D.W., Forest resources of the United States: Fort Collins, Colorado, U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station, General Technical Report RM-234, 132 p.

U.S. Department of Agriculture, National Agricultural Statistics Service, 1999, Census of agriculture, 1997, v. 2, subject series, part 1, agricultural atlas of the United States: Washington, D.C., U.S. Government Printing Office, 163 p.

U.S. Department of Agriculture, Natural Resources Conservation Service (formerly Soil Conservation Service), Various county soil surveys of North Carolina and South Carolina.

U.S. Department of Agriculture, Soil Conservation Service, 1981, Land resource regions and major land resource areas of the United States: Washington, D.C., U.S. Government Printing Office, Agriculture Handbook 296, 156 p + map.

U.S. Department of Commerce, Bureau of the Census, 1995, Census of agriculture, 1992, v. 2, subject series, part 1, agricultural atlas of the United States: Washington, D.C., U.S. Government Printing Office, 204 p.

U.S. Geological Survey, 1986, Land use and land cover data from 1:250,000- and 1:100,000-scale maps: Reston, Va., U.S. Geological Survey, Data Users Guide no. 4.

Van Lear, D.H., and Jones, S.M., 1987, An example of site classification in the southeastern coastal plain based on vegetation and land type: Southern Journal of Applied Forestry, v. 11, no. 1, p. 23-28.

Waggoner, G.S., 1975, Southeastern evergreen and oak-pine region; inventory of natural areas and sites recommended as potential natural landmarks: Washington, D.C., U.S. National Park Service, 206 p.

Walker, J., and Peet, R.K., 1983, Composition and species diversity of pine-wiregrass savannas of the Green Swamp, North Carolina: Vegetatio, v. 55, p. 163–179.

Ware, S., Frost, C., and Doerr, P.D., 1993, Southern mixed hardwood forest: the former longleaf pine forest, *in* Martin, W.H., Boyce, S.G., and Echternacht, A.C., eds., Biodiversity of the southeastern United States: lowland terrestrial communities: New York, John Wiley and Sons, p. 447-493.

White, P.S., Wilds, S.P., and Thunhorst, G.A., 1998, Southeast: *in* Mac, M.J., Opler, P.A., Puckett Haecker, C.E., and Doran, P.D., eds., Status and trends of the nation's biological resources: Reston, Va., U.S. Dept. of the Interior, U.S. Geological Survey, p. 255-314.

Whittaker, R.H., 1956, Vegetation of the Great Smoky Mountains: Ecological Monographs, v. 26, p. 1-80.

Winner, M.D, Jr., and Coble, R.W., 1996, Hydrogeologic framework of the North Carolina coastal plain: U.S. Geological Survey Professional Paper 1404-I, p. 1-106.

Wiser, S.K., 1994, High-elevation cliffs and outcrops of the Southern Appalachians-vascular plants and biogeography: Castanea, v. 59, no. 2, p. 85-116.

Wiser, S.K., Peet, R.K., and White, P.S., 1996, High elevation rock outcrop vegetation of the Southern Appalachian Mountains: Journal of Vegetation Science, v. 7, p. 703-722.

Witter, J.A., and Ragenovich, I.R., 1986, Regeneration of Fraser fir at Mt. Mitchell, North Carolina after depredations by the balsam woolly adelgid: Forest Science, v. 32, p. 585-594.

Wyant, J.G., Alig, R.J., and Bechtold, W.A., 1991, Physiographic position, disturbance and species composition in North Carolina Coastal Plain forests: Forest Ecology and Management, v. 41, p. 1-19.