Glossary

atmospheric deposition. Occurs when pollutants are transferred from the air to the earth's surface.

average annual mortality. Average annual volume of trees 5.0 inches diameter at breast height (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.

cation. An ion or group of ions having a positive charge and characteristically moving toward the negative electrode in electrolysis.

census designated places. A type of place identified by the U.S. Census Bureau to delineate incorporated places, such as cities, towns and villages, as well as populated areas that lack separate municipal government but which otherwise physically resemble incorporated places.

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.

clone. A vegetatively propagated organism, or a group of such organisms consisting of an ortet and its ramets.

coastal plain. A term used in this document with or without “North Carolina” (NC), to refer to the sections of the Coastal Plain province encompassed by North Carolina’s boundaries (see **physiograpic region** in this glossary).

Community Accomplishment Reporting System (CARS). The four performance measures used to ascertain a level of function for a municipal urban forest program, as determined by the USDA Forest Service: professional staffing, tree ordinances, management plans based on scientific inventories, and tree advocacy groups providing citizen support.

composite panels. Roundwood products manufactured into chips, wafers, strands, flakes, shavings, or sawdust and then reconstituted into a variety of panel and engineered lumber products.

consumption. The quantity of a commodity, such as pulpwood, utilized by a particular mill or group of mills.

controlled burn. The use of fire under specific environmental conditions to achieve forest management objectives. Used to reduce hazardous fuel levels, control unwanted vegetation, favor desired vegetation, and improve visibility and wildlife habitat.

current forest health threats. Insects, diseases, and non-native invasive weeds currently found in North Carolina that threaten trees and forest ecosystems. Insects and diseases may be native or non-native.

diameter class. A classification of trees based on tree d.b.h. Two-inch diameter classes are commonly used by USDA Forest Service FIA, with the even inch as the approximate midpoint for a class. For example, the 6-inch class includes trees 5 through 6.9 inches d.b.h.

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

ecoregion. An area defined by environmental conditions and natural features; a region defined by its ecology. Ecoregions span state borders but share similar environmental conditions and natural features. This term has been used to describe regions of the United States for the USDA Forest Service (Bailey, 1995) and in the *NC Wildlife Action Plan* (NCWRC, 2005). Ecoregions correspond to U.S. Geological physiographic regions to some extent. *See* **physiographic region** in this glossary.

Blue Ridge Ecoregion refers to areas in North Carolina and other states that are part of the Southern section of the Blue Ridge province.

Mid-Atlantic Coastal Plain Ecoregion refers to areas in North Carolina and other states that are part of the Coastal Plain province.

Piedmont Ecoregion refers to areas in North Carolina and other states that are part of the Piedmont province.

eutrophication. An increase in the concentration of chemical nutrients in an ecosystem to an extent that increases the primary productivity of the ecosystem.

exotic species. A species that occurs outside of its native range.

extirpate. To cause extinction in a localized area.

extraterritorial jurisdiction (ETJ). Legal ability of a government to exercise authority beyond its normal boundaries.

exurban. Private forest lands with 16 to 64 housing units per square mile. Lands with these higher housing densities can still support many wildlife species and other ecological functions, although perhaps at a reduced level. However, management for commercial timber may be less likely.

family forest owners. Families, individuals, trusts, estates, family partnerships, and other unincorporated groups of individuals that own forest land. This group is a subset of nonindustrial private forest owners.

Firewise. An approach that emphasizes (1) community responsibility for wildfire planning via the design of a safe community; (2) effective emergency response; and (3) individual responsibility for safer home construction and design, landscaping, and maintenance,

forest certification. The stewardship and use of forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality, and potential to fulfill, now and in the future relevant ecological, economic, and social functions at local, national, and global levels, and that does not cause damage to other ecosystems

forest industry related. The term used in this report to encompass the NAICS sectors defined below.

NAICS. The North American Industry Classification System is used by government agencies and business to classify business establishments according to type of economic activity in the United States, Canada, and Mexico. The following NAICS sectors comprise what we refer to in this report as "forest industry related."

NAICS Sector 113 – Forestry and Logging. Industries in the Forestry and Logging subsector grow and harvest timber on a long production cycle (i.e., of 10 years or more). Long production cycles use different production processes than short production cycles, which require more horticultural interventions prior to harvest, resulting in processes more similar to those found in the Crop Production subsector. Consequently, Christmas tree production and other production involving production cycles of less than 10 years are classified in the Crop Production subsector.

NAICS Sector – 115 Support Activities for Agriculture and Forestry. Industries in the Support Activities for Agriculture and Forestry subsector provide support services that are an essential part of agricultural and forestry production. These support activities may be performed by the agriculture or forestry producing establishment or conducted independently as an alternative source of inputs required for the production process for a given crop, animal, or forestry industry. Establishments that primarily perform these activities independent of the agriculture or forestry producing establishment are in this subsector.

NAICS Sector – 321 Wood Product Manufacturing. Industries in the Wood Product Manufacturing subsector manufacture wood products, such as lumber, plywood, veneers, wood containers, wood flooring, wood trusses, manufactured homes (i.e., mobile homes), and prefabricated wood buildings. The production processes of the Wood Product Manufacturing subsector include sawing, planing, shaping, laminating, and assembling of wood products starting from logs that are cut into bolts, or lumber that then may be further cut, or shaped by lathes or other shaping tools. The lumber or other transformed wood shapes may also be subsequently planed or smoothed, and assembled into finished products, such as wood containers. The Wood Product Manufacturing subsector includes establishments that make wood products from logs and bolts that are sawed and shaped, and establishments that purchase sawed lumber and make wood products. With the exception of sawmills and wood preservation establishments, the establishments are grouped into industries mainly based on the specific products manufactured.

NAICS Sector – 322 Paper Manufacturing. Industries in the Paper Manufacturing subsector make pulp, paper, or converted paper products. The manufacturing of these products is grouped together because they constitute a series of vertically connected processes. More than one is often carried out in a single establishment. There are essentially three activities. The manufacturing of pulp involves separating the cellulose fibers from other impurities in wood or used paper. The manufacturing of paper involves matting these fibers into a sheet. Converted paper products are made from paper and other materials by various cutting and shaping techniques and includes coating and laminating activities.

NAICS Sector – 337 Furniture and Related Product Manufacturing. Industries in the Furniture and Related Product Manufacturing subsector make furniture and related articles, such as mattresses, window blinds, cabinets, and fixtures. The processes used in the manufacture of furniture include the cutting, bending, molding, laminating, and assembly of such materials as wood, metal, glass, plastics, and rattan. However, the production process for furniture is not solely bending metal, cutting and shaping wood, or extruding and molding plastics. Design and fashion trends play an important part in the production of furniture. The integrated design of the article for both esthetic and functional qualities is also a major part of the process of manufacturing furniture. Design services may be performed by the furniture establishment's work force or may be purchased from industrial designers.

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

Pine plantation. Stands that (1) have been artificially regenerated by planting or direct seeding, (2) are classed as a pine or other softwood forest type, and (3) have at least 10 percent stocking.

Natural pine. Stands that (1) have not been artificially regenerated, (2) are classed as a pine or other softwood forest type, and (3) 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 that are less than 10 percent stocked with live trees.

forest patch. A forest tract larger than 500 acres.

forest products industry. A term used commercially that encompasses the NAICS sectors and subsectors defined for forestry.

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

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 as 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.

forestland. 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.

germplasm. (1) Within an individual or group, the collective hereditary materials that are the physical basis for inheritance; the hereditary stream. (2) The genotype, with particular reference to its transmission to the next generation.

green space. Open, undeveloped land with natural vegetation.

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.)

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.

healthy urban forest. A forest that is actively managed for long-term benefits, is structurally diverse enough to withstand environmental change and periodic catastrophic events, and consists of an interconnected network of green space that conserves the natural ecosystem values and function.

hydrology. The scientific study of the properties, distribution, and effects of water on the earth's surface, in the soil and underlying rocks, and in the atmosphere.

imminent forest health threats. Forest health threats that are not currently found in North Carolina but are in adjacent states or have the capability to invade North Carolina within the next few years.

impervious surface. Surfaces that water cannot penetrate, such as buildings and pavement.

infrastructure. A basic framework or system of public works (including transportation, communication, sewage, water, and utility systems) needed to support human activity.

introduced species. A species that exists in a given area due to human action or activity that has led to its dispersal across natural geographic barriers and/or produced conditions favorable to its growth and spread.

invasive species. A species occurring outside of its native range that is likely to cause harm to or threaten the survival of native species.

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 < 200 feet wide, and lakes, reservoirs, and ponds < 4.5 acres in area.

large community. A community with a population greater than 60,000 people.

limited-resource landowners. Traditionally under-served landholders. This group includes those who have smaller-than-average land holdings with no or limited access to substantial amounts of capital or off-farm income. This group may include beginning farmers; farmers producing for emerging or alternative markets; and certain individuals or groups, such as minority farmers who are traditionally under-served by credit and other farm service institutions (SARE, 2000).

locally significant forest health threats. Current forest health threats that can cause significant damage and impact diversity in local areas. These pests may be confined to a small geographic area, spread more slowly, or pose little ability to spread into unaffected areas.

major forest health threats. Current forest health threats that can cause significant ecological and economic damage to North Carolina's forest resources.

mass controlled pollinations (MCP). A method of tree breeding where large numbers of pollen parentage are completely controlled, eliminating pollen contamination and allowing for positive assortative mating among seed orchard parents to maximize genetic gains or specific genetic traits.

medium community. A community with a population between 10,000 and 60,000 people.

mountains. A term used in this document with or without "North Carolina" (NC) to refer to the sections of the Blue Ridge province encompassed by North Carolina's boundaries (see **physiograpic region** in this glossary).

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.

net 40 benefit. A benefit calculated as the cost of a tree and its maintenance accumulated over 40 years subtracted from the tree's economic and environmental benefits over 40 years.

non-native invasive pest Insects or diseases that are not indigenous to North Carolina and when introduced aggressively infest or infect forest trees and plants.

non-native invasive plant. Plants that are not indigenous to North Carolina and when introduced aggressively outcompete or otherwise impact native vegetation.

nonforestland. 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.

open space. An area of land that is valued for natural processes and wildlife, for agricultural and sylvan production, for active and passive recreation, for providing other public benefits, or for any combination of these uses. Open space may be either open, forested, cropland, or pastureland that has not been converted or used to support development.

other forestland. Forestland other than timberland and productive reserved forestland. It includes available and reserved forestland that 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 forestland. 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.

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.

ozone non-attainment areas. Areas not meeting the ground-level ozone standards established by the U.S. Environmental Protection Agency in 1997 and 2008.

particulate matter. Tiny subdivisions of solid or liquid matter suspended in a gas or liquid.

physiographic region. Physiographic regions are based on terrain texture, rock type, and geologic structure and history. The U.S. Geological Survey classification system has three tiers: *divisions*, which are broken into *provinces*; some provinces break further into *sections*. North Carolina crosses three provinces that encompass other states:

The *Blue Ridge province* is part of the *Appalachian Highlands division*. The Blue Ridge province encompasses mountainous lands in the Southeast, including areas of Virginia, North Carolina, and Tennessee. North Carolina's mountainous areas occur in the *Southern section* of the Blue Ridge province.

The *Coastal Plain province* is part of the *Atlantic Plain division*. The Coastal Plain province includes coastal lands in the East and Southeast from New Jersey to southern Texas.

The *Piedmont* province is part of the *Appalachian Highlands division*. The Piedmont province encompasses inland areas and foothills in the East and Southeast from Pennsylvania south to Alabama.

piedmont. A term used in this document with or without "North Carolina" (NC) to refer to areas of the Piedmont province encompassed by North Carolina's boundaries (see **physiograpic region** in this glossary).

Piedmont Crescent. A population term used to describe an area in North Carolina located in the central counties of the NC piedmont. The Piedmont Crescent stretches northeast from metropolitan Charlotte, through the Piedmont Triad cities of Greensboro and Winston-Salem at its center, to metropolitan Raleigh-Durham and the Research Triangle area at its eastern edge.

plantable space. Land not currently in tree canopy or impervious surface that may offer opportunities for tree planting.

primary processor. *See* **primary wood-using plant**.

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

priority places. Communities indicated as having a priority through data evaluation.

private forest. For this project, private forest includes tribal, forest industry, and nonindustrial private ownerships; it excludes public lands and private lands protected through conservation easements.

production. The total volume of known roundwood harvested from land within a State, regardless of where it is consumed. Production is the sum of timber harvested and used within a State, and all roundwood exported to other States.

pulpwood. A roundwood product that will be reduced to individual wood fibers by chemical or mechanical means. The fibers are used to make a broad generic group of pulp products that includes paper products, as well as fiberboard, insulating board, and paperboard.

receipts. The quantity or volume of industrial roundwood received at a mill or by a group of mills in a State, regardless of the geographic source. Volume of roundwood receipts is equal to the volume of roundwood retained in a State plus roundwood imported from other States.

riparian. Pertaining to a river or other natural course of water and the corridor adjoining it, including the banks and floodplain of a river.

riverine. Relating to, formed by, or resembling a river; living or situated on the banks of a river.

roguing. A systematic removal of individuals not desired for the perpetuation of a population, e.g., from a seed stand, nursery, or genetic test.

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

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

rural. Private forest lands with 16 or fewer housing units per square mile. Forest lands with this housing density can generally support a diversity of economic and ecological functions commonly associated with private forests, such as management for timber, most wildlife species, and water quality.

serotinous. a pinecone or other seed case that requires heat from a fire to open and release the seed.

small community. A community with a population of less than 10,000 people.

smoke-sensitive area. An area in which smoke from outside sources is intolerable. North Carolina's smoke-sensitive areas are calculated as a 2-mile buffer surrounding medical facilities, major roads, schools, and universities.

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 red cedar, white cedar, eastern white pine, eastern hemlock, spruce, and fir.

southern Appalachian region. This term is used to describe southern parts of the Appalachian Highlands division. The area this term describes corresponds roughly to the Blue Ridge province and its Southern section.

stand age. The average age of dominant and co-dominant 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.

sustainable development. Development that integrates environmental protection, economic development, and social equity.

Sustainable Forestry Initiative (SFI). A voluntary, third-party organization that develops standards of good forest management and certifies that forests are well-managed as defined by a particular standard ensuring that certain wood and paper products come from responsibly managed forests.

sustainable forestry. The practice of meeting the forest resource needs and values of the present without compromising the ability of future generations to meet their own needs.

timber investment management organization (TIMO). A management group that aids institutional investors in managing their timberland investments. A TIMO acts as a broker for institutional clients.

timber products. Roundwood products and byproducts.

timber products output. The total volume of roundwood products from all sources plus the volumes of byproducts recovered from mill residues (equals roundwood product drain).

timber stand improvement. An intermediate treatment made to improve the composition, structure, condition, health, and growth of evenly or unevenly aged forest stands.

timberland. Forestland capable of producing 20 cubic feet of industrial wood per acre per year and not withdrawn from timber utilization.

tree. A woody plant 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).

tropical cyclone. An intense low-pressure system typically associated with high winds, flooding due to storm surge, and intense rainfall, and thunderstorms. Tropical cyclones are broken into three categories based on sustained wind speeds: tropical depression, tropical storm, and hurricane.

urban. Private forestland with 64 or more housing units per square mile. Such lands are less likely to be used for timber production or to contribute to wildlife habitat and water quality because of increased road density, infrastructure, and human population levels. Such forest patches, however, are often highly valued for their aesthetics, noise abatement properties, and positive effect on property values.

urban areas. Areas with a housing density of at least one house per 2 acres.

urban clusters. Areas with a housing density of one house every 2 to 16 acres.

urban heat islands. Urban areas that become warmer than their rural surroundings, forming an "island" of higher temperatures in the landscape.

urban-rural interface. The area or zone where infrastructure and other associated development from human populations meet or intermingle with rural forests and farms.

veneer log. A roundwood product either rotary cut, sliced, stamped, or sawn into a variety of veneer products, such as plywood, finished panels, veneer sheets, or sheathing.

wildfire. A rapidly spreading fire, often occurring in wildland areas, that is out of control.

wildland-urban interface. The area where homes and structures meet the natural environment of forests and wildlands.

Appendix A: Contributing Plans & Resources

Losing Our Natural Heritage: Development & Open Space Loss in North Carolina (PDF) from the Environment North Carolina Research & Policy Center, April 2007

North Carolina Division of Forest Resources Longleaf Initiative & Action Plan 2006-2010 (PDF)

Assessment of Need for the Forest Legacy Program (PDF)

Economic & Ecological Impacts Associated with Wood Chip Production in North Carolina, Integrated Research Project Summary (PDF)

Forest Inventory & Analysis Factsheet - North Carolina, 2002 (PDF)

North Carolina Division of Forest Resources Outreach Plan (PDF)

North Carolina Division of Forest Resources Urban & Community Forestry Five Year Strategic Plan (2004-2008) (PDF)

North Carolina Urban Forestry Council Report: Long Range Program (PDF)

North Carolina's Forests, 1990 (PDF)

North Carolina's Forests, 2002 (PDF)

North Carolina's Fourth Forest...a Look Before & After (PDF)

Pathways for Forestry in North Carolina (PDF)

Report of the Governor's Task Force on Forest Sustainability (PDF)

Recommendations to Increase the Productivity of Small Woodlots in North Carolina (PDF)

The North Carolina Forest Stewardship Program Five Year Work Plan, 2002-2007 (PDF)

NCDFR 2008 Annual Report (PDF)

Range-Wide Conservation Plan for Longleaf Pine
http://www.americaslongleaf.net/resources/the-conservation-plan/Conservation%20Plan.pdf

North Carolina Wildlife Action Plan http://www.wildlifeactionplans.org/north_carolina.html

North Carolina Outdoor Recreation Plan 2009 – 2013
http://www.ncparks.gov/About/plans/scorp/main.php

North Carolina Coastal Habitat Protection Plan
http://www.ncfisheries.net/habitat/chpp2k5/_Complete%20CHPP.pdf

Appendix B: GIS Processes and Data Sources

Chapter 1.

FIGURE 1b-2. Conserving Working Forest Lands Map

Map assembled by Andrew Bailey, NC Division of Forest Resources

Spatial Reference:

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter

Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Forested lands data from Southern Forest Land Assessment:
http://tfsweb.tamu.edu/main/popup.aspx?id=5818

T&E species habitat data from Southern Forest Land Assessment:
http://tfsweb.tamu.edu/main/popup.aspx?id=5818

Development Risk data from Southern Forest Land Assessment:
http://tfsweb.tamu.edu/main/popup.aspx?id=5818

Water quality point data from NC DENR Division of Water Quality. 12-digit hydrologic units from USDI Natural Resource Conservation Service Watershed Boundary Dataset:
http://www.ncgc.nrcs.usda.gov/products/datasets/watershed/

Wood Using Mills Data from Carolyn Steppleton, USDA Forest Service, Southern Research Station, Forest Inventory and Analysis.

Forest type-group data from USDA Forest Service, Forest Inventory and Analysis program and Remote Sensing Applications Center:
http://fsgeodata.fs.fed.us/rastergateway/forest_type/

Forest health data from NC Division of Forest Resources (see process information for figure 1b-4).

Wildland fire susceptibility data from Southern Wildfire Risk Assessment WFSI layer:
http://www.southernwildfirerisk.com/

Process

Forested Lands
Step 1: Reprojected from Albers to NAD 83 State Plane. No additional processing.

T&E Species
Step 1: Reprojected from Albers to NAD 83 State Plane. No additional processing.

Development Risk
Step 1: Reprojected from Albers to NAD 83 State Plane. No additional processing.

Water Quality Watersheds
Step 1: Select all water quality sampling points where the most recent sample resulted in a finding of "excellent" water quality
Step 2: Select and export all 12-digit HUCs that intersect an excellent quality point.
Step 3: Add a field and score all excellent quality HUCs "100".
Step 4: Convert excellent quality HUCs to ESRI GRID (ex_q_hucs) where "0" represents all areas outside the excellent quality HUCs.

Hardwood and Softwood Market Strength
Step 1: Create a point feature class from latitude/longitude mill locations.
Step 2: Add integer field [SCORE]. Assign a value of 1 for all records.
Step 3: Add integer field [BUFF_M]. Assign buffer distances as follows:
Hardwood saw and pulp mills: 104,607 meters (65 miles)
Hardwood veneer and plywood mills: 128,748 meters (80 mills)
Softwood saw, pulp, and "other" mills: 104,607 meters (65 miles)
Softwood plywood, veneer, pole, post, and composite mills: 128,748 meters (80 mills)
Step 4: Separate into 4 shapefiles by species (hardwood or softwood) and source material size (pulp/composite or solid wood).
Step 5: Buffer each point shapefile using [BUFF_M] as the buffer distance field.
Step 6: Export each buffer to a separate shapefile using ETGeoWizards (http://www.ian-ko.com/) split by attributes tool. Keep species and source material groupings by separating into 4 folders.
Step 7: Using a python geo-processing script (available upon request), convert each shapefile to a grid. Set the value of the grid to the new field (1).
Step 8: Using a python geo-processing script (available upon request), add the grids in each folder using raster math. The value of the output represents the number of overlapping mill source areas by for a particular species and source material size.
Step 9: Reclassify the forest type-groups data into a softwoods and hardwoods map. For each species map, all pixels corresponding to that species (or a mix including that species) should be scored one, and all pixels that don't correspond should be scored 0.
Step 10: Calculate a score for market strength in both hardwoods and softwoods as follows:
0: There is no/limited source material- the FIA forest type-groups map indicates either no forest cover or forest cover of the wrong species.
1: There is source material but no market for the species (this class is empty in both hardwood and softwood outputs; we have at least one market within a 65- or 80- mile radius of everywhere in the state).

2: There is source material AND between 1 and 4 mills in either the pulpwood/composite or solid wood products classes.
3: There is source material and either: 5+ mills in one product class and none in the other, or between 1 and 4 mills in BOTH product classes.
4: There is source material and 1-4 mills in one category and 5+ mills in the other.
5: There is source material and 5+ mills in both categories.

The raster math statement is (Replace [species] with the forest type-group layer reclassified by species):

[species] * (1 + con([species_solidwood] >= 5,2,con([species_solidwood] > 0,1,0)) + con([species_pulp_composite] >= 5,2,con([species_pulp_composite] > 0,1,0)))

Create Priority Map
Step 1: Add the preceding products together using simple raster math. Softwood and Hardwood market strength are multiplied by 20 to scale them appropriately with layers scored 0-100. No weighting is applied.

([Hardwood Market Strength] * 20) + ([Softwood Market Strength] * 20) + [Excellent Water Quality Watersheds] + [Forested Land] + [Development Risk] + [T&E Species Habitat]

Step 2: Reclassify areas above the median score (250) as priority, and areas below the median non-priority.

FIGURE 1b-3. Protecting Forests and Communities from Wildfire Risk Map

Map assembled by Andrew Bailey, NC Division of Forest Resources

Spatial Reference:

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter

Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Wildland Urban Interface layer from Radeloff, et al.:
http://silvis.forest.wisc.edu/Library/WUI_state_download.asp?state=North%20Carolina&abrev=NC

Vacant Homes and Total Housing Units by Block-Group, Census Block Groups layer, ESRI Maps and Data DVD, Tele Atlas North America, Inc. and ESRI, April 2008.

Wildland fire susceptibility data from Southern Wildfire Risk Assessment WFSI layer:
http://www.southernwildfirerisk.com/

Process

Step 1: Reclassify WFSI by natural breaks, excluding 0, as follows:
- 0- 0
- 1- 0.001692458 - 0.010154748
- 3- 0.010154748 - 0.02538687
- 5- 0.02538687 - 0.05077374
- 8- 0.05077374 - 0.089700274
- 10- 0.089700274 - 0.431576788

Step 2: Reclassify percent vacation homes by natural breaks, as follows:
- 0- 0 – 17
- 5- 17 – 39
- 10- 39 – 92

Step 3: Reclassify all WUI Interface and Intermix areas to 10, and all other areas 0.

Step 4: Add the preceding three products together using raster math as follows:
([WFSI] * 2) + [PctVacationHomes] + [WUI]

Step 5: Reclassify areas above the median score (10) as priority, and areas below the median non-priority.

FIGURE 1b-4. Forest Health Priority Lands

Map assembled by Jason Moan, NC Division of Forest Resources

Spatial Reference:

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_of_Origin:	33.75000000
Linear Unit:	Meter

Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich

Angular Unit: Degree

Raster Information:
File Name: FH_Prior_int
Cell Size: 30x30
Source Type: Continuous
Pixel type: signed integer

Discussion

This layer was developed using two layers derived during the state assessment forest health analysis: Major Insect and Disease Threats & Imminent Insect and Disease Threats. No climate data was included due to the coarseness of much of that data; sudden oak death was also left out for this reason. This priority layer represents lands at risk of southern pine beetle, hemlock woolly adelgid, balsam woolly adelgid, littleleaf disease, annosus root rot, fusiform rust, beech bark disease, redbay ambrosia beetle/laurel wilt, emerald ash borer, asian longhorned beetle, and sirex wood wasp.

Process

Step 1: The layers listed above were split into major threats (those already present) and imminent threats (those likely to become present) through careful analysis (see appendix for each of those layers for in-depth explanation).
Step 2: These input layers had were scored with 3 classes, little to no hazard (1), moderate hazard (2), and high hazard (3).
Step 3: A 'Mean' function was performed on the two input layers using Raster Calculator.
Step 4: The output was then converted to integer to minimize the file size.
Step 5: Priority landscapes were identified as any pixels having a mean value of 2 or higher (Moderate to high hazard).

FIGURE 1b-5. Maintaining Viable Urban Forests Map

Map assembled by Alan Moore, NC Division of Forest Resources.

Projected Coordinate System: NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection: Lambert_Conformal_Conic
False_Easting: 609601.22000000
False_Northing: 0.00000000
Central_Meridian: -79.00000000
Standard_Parallel_1: 34.33333333
Standard_Parallel_2: 36.16666667
Latitude_Of_Origin: 33.75000000
Linear Unit: Meter

Geographic Coordinate System: GCS_North_American_1983
Datum: D_North_American_1983

Prime Meridian: Greenwich
Angular Unit: Degree

Discussion

This map was created through a weighted overlay analysis using layers from figures 4k1 – 4k-13:

* Hammer et al - Urban Growth Score (13%)
* NLCD 2001 - Imperviousness (10%)
* NLCD 2001 - Tree Canopy (8%)
* US Census data - Population Density (8%)
* US Census data - Total Population (8%)
* NLCD 2001 - Absence of Tree Canopy (7%)
* SFLA - Forestland (6%)
* USDA Forest Service CARS - No Professional Staff (6%)
* NOAA data - Hurricane Risk (5%)
* NC Division of Air Quality - Ozone Nonattainment Area (5%)
* SFLA - Forest Patches (4%)
* Powell Bill data - Urban ETJ (4%)
* USDA Forest Service CARS - No Management Plan (4%)
* State Climate Office of NC data - Freezing Rain Risk (3%)
* One NC Naturally Conservation Planning Tool - Biodiversity/Wildlife Habitat (2%)
* NLCD 2001 - Plantable Space (2%)
* FEMA publication - Tornado Risk (1%)
* SFLA - Wildfire Risk (1%)
* SFLA - Site Productivity (1%)
* USDA Forest Service CARS - No Advocacy Group (1%)
* USDA Forest Service CARS - No Ordinance (1%)

Data Source

NLCD 2001 - National Land Cover Database 2001, Homer et al. (2003) and http://www.mrlc.gov/mrlc2k.asp

NOAA data - National Oceanic and Atmospheric Administration data, Tropical Storms and Hurricanes, 1950 - 2008

State Climate Office of North Carolina - Fullmann and Konrad: A winter Weather Climatology for Southeastern U.S.

US Census - 2000 Population Density by Block Group and 2000 Total Population

SFLA - Southern Forest Land Assessment by USDA Forest Service and Southern Group of State Foresters

FEMA - US Federal Emergency Management Agency Publication 361, First Edition, Chapter 2

Hammer, R. B. S. I. Stewart, R. Winkler, V. C. Radeloff, and P. R. Voss. 2004. Characterizing spatial and temporal residential density patterns across the U.S. Midwest, 1940-1990. Landscape and Urban Planning 69: 183-199

Powell Bill data - The North Carolina Department of Transportation Geographic Information Systems Unit

One NC Naturally Conservation Planning Tool - http://www.conservision-nc.net/ , Biodiversity/Wildlife Habitat Assessment Grid January 2009

NC Division of Air Quality data - Ozone Nonattainment Area data, 2008
USDA Forest Service, Urban & Community Forestry Program, Community Accomplishment Reporting System - Professional Staff, Management Plan, Ordinance, Advocacy Group

Process

Step 1: Use Raster Calculator to do weighted overlay analysis
Step 2: Apply mask created for Figure 4k-1
Step 3: Breaks determined by Natural breaks (Jenks method)

FIGURE 1b-6. Rural Forest Priority Landscapes Map

Map assembled by Andrew Bailey, NC Division of Forest Resources

Spatial Reference:

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter

Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Forested lands data from Southern Forest Land Assessment: http://tfsweb.tamu.edu/main/popup.aspx?id=5818
T&E species habitat data from Southern Forest Land Assessment: http://tfsweb.tamu.edu/main/popup.aspx?id=5818
Water quality point data from NC DENR Division of Water Quality. 12-digit hydrologic units from USDI Natural Resource Conservation Service Watershed Boundary Dataset: http://www.ncgc.nrcs.usda.gov/products/datasets/watershed/
Wood Using Mills Data from Carolyn Steppleton, USDA Forest Service, Southern Research Station, Forest Inventory and Analysis.
Forest type-group data from USDA Forest Service, Forest Inventory and Analysis program and Remote Sensing Applications Center: http://fsgeodata.fs.fed.us/rastergateway/forest_type/
Forest health data from NC Division of Forest Resources (see process information for figure 1b-4).

Wildland fire susceptibility data from Southern Wildfire Risk Assessment WFSI layer: http://www.southernwildfirerisk.com/

Process

Hardwood Market Strength, Softwood Market Strength, T&E Species Habitat, DWQ Excellent Water Quality Subwatersheds, Existing Forest Land: See process steps for figure 1b-2
Wildland Fire Susceptibility: see process steps for figure 1b-3.
Forest Health: see process steps for figure 1b-4

Step 1: Using raster math, add the layers listed above with no weighting.
Step 2: Mask out urban areas.
Step 3: Reclassify areas above the median score (260) as priority, and areas below the median non-priority.

FIGURE 1b-7. Urban Forest Priority Landscapes Map

Map assembled by Andrew Bailey, NC Division of Forest Resources

Spatial Reference:

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Conserving and Promoting Urban Forests data from NC Division of Forest Resources (see process information for figure 1b-5).
Forest health data from NC Division of Forest Resources (see process information for figure 1b-4).
Wildland Urban Interface layer from Radeloff, et al.: http://silvis.forest.wisc.edu/Library/WUI_state_download.asp?state=North%20Carolina&abrev=NC
12-digit hydrologic units from USDI Natural Resource Conservation Service Watershed Boundary Dataset: http://www.ncgc.nrcs.usda.gov/products/datasets/watershed/

Forested lands data from Southern Forest Land Assessment:
http://tfsweb.tamu.edu/main/popup.aspx?id=5818

Process

Promoting Forests for Water Quality
Step 1: Summarize number of total land pixels and number of forested pixels by 12-digit HUC.
Step 2: Calculate percentage forested for each 12-digit HUC.
Step 3: Convert percentage forested into a raster grid.
Step 4: Apply mask created for Figure 4k-1
Step 5: Assign a score of 100 for HUCs with less than 60% forest, 50 for HUCs between 60% and 70%, and 0 for HUCs over 70%. This puts emphasis on areas where urban forestry programs can improve water quality.

Conserving and Promoting Urban Forests
Step 1: Reclassify output layer for figure 1b-5 into 5 classes using natural breaks as follows:
20- 965 - 1,767
40- 1,767.000001 - 2,334
60- 2,334.000001 - 2,930
80- 2,930.000001 - 3,672
100- 3,672.000001 - 6,106

Protecting Urban Forest Health
Step 1: Reclass Forest Health layer (figure 1b-4) as follows:
1- 25
2- 50
3- 75
4- 100
Step 2: Apply mask created for Figure 4k-1

Protecting The Wildland-Urban Interface
Step 1: Apply mask created for Figure 4k-1 to the WUI layer created for figure 1b-3.

Create Priority Map
Step 1: Using raster math, add the layers listed above with no weighting.
Step 2: Reclassify areas above the median score (285) as priority, and areas below the median non-priority.

Chapter 2.

FIGURE 2a-2. Physiographic regions of North Carolina based upon survey unit (county) boundaries (data collected in the coastal plain units is cumulative throughout this section).

Map assembled by Andrew Bailey, NC Division of Forest Resources

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter

Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

FIA physiographic regions data based on survey unit boundaries from USDA Forest Service, Southern Research Station, Forest Inventory And Analysis Program.

FIGURE 2a-4. Public land, private forest land, and private non-forest land in North Carolina, 2006.

Map assembled by Andrew Bailey, NC Division of Forest Resources

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter

Geographic Coordinate System: GCS_North_American_1983

Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Public land data from NC Natural Heritage Program "Managed Areas" layer.
Private forest land data from National Land Cover Dataset, 2001.

FIGURE 2a-10. Forest-type groups of North Carolina.

Map assembled by Andrew Bailey, NC Division of Forest Resources

Spatial Reference:

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Forest type-group data from USDA Forest Service, Forest Inventory and Analysis program and Remote Sensing Applications Center:
http://fsgeodata.fs.fed.us/rastergateway/forest_type/

FIGURE 2b-1. North Carolina longleaf pine forest distribution in 2008 versus historic range.

Map assembled by Andrew Bailey, NC Division of Forest Resources and David Jones, NC Division of Forest Resources

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic

False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Longleaf Pine range data from USDA Forest Service, Northeastern Research Station, RWU NE-4153: http://www.fs.fed.us/ne/delaware/4153/global/littlefia/index.html .

Longleaf Pine distribution data from USDA Forest Service, Forest Inventory and Analysis program and Remote Sensing Applications Center: http://fsgeodata.fs.fed.us/rastergateway/forest_type/

FIGURE 2b-3. North Carolina shortleaf pine forest distribution in 2008 versus historic range.

Map assembled by Andrew Bailey, NC Division of Forest Resources and David Jones, NC Division of Forest Resources

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Shortleaf Pine range data from USDA Forest Service, Northeastern Research Station, RWU NE-4153: http://www.fs.fed.us/ne/delaware/4153/global/littlefia/index.html .

Shortleaf Pine distribution data from USDA Forest Service, Forest Inventory and Analysis program and Remote Sensing Applications Center: http://fsgeodata.fs.fed.us/rastergateway/forest_type/

FIGURE 2c-3. Minority population density in North Carolina by Census block group.

Map assembled by Buck Vaughn, The Conservation Fund.

Spatial Reference

Geographic Coordinate System:	GCS_WGS_1984
Datum:	D_WGS_1984
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Minority Population density from Census Block Groups layer, ESRI Maps and Data DVD, Tele Atlas North America, Inc. and ESRI, April 2008.

FIGURE 2d-3. Population by census tract (square mile) in North Carolina

Map assembled by Andrew Bailey, NC Division of Forest Resources.

Spatial Reference

Geographic Coordinate System:	GCS_WGS_1984
Datum:	D_WGS_1984
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Population density from Census Block Groups layer, ESRI Maps and Data DVD, Tele Atlas North America, Inc. and ESRI, April 2008.

FIGURE 2d-4. Average Number of Acres per Housing Unit in North Carolina in 2010

Map assembled by Andrew Bailey, NC Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000

Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

2010 Housing density data from University of Wisconsin Silvis Lab, Housing Density GIS Data 1940-2030 (Census Partial Block Groups): http://silvis.forest.wisc.edu/Library/HousingDataDownload.asp?state=North%20Carolina&abrev=NC

Process

Step 1: Add a new field, ACRHSE10, of Type DOUBLE, to nc_hse_dens.shp .

Step 2: Calculate acres per housing unit from housing density for 2010 (247.1044 acre/sq km divided by the number of housing units/sq km equals the number of acres per housing unit): 247.1044 / [HDEN10].

Step 3: Use spatial analyst extension to convert features in nc_hse_dens.shp to raster, using ACRHSE10 as the value field, with a 30m pixel size.

FIGURE 2d-5. Average Number of Acres per Housing Unit in North Carolina in 2030.

Map assembled by Andrew Bailey, NC Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit: Meter	
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

2030 Housing density data from University of Wisconsin Silvis Lab, Housing Density GIS Data 1940-2030 (Census Partial Block Groups): http://silvis.forest.wisc.edu/Library/HousingDataDownload.asp?state=North%20Carolina&abrev=NC

Process

Step 1: Add a new field, ACRHSE30, of Type DOUBLE, to nc_hse_dens.shp .

Step 2: Calculate acres per housing unit from housing density for 2030 (247.1044 acre/sq km divided by the number of housing units/sq km equals the number of acres per housing unit): 247.1044 / [HDEN30].

Step 3: Use spatial analyst extension to convert features in nc_hse_dens.shp to raster, using ACRHSE30 as the value field, with a 30m pixel size.

FIGURE 2d-6. Percent of land developed in North Carolina, 2010.

Map assembled by Andrew Bailey, NC Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

1990, 2010 and 2030 housing density data (bhcs_fote20080612- bhc1990, bhc2010 and bhc2030) from David Theobold, Colorado State University. Data were developed as part of the Forests on the Edge project: http://www.nrel.colostate.edu/ftp/theobald/

Process

Step 1: Use Zonal Statistics++ tool in ArcGIS Hawth's Tools Extension to summarize bhc2010 by county boundaries. Save output in bhc2010sum.dbf.

Step 2: Add a field named [devel], type Integer, to the summary table.

Step 3: Calculate the value of [devel]: [TRS_10] + [TRS_9] + [TRS_8] + [TRS_7] + [TRS_6] + [TRS_5]+ [TRS_4] . This definition of developed includes all land with less than 40 acres per house.
Step 4: Add a field named [TotalSize], type Integer, to the summary table.
Step 5: Calculate the value of [TotalSize]: [TRS_10] + [TRS_9] + [TRS_8] + [TRS_7] + [TRS_6] + [TRS_5] + [TRS_4] + [TRS_3] + [TRS_2] + [TRS_1] + [TRS_0]. This definition of total land excludes water and protected conservation land.
Step 6: Add a field named [PctDev], type Double, to the summary table.
Step 7: Calculate the value of [PctDev]: [devel]/[TotalSize] * 100
Step 8: Join the summary table to the county boundary layer.

Repeat Steps 1-7 for bhc1990 and bhc2030

FIGURE 2d-7. Development changes in North Carolina, 1990 – 2010.

Map assembled by Andrew Bailey, NC Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

2010 and 1990 housing density data (bhcs_fote20080612- bhc2010 and bh1990) from David Theobold, Colorado State University. Data were developed as part of the Forests on the Edge project: http://www.nrel.colostate.edu/ftp/theobald/

Process

Step 1: Join bhc2010sum.dbf, and bhc1990sum.dbf (created while making map for figure 2d-6) to county boundary shapefile.
Step 2: Add new field [DevInc9010], type double.
Step 3: Calculate [DevInc9010]: bhc2010sum.[PctDev] - bhc1990sum.[PctDev] .

FIGURE 2d-8. Development changes in North Carolina, 2010 – 2030.

Map assembled by Andrew Bailey, NC Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

2010 and 2030 housing density data (bhcs_fote20080612- bhc2010 and bh2030) from David Theobold, Colorado State University. Data were developed as part of the Forests on the Edge project: http://www.nrel.colostate.edu/ftp/theobald/

Process

Step 1: Join bhc2030sum.dbf, and bhc2010sum.dbf (created while making map for figure 2d-6) to county boundary shapefile.
Step 2: Add new field [DevInc1030], type double.
Step 3: Calculate [DevInc1030]: bhc2030sum.[PctDev] - bhc2010sum.[PctDev] .

FIGURE 2f-1. Approximate wetland and stream mitigation site opportunities for private landowners.

Map assembled by David Jones, North Carolina Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.220000
False_Northing:	0.000000
Central_Meridian:	-79.000000
Standard_Parallel_1:	34.333333
Standard_Parallel_2:	36.166667

Latitude_Of_Origin:	33.750000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Process

Step 1: Intersect National Land Cover Database (NLCD) 2001 Land Cover Dataset disturbed land classes with NRCS SSURGO Database hydric soils.

Step 2: Intersect National Hydrography Dataset (Plus) buffered by 30 meters with the NLCD 2001 Land Cover Dataset disturbed land classes.

Step 3: Merge wetland mitigation opportunities layer from step 1 with stream mitigation opportunities from step 2 to create combined mitigation opportunities.

Step 4: Erase a mask of developed land and impervious cover from NLCD and national forests, national parks, state forests, state parks, existing mitigation banks, NCEEP sites, NRCS Wetlands Reserve Program lands, NRCS Conservation Reserve Areas, NC Clean Water Management Trust Fund properties, and other conservation lands from combined mitigation opportunities

FIGURE 2f-2. Approximate nutrient offset bank opportunities for private land owners.

Map assembled by David Jones, North Carolina Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.220000
False_Northing:	0.000000
Central_Meridian:	-79.000000
Standard_Parallel_1:	34.333333
Standard_Parallel_2:	36.166667
Latitude_Of_Origin:	33.750000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Process

Step 1: Intersect National Hydrography Dataset (Plus) buffered by 200 feet with the NLCD 2001 Land Cover Dataset disturbed land classes.

FIGURE 2f-3. Federally-listed species occurrences in North Carolina.

Map assembled by David Jones, North Carolina Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.220000
False_Northing:	0.000000
Central_Meridian:	-79.000000
Standard_Parallel_1:	34.333333
Standard_Parallel_2:	36.166667
Latitude_Of_Origin:	33.750000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

The following map depicts the number of federally listed species that are known to occur (past or present) in each county. These data were acquired from the NC Natural Heritage Program Listed Species Database.

FIGURE 2f-4. Estimated forest carbon biomass (above- and below-ground) in North Carolina.

Map assembled by David Jones, North Carolina Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.220000
False_Northing:	0.000000
Central_Meridian:	-79.000000
Standard_Parallel_1:	34.333333
Standard_Parallel_2:	36.166667
Latitude_Of_Origin:	33.750000

Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Title:	Mapping U.S. forest biomass using nationwide forest inventory data and moderate resolution information
Authors:	J.A. Blackard, M.V. Finco, E.H. Helmer, G.R. Holden, M.L. Hoppus, D.M. Jacobs, A.J. Lister, G.G. Moisen, M.D. Nelson, R. Riemann, B. Ruefenacht, D. Salajanu, D.L Weyermann, K.C. Winterberger, T.J. Brandeis, R.L. Czaplewski, R.E. McRoberts, P.L. Patterson, R.P. Tymcio
Geospatial_Data_Presentation_Form:	remote-sensing image
Series_Name:	Remote Sensing of Environment
Issue_Identification:	112:1658-1677
Publisher:	Elsevier
Online_Linkage:	<http://fsgeodata.fs.fed.us/rastergateway/biomass/>

Chapter 3.

FIGURE 3a-1. Map of North Carolina's major insect and disease threats by risk level.

Map assembled by Jason Moan, NC Division of Forest Resources
Raster name: Major_extr

Spatial Reference

Raster Information -
Cell Size (x,y): 30,30
Format: GRID
Source Type: continuous
Pixel type: Unsigned integer
Pixel Depth: 8 bit

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Linear Unit:	Meter (1.000000)
Angular Unit:	Degree (0.0174532925199433299)
False_Easting:	609601.22
False_Northing:	0.000000
Central_Meridian:	-79
Standard_Parallel_1:	34.33333333333334
Standard_Parallel_2:	36.16666666666666
Latitude_Of_Origin:	23.000000
Datum:	D_North_American_1983

Data Source

Major Insects and Disease Threats Map data source: This map is the product of a modeling effort involving the existing forest health layers listed below. All layers were reprojected into NAD 1983 North Carolina State Plane Meters and resampled to 30 meter resolution if necessary. All layers were then recoded to either 2 or 3 classes representing low, moderate, and high hazard. A Maximum function was applied to the resulting layers to create the final Major Insects and Disease Threats raster layer.

Process

Step 1. SPB Hazard map: Produced by the USDA - Forest Service Forest Health Technology Enterprise Team. Original dataset has 10 hazard categories. Data was reclassified to values NoData and 0 = 0; 1-3 = 1 (low); 4-6 = 2 (moderate); and 7-10 = 3 (high)

Step 2. "Forest Health" layer from the Southern Forest Land assessment: Layer represents the following forest health concerns:

a. Annosus root rot
b. Fusiform rust
c. Beech bark disease
d. Southern pine beetle

e. Balsam woolly adelgid
f. Hemlock woolly adelgid

The SFLA forest Health Layer represents expected mortality within 15 years for the listed pests. This information was predicted for the 2006 version of the National Insect and Disease Risk Map (NIDRM) produced by the USDA - Forest Service Forest Health Technology Enterprise Team. Original data classes were 0, 33, 67, 100. These values represent expected mortality as shown in the following: 0 = < 5%, 33 = 5-15%, 67 = 15-25%, 100 = >25%. This layer was reclassified as NoData & 0 = 0, 33 = 1 (low), 67 = 2 (moderate), and 100 = 3 (high).

Step 3. Hemlock woolly adelgid - Layer of predicted eastern and Carolina hemlock basal area from the 2006 NIDRM was used to identify areas susceptible to HWA. Data was originally at 1km resolution. Original modeled basal area ranged from 0-77. Reclassified values < 1 to 1, 1-77 to 3, and NoData to 0.

Step 4. Balsam woolly adelgid - Layer of predicted Fraser fir basal area from the 2006 NIDRM was used to identify areas susceptible to BWA. Data was originally at 1km resolution. Original modeled basal area ranged from 0-7. Reclassified values < 1 to 1, 1-7 to 3, and NoData to 0.

Step 5. Littleleaf disease - Layer of predicted loblolly and shortleaf pine basal area from the 2006 NIDRM was used to identify areas at risk of littleleaf disease. Both basal area layers were clipped to the known range of littleleaf disease in NC (http://www.srs.fs.usda.gov/sustain/report/hlth2/hlth2-33.htm). Reclassified basal area layers such that any basal area > 1 = high hazard (3), < 1 = low hazard (1). This resulted in pixel values of 1, 3, and 33 (no data). Created a weighted overlay of reclassified basal area layers with Shortleaf = 70% weight and loblolly = 30% weight. Weights were based on expert opinion. Before littleleaf layer could be modeled with other layers, a constant raster (pixel value 0) equal to the state extent had to be created and merged with littleleaf layer. This resulted in an output layer with values of 0,1,2,3. The values of 0 and 1 represented background data, so the layer was reclassified to 3 classes (1, 2, and 3) with 1 = low or no hazard, 2 = moderate hazard. and 3 = high hazard.

FIGURE 3a-2. Southern pine beetle hazard map.

Map assembled by Jason Moan, NC Division of Forest Resources

Spatial Reference

Projected Coordinate System:	USA_Contiguous_Albers_Equal_Area_Conic_USGS_version
Projection:	Albers
False_Easting:	0.000000
False_Northing:	0.000000
Central_Meridian:	-96.000000
Standard_Parallel_1:	29.500000
Standard_Parallel_2:	45.500000
Latitude_Of_Origin:	23.000000
Linear Unit:	Meter (1.000000)

Geographic Coordinate System:	GCS_North_American_1983
Angular Unit:	Degree (0.017453292519943299)
Prime Meridian:	Greenwich (0.000000000000000000)
Datum:	D_North_American_1983
Spheroid:	GRS_1980
Semimajor Axis:	6378137.000000000000000000
Semiminor Axis:	6356752.314140356100000000
Inverse Flattening:	298.257222101000020000

Data Source

SPB Hazard Map data source: Data produced by USDA - Forest Service Forest Health Technology Enterprise Team.

FIGURE 3a-3. European gypsy moth quarantine map, 2008.

Map assembled by Jason Moan, NC Division of Forest Resources

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter

Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Gypsy Moth Quarantine data source: Provided by Matt Andresen - NCDA Gypsy Moth Program Coordinator. Data created by USDA - Animal and Plant Health Inspection Service

FIGURE 3a-4. Imminent forest health threats map; includes emerald ash borer, Asian longhorned beetle, redbay ambrosia beetle, and sirex woodwasp.

Map assembled by Jason Moan, NC Division of Forest Resources

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Linear Unit:	Meter (1.000000)
Angular Unit:	Degree (0.0174532925199433299)
False_Easting:	609601.22
False_Northing:	0.000000
Central_Meridian:	-79
Standard_Parallel_1:	34.33333333333334
Standard_Parallel_2:	36.16666666666666
Latitude_Of_Origin:	23.000000
Datum:	D_North_American_1983

Raster name: future_fh

Raster Information -
Cell Size (x,y): 30,30
Format: GRID
Source Type: continuous
Pixel type: Unsigned integer
Pixel Depth: 8 bit

Data Source

This map is the product of a modeling effort involving the existing forest health layers listed below. All layers were reprojected into NAD 1983 North Carolina State Plane Meters and resampled to 30 meter resolution if necessary. All layers were then recoded to either 2 or 3 classes representing low, moderate, and high hazard. A Maximum function was applied to the resulting layers to create the final Imminent Insects and Disease Threats raster layer.

Process

Step 1. Emerald ash borer hazard map: Produced by the USDA - Forest Service Forest Health Technology Enterprise Team. Original dataset has 10 hazard categories. Data was reclassified to values NoData and 0 = 0; 1-3 = 1 (low); 4-6 = 2 (moderate); and 7-10 = 3 (high)

Step 2. Asian longhorned bettle hazard map: Produced by the USDA - Forest Service Forest Health Technology Enterprise Team. Original dataset has 7 hazard categories (1-7). Data was reclassified to values NoData and 0 = 0; 1-2 = 1 (low); 3-4 = 2 (moderate); and 5-7 = 3 (high)

Step 3. Sirex woodwasp hazard map: Produced by the USDA - Forest Service Forest Health Technology Enterprise Team. Original dataset has 4 hazard categories (1,3,4,5). Data was reclassified to values NoData and 0 = 0; 1 = 1 (low); 3 = 2 (moderate); and 4-5 = 3 (high)

Steb 4. Redbay ambrosia beetle/Laurel wilt: The RAB map is a combination of three layers all of which were developed by Frank Koch and Bill Smith with USDA-FS Forest Health Monitoring National Research Team and NC State University and published by Koch and Smith in 2008 in Environmental Entomology 37(2): "Spatio-temporal analysis of

Xyleborus glabratus (Coleoptera: Circulionidae: Scolytinae) Invasion in Eastern U.S. Forests".

a. Predicted number of trees per acre of Persea borbonia developed from FIA analysis (GRID)
b. Predicted number of trees per acre of Sassafras albidum developed from FIA analysis (GRID)
c. Potential range of Xyleborus glabratus (Shapefile) based on climate matching.

The RAB host trees per acre data was continuous and had to be converted to categorical data before comparison could occur between the layers. The sassafras and redbay layers were added together using Raster Calculator. The resulting raster had TPA values of 0-240.5. Based on expert opinion (James Johnson - Georgia Forestry Commission and Bud Mayfield - Florida Dept of Ag and Consumer Services - Division of Forestry) the data was categorized with < 10 TPA = 1 (low) and greater than or equal to 10 TPA = 3 (high). This output layer was then exported to the extent of the dataframe and extracted to the extent of the potential RAB range.

FIGURE 3a-5. Major non-native invasive imminent threats.

Map assembled by Jason Moan, NC Division of Forest Resources

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Emerald ash borer data source:
KY/VA: Dale Starkey - USFS FHM Coordinator (Pineville, LA) - Current through 12/31/09
WV: http://www.emeraldashborer.info/files/MultiState_EABpos.pdf - Current through 12/2/09
MD: http://www.mda.state.md.us/plants-pests/eab/eab_survey_map.php - Current through 3/25/09

Gypsy Moth Quarantine data source:
http://www.aphis.usda.gov/plant_health/plant_pest_info/gypsy_moth/downloads/gypmoth.pdf - Current through 5/13/09
Redbay ambrosia beetle/Laurel wilt data source: Dale Starkey - USFS FHM Coordinator (Pineville, LA) - Current through 12/31/09
Cogongrass data source: http://www.cogongrass.org/distribution/index.cfm - Current through 1/20/10

FIGURE 3b-2. Fire occurrences in North Carolina, 2000 – 2008.

Analysis completed by Justin Shedd, NC State University.
Map assembled by Andrew Bailey, NC Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Process:

Step 1: Fires occurring from 2000-2008 were selected.
Step 2: A linear interpolation of the fire occurrence data was completed using a search radius of 100 acres (20871 feet by 20871 feet) and an output cell size of 98 feet. The fire occurrence grid was divided by the total number of years in the sample (8).

The output GRID represents the average number of fires that have occurred near that site during a year.

Data Source

NC Division of Forest Resources fire reporting database, USDA, USDI, USDOD

FIGURE 3b-3. Presumed mean interval (years) between fire return in NC under a presumed historical regime.

Map assembled by Justin Shedd - NC State University, and Andrew Bailey, NC Division of Forest Resources

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Process

Step 1: Download mean fire return interval data.
Step 2: Mask mean fire return interval data to NC boundary.

Data Source

Mean fire return interval data from Landfire Project, US Geological Survey:
http://landfire.cr.usgs.gov/viewer/

FIGURE 3b-4. Smoke-sensitive areas in North Carolina, 2009.

Map assembled by James Rogers, NC Division of Forest Resources and Andrew Bailey, NC Division of Forest Resources

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983

Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Medical facilities, public schools, private schools, colleges and universities, and hospital point data is from NC OneMap: http://www.nconemap.com/Default.aspx?tabid=286 (schlpl.shp, schlnp.shp, medfacs.shp, colluniv.shp, hsp.shp)

Interstate and US highway data is from the NC Department of Transportation Integrated Statewide Road Network: http://www.ncdot.org/it/gis/DataDistribution/DOTData/default.html .

Process

Step 1: Buffer interstate and US highways, medical facilities, public schools, private schools, colleges and universities, and hospitals by 2 miles.

Step 2: Merge above buffers.

Step 3: Dissolve merged buffers.

FIGURE 3b-5. Percentage of NC homes vacant in 2000.

Map assembled by Andrew Bailey, NC Division of Forest Resources and James Rogers, NC Division of Forest Resources

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Sources:

Vacant Homes and Total Housing Units by Block-Group, 2000 Census

FIGURE 3b-6. Wildland-urban interface areas in North Carolina based on vegetation and housing density, 2000.

Map assembled by Andrew Bailey, NC Division of Forest Resources
Map Design based on WUI maps available at Radeloff et al. website.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Sources:

Radeloff, V.C., et al. University of Wisconsin-Madison:
http://silvis.forest.wisc.edu/Library/WUI_state_download.asp?state=North%20Carolina&abrev=NC

FIGURE 3b-7. NC communities at risk of wildfire, 2009.

Map assembled by Justin Shedd, NC State University and Andrew Bailey, NC Division of Forest Resources

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter

Geographic Coordinate System: GCS_North_American_1983
Datum: D_North_American_1983
Prime Meridian: Greenwich
Angular Unit: Degree

Data Sources:
Southern Wildlife Risk Assessment, Sanborn Map Company:
http://www.southernwildfirerisk.com/

FIGURE 3b-8. North Carolina CWPPs, 2009.

Map assembled by Andrew Bailey, NC Division of Forest Resources and James Rogers, NC Division of Forest Resources

Spatial Reference
Projected Coordinate System: NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection: Lambert_Conformal_Conic
False_Easting: 609601.22000000
False_Northing: 0.00000000
Central_Meridian: -79.00000000
Standard_Parallel_1: 34.33333333
Standard_Parallel_2: 36.16666667
Latitude_Of_Origin: 33.75000000
Linear Unit: Meter

Geographic Coordinate System: GCS_North_American_1983
Datum: D_North_American_1983
Prime Meridian: Greenwich
Angular Unit: Degree

Data Source
CWPP data from James Rogers, NC DENR Division of Forest Resources.

FIGURE 3c-2. NC coastal areas within 6 feet of sea level.

Map assembled by Margaret Fields, The Nature Conservancy of NC.

Spatial Reference
Projected Coordinate System: NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection: Lambert_Conformal_Conic
False_Easting: 609601.22000000
False_Northing: 0.00000000

Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Sea level rise data from USDA Forest Service Southern Research Station, Southern Global Change Program.

FIGURE 3c-3. Tropical storms and hurricanes, 1950 – 2008. A storm was counted if its eye passed within 50 miles of a county.

Map assembled by Andrew Bailey, NC Division of Forest Resources

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Tropical storm and hurricane data from NOAA Coastal Services Center: http://csc-s-maps-q.csc.noaa.gov/hurricanes/download.jsp

Process

Step 1: Subset tropical storm and hurricane tracks between 1950 and 2008 from Atlantic Storms dataset.

Step 2: Buffer storm tracks by 50 miles.
Step 3: Add a field to the buffered tracks. Calculate a value of 1 to the field.
Step 4: Export each storm track buffer to a separate shapefile using ETGeoWizards (http://www.ian-ko.com/) split by attributes tool.
Step 5: Using an AML script, convert each shapefile to a grid using the shapegrid() function. Set the value of the grid to the new field (1).
Step 6: Using an AML script, add the grids using raster math. The value of the output represents the number of overlapping storm tracks, or the number of storms which passed within 50 miles.

FIGURE 3c-4. Annual freezing rain event frequency, 1948 – 2003.

Map assembled by Andrew Bailey, NC Division of Forest Resources

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

NC Climate data from the NC State Climate Office: http://www.nc-climate.ncsu.edu/climate/winter

Process

The map “Freezing Rain Dominant Events”) http://www.nc-climate.ncsu.edu/images/climate/winter/FZRA_EVENTS.jpg was digitized in ArcMap using the Georeferencing toolbar.

Chapter 4.

FIGURE 4a-8. NC certified prologgers by county.

Map assembled by Andrew Bailey, NC Division of Forest Resources

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Certified Prologgers by County data from NC Forestry Association:
http://www.ncforestry.org/WEBPAGES/PROLOGGER/PROLOGGERINDEXPAGE.htm

Processing Steps:

Step 1: Joined prologger data to county boundary shapefile.

FIGURE 4c-13. NC 8-year average of total stumpage value by county and wood-using mills, 2001 – 2008.

Map assembled by Andrew Bailey, NC Division of Forest Resources

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667

Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Stumpage Value Data from James Jeuck, NC State University Extension Forestry.
Wood Using Mills Data from Carolyn Steppleton, USDA Forest Service, Southern Research Station, Forest Inventory and Analysis.

FIGURE 4d-1. NC primary wood-using mills, 2007.

Map assembled by Andrew Bailey, NC Division of Forest Resources

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Wood Using Mills Data from Carolyn Steppleton, USDA Forest Service, Southern Research Station, Forest Inventory and Analysis.

FIGURE 4f-1. River basins of North Carolina.

Map assembled by David Jones, NC Division of Forest Resources
Map design based on Figure 5 B.1. in NC Wildlife Action Plan

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

River basins from USGS 1:250,000 Hydrologic Units dataset:
http://water.usgs.gov/lookup/getspatial?huc250k

FIGURE 4f-2. North Carolina annual precipitation.

Map assembled by David Jones, North Carolina Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.220000
False_Northing:	0.000000
Central_Meridian:	-79.000000
Standard_Parallel_1:	34.333333
Standard_Parallel_2:	36.166667
Latitude_Of_Origin:	33.750000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Terziotti, S., J.L. Eimers, and J.C. Weaver. 2001. Watershed Characteristic Rating for North Carolina: U.S. Geological Survey Open-File Report 01-490 (digital data updated July 2009). http://nc.water.usgs.gov/reports/ofr01490/index.html. [Date accessed: July 2009].

FIGURE 4f-3. North Carolina annual runoff.

Map assembled by David Jones, North Carolina Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.220000
False_Northing:	0.000000
Central_Meridian:	-79.000000
Standard_Parallel_1:	34.333333
Standard_Parallel_2:	36.166667
Latitude_Of_Origin:	33.750000
Linear Unit:	Meter

Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Gebert, W.A., D.J. Graczyk, and W.R. Krug. 1987. Average Annual Runoff in the United States, 1951-80: U.S. Geological Survey Hydrologic Investigations Atlas HA-710, scale 1:7,500,000. http://water.usgs.gov/GIS/metadata/usgswrd/XML/runoff.xml.

FIGURE 4f-4. Key subbasins for freshwater conservation: Subbasins impaired for aquatic life use support.

Map assembled by David Jones, North Carolina Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.220000
False_Northing:	0.000000
Central_Meridian:	-79.000000
Standard_Parallel_1:	34.333333
Standard_Parallel_2:	36.166667
Latitude_Of_Origin:	33.750000
Linear Unit:	Meter

Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Map assembled using data from the following two sources:

Master, L.L., S.R. Flack, and B.A. Stein, editors. 1998. Rivers of Life: Critical Watersheds for Protecting Freshwater Biodiversity. The Nature Conservancy. http://www.natureserve.org/library/riversoflife.pdf

North Carolina Division of Water Quality (NCDWQ). 2007. North Carolina Water Quality Assessment and Impaired Waters List: 2006 integrated 305(b) and 303(d) report. http://h2o.enr.state.nc.us/tmdl/documents/2006IR_FINAL_000.pdf.

FIGURE 4f-5. Forest and/or natural cover trends in relation to impervious cover.

Map assembled by David Jones, North Carolina Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.220000
False_Northing:	0.000000
Central_Meridian:	-79.000000
Standard_Parallel_1:	34.333333
Standard_Parallel_2:	36.166667
Latitude_Of_Origin:	33.750000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Forest/natural cover was summarized for each subwatershed (NRCS Watershed Boundary Dataset[WBD]: 12-digit hydologic unit) using the National Land Cover Database (NLCD) 1992 and 2001 Land Cover Datasets using the Spatial Analyst Tools/Zonal/Tablulate Area function of ArcGIS. Impervious cover was summarized from the NLCD 2001 Impervious Cover Dataset using the Spatial Analyst Tools/Zonal/Tablulate Area function of ArcGIS.

FIGURE 4f-6. Piedmont Crescent.

Map assembled by David Jones, North Carolina Division of Forest Resources.

Spatial Reference

Projected Coordinate System: NAD_1983_StatePlane_North_Carolina_FIPS_3200

Projection:	Lambert_Conformal_Conic
False_Easting:	609601.220000
False_Northing:	0.000000
Central_Meridian:	-79.000000
Standard_Parallel_1:	34.333333
Standard_Parallel_2:	36.166667
Latitude_Of_Origin:	33.750000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Discussion

This map depicts urban land from the National Land Cover Database - 2001 Land Cover Dataset. The crescent shape is a rough approximation of the area commonly referred to as the Piedmont Cresent; loosely defined as the I-85/I-40 corridor from Charlotte to Raleigh.

FIGURE 4f-7. Forecast of water demand growth 2005 – 2030 (all sectors included).

Map assembled by David Jones, North Carolina Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.220000
False_Northing:	0.000000
Central_Meridian:	-79.000000
Standard_Parallel_1:	34.333333
Standard_Parallel_2:	36.166667
Latitude_Of_Origin:	33.750000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

North Carolina Rural Economic Development Center (NCREDC). 2006. Water 2030: North Carolina Water Supply and Demand Overview. http://www.ncruralcenter.org/water2030/.

FIGURE 4f -8a. Priority forest watersheds in North Carolina for water quality and quantity illustrating a subwatershed relative value.

Map assembled by David Jones, North Carolina Division of Forest Resources.

Spatial Reference

Projected Coordinate System: NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection: Lambert_Conformal_Conic
False_Easting: 609601.220000
False_Northing: 0.000000
Central_Meridian: -79.000000
Standard_Parallel_1: 34.333333
Standard_Parallel_2: 36.166667
Latitude_Of_Origin: 33.750000
Linear Unit: Meter

Geographic Coordinate System: GCS_North_American_1983
Datum: D_North_American_1983
Prime Meridian: Greenwich
Angular Unit: Degree

Discussion

This map was generated through a weighted overlay using the following datasets and values:

NC Conservation Planning Tool - Water Services Assessment	30%
NCREDC - Forecasted Water Demand Growth	25%
SFLA - Forestland (based on NLCD 2001 LULC)	20%
NCDWQ/NCDEH Source Water Areas - Surface Water Supply Watersheds & Groundwater Well Protection Areas	15%
SFLA - Development Level	10%

Each layer was converted to a 30x30 meter raster dataset as needed before analysis. Data was then summarized on a percent basis for each subwatershed (12-digit hydrologic unit) in the state using the NRCS Watershed Boundary dataset.

FIGURE 4f-8b. Priority forest watersheds in North Carolina for water quality and quantity illustrating a 30-meter pixel display.

Map assembled by David Jones, North Carolina Division of Forest Resources.

Spatial Reference

Projected Coordinate System: NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection: Lambert_Conformal_Conic
False_Easting: 609601.220000
False_Northing: 0.000000
Central_Meridian: -79.000000
Standard_Parallel_1: 34.333333
Standard_Parallel_2: 36.166667
Latitude_Of_Origin: 33.750000
Linear Unit: Meter

Geographic Coordinate System: GCS_North_American_1983
Datum: D_North_American_1983
Prime Meridian: Greenwich
Angular Unit: Degree

Discussion

This map was generated through a weighted overlay using the following datasets and values:

NC Conservation Planning Tool - Water Services Assessment	30%
NCREDC - Forecasted Water Demand Growth	25%
SFLA - Forestland (based on NLCD 2001 LULC)	20%
NCDWQ/NCDEH Source Water Areas - Surface Water Supply Watersheds & Groundwater Well Protection Areas	15%
SFLA - Development Level	10%

Each layer was converted to a 30x30 meter raster dataset as needed before analysis.

FIGURE 4g-1. Ecoregions of North Carolina.

Map assembled by Andrew Bailey, NC Division of Forest Resources

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter

Geographic Coordinate System: GCS_North_American_1983
Datum: D_North_American_1983
Prime Meridian: Greenwich
Angular Unit: Degree

Data Source

Ecoregion data from Southern Forest Resource Assessment, USDA Forest Service, Southern Research Station: http://www.srs.fs.usda.gov/sustain/data/ .

FIGURE 4g-2. River basins of North Carolina.

Map assembled by Andrew Bailey, NC Division of Forest Resources
Map design based on Figure 5 B.1. in NC Wildlife Action Plan

Spatial Reference

Projected Coordinate System: NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection: Lambert_Conformal_Conic
False_Easting: 609601.22000000
False_Northing: 0.00000000
Central_Meridian: -79.00000000
Standard_Parallel_1: 34.33333333
Standard_Parallel_2: 36.16666667
Latitude_Of_Origin: 33.75000000
Linear Unit: Meter

Geographic Coordinate System: GCS_North_American_1983
Datum: D_North_American_1983
Prime Meridian: Greenwich
Angular Unit: Degree

Data Source

River basins from USGS 1:250,000 Hydrologic Units dataset:
http://water.usgs.gov/lookup/getspatial?huc250k

FIGURE 4h-3. US Environmental Protection Agency tracked sites in North Carolina with biorefinery facility site potential.

Map assembled by Andrew Bailey, NC Division of Forest Resources

Spatial Reference

Projected Coordinate System: NAD_1983_StatePlane_North_Carolina_FIPS_3200

Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Biomass Resource and EPA Traced Sites data from US EPA:
http://www.epa.gov/renewableenergyland/

FIGURE 4i-2. North Carolina open space and conservation land.

Map assembled by Andrew Bailey, NC Division of Forest Resources

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

State and Federal Lands data from NC Natural Heritage Program "Managed Areas" layer (marea.shp).
State Forests data from Andrew Bailey, NC DENR Division of Forest Resources.
The following data layers are from the July '09 NC DENR "One NC Naturally" Conservation Planning Tool:

http://wfs.enr.state.nc.us/conservision_data/July09/OpenSpace_ConservationLands_0709.zip

Mountains-To-Sea Trail and Corridor data from NC DENR Division of Parks and Recreation (app-trail.shp, mt2sea.shp, and mt2sea_status.shp).

Other Managed Lands from Lands Managed for Conservation and Open Space (lmcos.shp).

State Park Units from NC DENR Division of Parks and Recration (ncprk_0709.shp).

Figure 4k-1. North Carolina urban housing density in 2000 and designation of urban areas and urban clusters, representing land area included within the analysis.

Map assembled by Alan Moore, NC Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Data Source

Hammer, R. B. S. I. Stewart, R. Winkler, V. C. Radeloff, and P. R. Voss. 2004. Characterizing spatial and temporal residential density patterns across the U.S. Midwest, 1940-1990. Landscape and Urban Planning 69: 183-199

Process

Step 1: Polygon to Raster using ACRHSE00 as the value field, with a 30m pixel size
Step 2: Reclassify to Value 1=0 to 2 and Value 2=2.00001 to 16

Figure 4k-2. Priority ranking of urban areas identifying areas that would increase urban forest health and viability.

Map assembled by Alan Moore, NC Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit: Meter	

Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Discussion

This map was created through a weighted overlay analysis using:
* Hammer et al - Urban Growth Score (40%)
* Powell Bill data - Urban ETJ (20%)
* SFLA - Forest Patches (20%)
* SFLA - Forestland (10%)
* One NC Naturally Conservation Planning Tool - Biodiversity/Wildlife Habitat (10%)

Data Source

Hammer, R. B. S. I. Stewart, R. Winkler, V. C. Radeloff, and P. R. Voss. 2004. Characterizing spatial and temporal residential density patterns across the U.S. Midwest, 1940-1990. Landscape and Urban Planning 69: 183-199

Powell Bill data - The North Carolina Department of Transportation Geographic Information Systems Unit

SFLA - Southern Forest Land Assessment by USDA Forest Service and Southern Group of State Foresters

One NC Naturally Conservation Planning Tool - http://www.conservision-nc.net/ , Biodiversity/Wildlife Habitat Assessment Grid January 2009

Process

Step 1: Reclassify Biodiversity/Wildlife Habitat on field: Final, -1 to 0; 0 to 0; 1 to 10; 2 to 20; 3 to 30; 4 to 40; 5 to 50; 6 to 60; 7 to 70; 8 to 80; 9 to 90; 10 to 100
Step 2: Reclassify Forest Patches
Step 3: Buffer UrbanETJ by 1, 2, or 3 miles according to NC statute
Step 4: Reclassify UrbanETJ
Step 5: Reclassify UrbanGrowthScore
Step 6: Use Raster Calculator to do weighted overlay analysis
Step 7: Apply mask created for Figure 4k-1
Step 8: Breaks determined by Natural breaks (Jenks method)

Figure 4k-3. Priority ranking of named places plus associated ETJ, identifying municipalities experiencing rapid growth but currently forested.

Map assembled by Alan Moore, NC Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Process

Step 1: ZonalStatistics using input value of the final raster created for Figure 4k-2 and Statistics type MEAN

Step 2: Breaks determined by sorting places by place mean and grouped according to the following: 1 - 66 places (top 10%), 67- 131 places (next 10%), 132 - 261 places (next 20%), 262 - 458 places (next 30%), Very Low 459 - 655 places (bottom 30%)

Figure 4k-4. Priority areas index identifying where urban forest areas and their associated values are most at risk from catastrophic events.

Map assembled by Alan Moore, NC Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333

Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Discussion

This map was created through a weighted overlay analysis using:
* NLCD 2001 - Tree Canopy (40%)
* NOAA data - Hurricane Risk (25%)
* State Climate Office of NC data - Freezing Rain Risk (15%)
* US Census data - Population Density (10%)
* SFLA - Wildfire Risk (5%)
* FEMA publication - Tornado Risk (5%)

Data Source

NLCD 2001 - National Land Cover Database 2001, Homer et al. (2003) and http://www.mrlc.gov/mrlc2k.asp

NOAA data - National Oceanic and Atmospheric Administration data, Tropical Storms and Hurricanes, 1950 - 2008

State Climate Office of North Carolina - Fullmann and Konrad: A winter Weather Climatology for Southeastern U.S.

US Census - 2000 Population Density by Block Group

SFLA - Southern Forest Land Assessment by USDA Forest Service and Southern Group of State Foresters

FEMA - US Federal Emergency Management Agency Publication 361, First Edition, Chapter 2

Process

Step 1: PolygonToRaster digitized Tornado Occurence map
Step 2: Reclassify Tornado layer
Step 3: PolygonTo Raster Population Density by Block Group
Step 4: Reclassify Population Density layer
Step 5: Reclassify Freezing Rain Events layer
Step 6: Reclassify Hurricane Events layer
Step 7: Use Raster Calculator to do weighted overlay analysis
Step 8: Apply mask created for Figure 4k-1
Step 9: Breaks determined by Natural breaks (Jenks method)

Figure 4k-5. Priority ranking of named places identifying municipalities where urban forests and their associated values are most at risk from catastrophic events.

Map assembled by Alan Moore, NC Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit: Meter	

Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Process

Step 1: Use Hawth's Tools Zonal Statistics++ to determine mean of percent of maximum values calculated for figure 4k-4 within each named place

Step 2: Breaks determined by sorting places by place mean and grouped according to the following: 1 - 66 places (top 10%), 67- 131 places (next 10%), 132 - 261 places (next 20%), 262 - 458 places (next 30%), Very Low 459 - 655 places (bottom 30%)

Figure 4k-6. Priority areas index identifying areas with poor air quality, but with opportunities for tree conservation.

Map assembled by Alan Moore, NC Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter

Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich

Angular Unit: Degree

Discussion

This map was created through a weighted overlay analysis using:
* NLCD 2001 - Absence of Tree Canopy (35%)
* NC Division of Air Quality - Ozone Nonattainment Area (25%)
* NLCD 2001 - Imperviousness (20%)
* US Census data - Population Density (10%)
* Hammer et al - Urban Growth Score (10%)

Data Source

NLCD 2001 - National Land Cover Database 2001, Homer et al. (2003) and http://www.mrlc.gov/mrlc2k.asp

NC Division of Air Quality data - Ozone Nonattainment Area data, 2008

US Census - 2000 Population Density by Block Group

Hammer, R. B. S. I. Stewart, R. Winkler, V. C. Radeloff, and P. R. Voss. 2004. Characterizing spatial and temporal residential density patterns across the U.S. Midwest, 1940-1990. Landscape and Urban Planning 69: 183-199

Process

Step 1: PolygonToRaster Ozone Nonattainment Area map
Step 2: Reclassify Ozone Nonattainment Area layer
Step 3: Calculate Absence of Canopy by the equation, Absence of Canopy = 100 - Tree Canopy
Step 4: Use Raster Calculator to do weighted overlay analysis
Step 5: Apply mask created for Figure 4k-1
Step 6: Breaks determined by Natural breaks (Jenks method)

Figure 4k-7. Priority ranking of named places identifying municipalities with poor air quality, but with opportunities for tree conservation.

Map assembled by Alan Moore, NC Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich

Angular Unit: Degree

Process

Step 1: Use Hawth's Tools Zonal Statistics++ to determine mean of percent of maximum values calculated for figure 4k-6 within each named place

Step 2: Breaks determined by sorting places by place mean and grouped according to the following: 1 - 66 places (top 10%), 67- 131 places (next 10%), 132 - 261 places (next 20%), 262 - 458 places (next 30%), Very Low 459 - 655 places (bottom 30%)

Figure 4k-9. Priority areas index identifying areas where urban tree canopy has potential to reduce energy demands.

Map assembled by Alan Moore, NC Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit: Meter	

Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Discussion

This map was created through a weighted overlay analysis using:

* NLCD 2001 - Imperviousness (30%)
* US Census data - Population Density (20%)
* SFLA - Forestland (20%)
* Hammer et al - Urban Growth Score (15%)
* NLCD 2001 - Plantable Space (20%)
* SFLA - Site Productivity (5%)

Data Source

NLCD 2001 - National Land Cover Database 2001, Homer et al. (2003) and http://www.mrlc.gov/mrlc2k.asp

US Census - 2000 Population Density by Block Group

SFLA - Southern Forest Land Assessment by USDA Forest Service and Southern Group of State Foresters

Hammer, R. B. S. I. Stewart, R. Winkler, V. C. Radeloff, and P. R. Voss. 2004. Characterizing spatial and temporal residential density patterns across the U.S. Midwest, 1940-1990. Landscape and Urban Planning 69: 183-199

Process

Step 1: Reclassify Site Productivity layer
Step 2: Calculate Plantable Space by the equation, Planting Space = 100 - Imperviousness - Tree Canopy
Step 3: Use Raster Calculator to do weighted overlay analysis
Step 4: Apply mask created for Figure 4k-1
Step 5: Breaks determined by Natural breaks (Jenks method)

Figure 4k-10. Priority ranking of municipalities with the greatest potential to reduce energy demand by increasing urban tree canopy.

Map assembled by Alan Moore, NC Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Process

Step 1: Use Hawth's Tools Zonal Statistics++ to determine mean of percent of maximum values calculated for figure 4k-9 within each named place
Step 2: Breaks determined by sorting places by place mean and grouped according to the following: 1 - 66 places (top 10%), 67- 131 places (next 10%), 132 - 261 places (next 20%), 262 - 458 places (next 30%), Very Low 459 - 655 places (bottom 30%)

Figure 4k-11. Priority ranking of named places identifying municipalities missing one or more of the components required to be classified as a managing urban forestry program.

Map assembled by Alan Moore, NC Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Discussion

This map was created through a weighted overlay analysis using:
* US Census data - Total Population (40%)
* USDA Forest Service CARS - No Professional Staff (30%)
* USDA Forest Service CARS - No Management Plan (20%)
* USDA Forest Service CARS - No Ordinance (5%)
* USDA Forest Service CARS - No Advocacy Group (5%)

Data Source

US Census - 2000 Total Population
USDA Forest Service, Urban & Community Forestry Program, Community Accomplishment Reporting System - Professional Staff, Management Plan, Ordinance, Advocacy Group

Process

Step 1: Polygon to Raster for Total Population
Step 2: Classify to Value <10000 = 0, 10001 - 20000 = 20, 20001 - 50000 = 40, 50001 - 100000 = 60, 100001 - 250000 = 80, >250000 = 100
Step 3: Polygon to Raster for CARS data 4 times to create each layer
Step 4: Use Raster Calculator to do weighted overlay analysis
Step 5: Breaks determined by Natural breaks (Jenks method)

Figure 4k-12. Priority areas identifying areas with greatest potential to improve urban forest health and viability.

Map assembled by Alan Moore, NC Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Discussion

This map was created through a weighted overlay analysis using all layers previously used:
* Hammer et al - Urban Growth Score (13%)
* NLCD 2001 - Imperviousness (10%)
* NLCD 2001 - Tree Canopy (8%)
* US Census data - Population Density (8%)
* US Census data - Total Population (8%)
* NLCD 2001 - Absence of Tree Canopy (7%)
* SFLA - Forestland (6%)
* USDA Forest Service CARS - No Professional Staff (6%)
* NOAA data - Hurricane Risk (5%)
* NC Division of Air Quality - Ozone Nonattainment Area (5%)
* SFLA - Forest Patches (4%)
* Powell Bill data - Urban ETJ (4%)
* USDA Forest Service CARS - No Management Plan (4%)
* State Climate Office of NC data - Freezing Rain Risk (3%)
* One NC Naturally Conservation Planning Tool - Biodiversity/Wildlife Habitat (2%)
* NLCD 2001 - Plantable Space (2%)
* FEMA publication - Tornado Risk (1%)
* SFLA - Wildfire Risk (1%)
* SFLA - Site Productivity (1%)
* USDA Forest Service CARS - No Advocacy Group (1%)
* USDA Forest Service CARS - No Ordinance (1%)

Data Source

NLCD 2001 - National Land Cover Database 2001, Homer et al. (2003) and http://www.mrlc.gov/mrlc2k.asp

NOAA data - National Oceanic and Atmospheric Administration data, Tropical Storms and Hurricanes, 1950 - 2008

State Climate Office of North Carolina - Fullmann and Konrad: A winter Weather Climatology for Southeastern U.S.
US Census - 2000 Population Density by Block Group and 2000 Total Population
SFLA - Southern Forest Land Assessment by USDA Forest Service and Southern Group of State Foresters
FEMA - US Federal Emergency Management Agency Publication 361, First Edition, Chapter 2
Hammer, R. B. S. I. Stewart, R. Winkler, V. C. Radeloff, and P. R. Voss. 2004. Characterizing spatial and temporal residential density patterns across the U.S. Midwest, 1940-1990. Landscape and Urban Planning 69: 183-199
Powell Bill data - The North Carolina Department of Transportation Geographic Information Systems Unit
One NC Naturally Conservation Planning Tool - http://www.conservision-nc.net/ , Biodiversity/Wildlife Habitat Assessment Grid January 2009
NC Division of Air Quality data - Ozone Nonattainment Area data, 2008
USDA Forest Service, Urban & Community Forestry Program, Community Accomplishment Reporting System - Professional Staff, Management Plan, Ordinance, Advovacy Group

Process

Step 1: Use Raster Calculator to do weighted overlay analysis
Step 2: Apply mask created for Figure 4k-1
Step 3: Breaks determined by Natural breaks (Jenks method)

Figure 4k-13. Priority ranking of named places identifying municipalities with greatest potential to improve urban forest health and viability.

Map assembled by Alan Moore, NC Division of Forest Resources.

Spatial Reference

Projected Coordinate System:	NAD_1983_StatePlane_North_Carolina_FIPS_3200
Projection:	Lambert_Conformal_Conic
False_Easting:	609601.22000000
False_Northing:	0.00000000
Central_Meridian:	-79.00000000
Standard_Parallel_1:	34.33333333
Standard_Parallel_2:	36.16666667
Latitude_Of_Origin:	33.75000000
Linear Unit:	Meter
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Process

Step 1: Each named place was assigned a value of 1, 2, 3, 4, or 5 for each issue, depending on where it was ranked in the Priority Places for each of the 5 issues. Very Low = 1, Low = 2, Medium = 3, High = 4, and Very High = 5.

Step 2: A total score was determined for each named place by summing its assigned values across all 5 issues.

Step 3: Breaks determined by sorting places by total score and grouped according to the following: 0-4, 5-9, 10-14, 15-19, 20-25

Appendix C: Legacy Assessment of Need

Assessment of need for the North Carolina Forest Legacy Program

Revised 2010

The Forest Legacy Program authorizes the USDA Forest Service or state governments to purchase permanent conservation easements on private forest lands.* The program acquires certain land-use rights that promote effective forest land management, while protecting the land from conversion to non-forest uses. Priority lands are those that will support continuation of traditional forest uses yet also contain scenic, cultural, and recreation resources, fish and wildlife habitats, water resources, and other ecological values that are regionally and nationally significant.. Participating landowners must follow a management plan designed for their forest. Activities consistent with the management plan--including timber harvesting and recreational activities such as hunting, fishing, and hiking--may be permitted.

Forty three states have already qualified and been enrolled in the Forest Legacy Program. A number of properties have been acquired in those states since the program's inception. Modifications in the program to broaden its appeal have prompted interest on the part of conservation groups and state agencies in North Carolina to participate.

In order for the State of North Carolina to continue to participate in the Forest Legacy Program, the state is required to produce and maintain a document assessing need for the program. The North Carolina Forest Legacy Assessment of Need (AON) establishes a factual and procedural foundation for program implementation. The assessment must describe the forest resources of North Carolina, the efforts and programs available for effective conservation in the state, and the process used in identifying where state priorities for action exist. It builds upon preceding studies, such as the North Carolina Forest Assessment (Task Force 2009-2010). Overall, the assessment focuses on link between North Carolina's forests and its citizen's quality of life.

The AON document identifies four Forest Legacy Areas (FLAs) where the protection efforts, hence funds, provided under the Forest Legacy Program should be applied. For each of the four FLAs, the document:

(1) identifies the FLA's general characteristics and environmental values at risk

(2) describes kinds of threats to those values in the FLA,

(3) identifies entities that will work together for conservation within the region defined by the particular FLA, and

(4) specifies the FLA's geographic boundaries within which properties may be considered for the program. The document presents evaluation criteria and scoring that will be used to rate potential parcels on which acquisition of property development rights will be pursued.

- Cooperative Forestry Assistance Act of 1978, 16 U.S.C. 2101 et. seq., as amended by the 1990 Farm Bill, Section 1217 of Title XII of the Food, Agriculture, Conservation and Trade Act of 1990, Public Law 101-624, 104 Stat. 3359, 16 U.S.C. 2103c; later amended by the 1996 Farm Bill, Federal Agricultural Improvement and Reform Act of 1996; Public Law 104-127; Title III, Conservation; Subtitle G Forestry; Section 374, Optional State Grants for Forest Legacy Program.

PROCEDURES USED TO IDENTIFY FLAs

Legacy Priority Area Delineation using GIS – August 2009

Justification:

The North Carolina Division of Forest Resources is required to revise priority areas for the Forest Legacy program utilizing new priority area delineation techniques, and information on the importance of forests. One new information source used in the current assessment is the Southern Forest Land Assessment, released in November of 2008. The Southern Forest Land Assessment was developed by the Southern Group of State Foresters to prioritize lands for inclusion in the Forest Stewardship Program and to identify areas under threat from development, fire, insects and disease. Thirteen GIS data information layers mapped and scored and had direct application to establishing the Forest Legacy priority areas. The new Legacy Priority Areas and ecological boundaries were summarized by subwatershed, using the National Watershed Boundary dataset (developed by NRCS). North Carolina's 1,795 subwatersheds, which scored highly for Forest Legacy program suitability, were grouped to create four Forest Legacy priority areas.

Process:

A. The GIS input layers from the Southern Forest Land Assessment were evaluated to determine which layers would best display the guiding principles of the Forest Legacy program. Five layers were chosen:

Forest Land – shows the presence of forest land. All pixels representing forest and shrubland are scored 100, and all other land cover types are scored 0.

Forest Patches –contiguous patches of forest are given higher scores as forest patch size increases. Patches were scored on a scale from 0 (<500 acres) to 100 (>5000 acres).

Threatened and Endangered Species – The state was divided into quarter-quads, and each quarter-quad was scored from 0 -100 based on how many threatened or endangered (T&E) species occurrences were found in the quarter-quad. T&E Species data is from NC Natural Heritage Program.

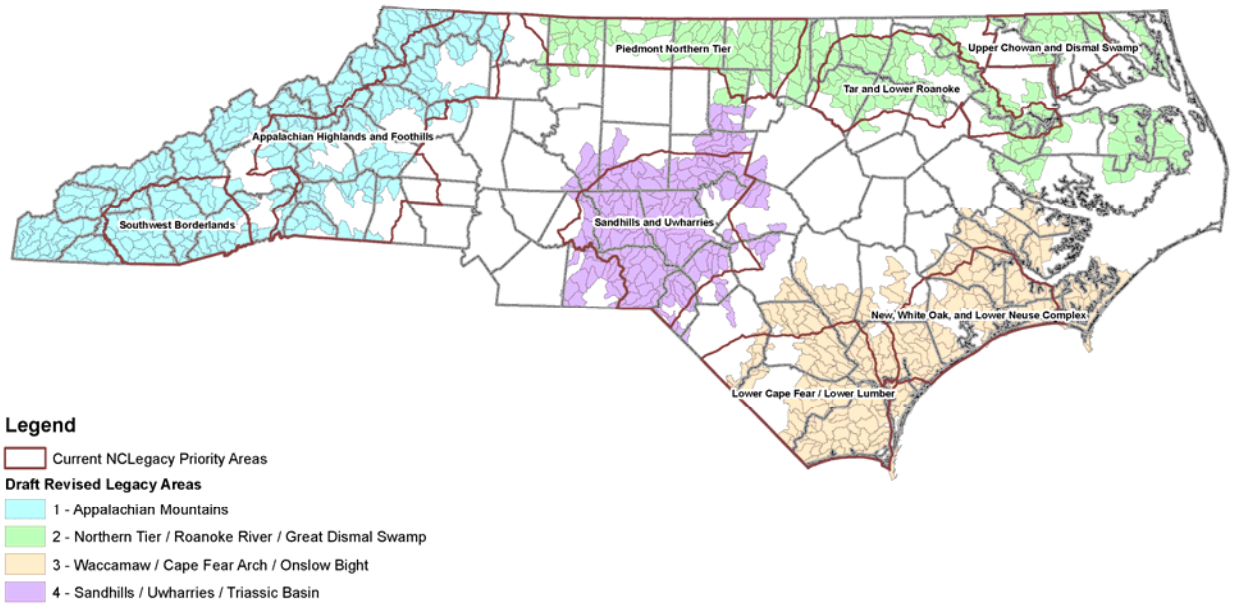
Development Threat – Based on census, roads, landcover, and population projection data. Scores increase from 0 – 100 as the magnitude of expected development between 2000 and 2030 increases. Areas that are most likely to change from rural to developed are scored 100, while areas that are either built out completely or likely to remain rural are scored 0.

Excellent Biological Classification Watersheds – all subwatersheds that contain waters sampled by the Division of Water Quality and found to have excellent biological indicators for high water quality were scored 100, and other areas scored 0 **(**this layer was developed to capture watersheds with outstanding water quality characteristics and high conservation value).

B. The five layers listed above were summed. For example, a pixel that scored 100 for Forest Land, 50 for Forest Patches, 20 for T&E Species, 70 for Development Threat, and 100 for Excellent Biological Classification Watersheds would have a total score of 340. A pixel with the highest value (100) in each layer would be scored 500.
C. Pixels on federally-owned lands were removed from the dataset, since federal land is not eligible for the Forest Legacy program.
D. Score statistics were calculated by subwatershed, and the mean score for each subwatershed was used to determine which subwatersheds should be included as Legacy program priority areas. The top 50% of the subwatersheds in NC, those with scores over 173, were chosen as the core of the Forest Legacy priority areas.
E. Four new Legacy priority areas were drawn: Appalachian Mountains, Northern Tier / Roanoke River / Great Dismal Swamp, Waccamaw / Cape Fear Arch / Onslow Bight, and Sandhills / Uwharries / Triassic Basin. Sixty-six subwatersheds with scores below 173 were added in order to maintain contiguous Legacy Priority areas. When considering which subwatersheds to add, preference was given to the highest scores.
F. In the proposed draft Forest Legacy Priority areas, 936 of North Carolina's 1,795 watersheds are selected. Their model scores for Forest Legacy suitability range from 72 to 455.

See FIGURE *C*-1 for the current and proposed Forest Legacy Priority Areas.

FIGURE *C*-1.—North Carolina Forest Legacy Areas.



Created by: A. Bailey, NCDFR, 2009

Area 1 - Appalachian Mountains and Foothills

Description of Forest Legacy Area and Important Environmental Values

The Appalachian Highlands and Foothills FLA extend from the Virginia and Tennessee borders to the South Carolina and Georgia borders along the Blue Ridge Escarpment and outlying foothill ranges. Mountain hardwood forests dominate most of the area, but the high elevation spruce-fir and acid-cove mix of yellow poplar, hemlock and rhododendron are two very important forest types also found here. In addition, pine forests occupy lands abandoned by farmers. This area is a significant resource base for the forest products industry. The timber resource has long been a vital part of local economies and still sustains an industry dependent on quality hardwood production as well as lower quality fiber. A critically important factor is that many communities have become dependent on tourism geared to the beauty and ecological integrity of the land.

Relatively large tracts in both public and private hands consisting of deed gorges and steep mountains covered with mixed hardwood exist in this FLA. Pisgah National Forest and Nantahala National Forest occupies much of the higher elevation land throughout this FLA, but many thousands of acres of corporately owned forest land and smaller privately owned forests are adjacent to the national forests. Crescent Resources LLC alone owns 25,000 acres in the Upper Catawba Basin along the river, lakes and tributaries. Wildlife habitat

conservation is represented by the Nantahala and Pisgah Gamelands. Water quality protection is important because of Nantahala Lake, river-based recreation on the Nantahala and Tuckasegee Rivers, and abundant trout streams with both native and stocked populations. Water quality restoration is a hope for the Upper Little Tennessee River and would contribute to the effort to maintain downstream habitat for the endangered spotfin chub and Appalachian elktoe.

The Blue Ridge Parkway, a major factor in the region's economy, spans the western portion of this FLA that includes some of the highest mountains in the state. Tourism drives concerns for maintenance of scenic beauty and recreational values. Forest-based recreation is also extraordinarily important to the economy of this region. South Mountains (35,000 acres publicly owned) and Green River Gorge (10,000+ acres publicly owned park and gamelands are in the southern portions of the FLA. Several nationally significant Natural Heritage sites are located in the southern portion of this FLA, including the South Mountains and the Hickory Nut Gorge State Park areas.

Scenic beauty and solitude are important values particularly associated with the Appalachian Trail, which traverses this FLA from the Nantahala River to the South Carolina border. Culturally important sites include the Coweeta Hydrologic Laboratory and Cradle of Forestry in America.

The Appalachian Mountains FLA is the largest of North Carolina's FLAs. It includes Burke, Caldwell, McDowell, and Polk, Rutherford and Wilkes Counties and parts of Ashe, Alleghany, Avery, Catawba, Cleveland, Gaston, Henderson, Jackson Lincoln, Haywood, Macon, Mitchell, Surry, Swain, Transylvania, Watauga, and Yancey Counties. It includes headwaters of the Broad, Catawba, New and Yadkin river basins, subbasins in the Little Tennessee River basin, headwaters of the Savannah River, and parts of western parts of the French Broad River basin, as well as headwaters of the Ivy River in the French Broad watershed.

Current and Future Conversion Pressures

This area has long been a tourist and recreation destination and is convenient for weekend escapes from more urbanized settings to the east and south. As a result, conversion to residential development has led to encroachment on the boundaries of national forest, state forest and state park lands. Upward price pressure on private forest tracts is leading to tract liquidation especially by large corporate landowners. Property tax increases are exacerbating the temptation to sell lands for development. Ridgetop development is a particularly problematic phenomenon wherever land is privately owned, but while large-scale development has been specifically addressed by legislation, individuals are not constrained, and panoramic views are highly desirable.

In the northern part of this FLA, development in recent years has intensified with growth of the ski industry. Both second home and resort community development are therefore accelerating. In the south, the Charlotte/Hickory/Spartanburg-Greenville metro areas are among the fastest growing in the Southeast, driving suburban and second home

development in this region. Land prices are escalating rapidly. Large corporate landowners are actively selling their lands--primarily to development interests--making the next few years critical. Residential, second home, and resort communities are intruding as development pressure from the Atlanta area, only 2.5 hours south from some North Carolina counties, is accelerating and as refugees from northern and eastern cities retire to this region. Many coves throughout this FLA are already entirely developed as golf course and retirement communities.

In the past decade, land prices were escalating, and either property taxes or inheritance taxes were prompting sales of lands to development interests. Many families that historically earned their living on the land were rapidly losing that ability or facing financial pressures that prompt sales to development interests. Suburbanization reduced opportunities for traditional forest uses, further inciting landowners to convert their properties to non-forest uses. However, the current economic slowdown has deterred many developers from buying land. This may offer opportunities to protect key areas if the funding and political will is there.

Goals and Objectives for Public Benefit

- Maintain large contiguous blocks of working forest lands.
- Encourage protection of scenic vistas from Blue Ridge Parkway.
- Enhance protection of water quality in the Broad, New, Upper Catawba and Upper Yadkin Rivers.
- Restore water quality in the Upper Little Tennessee River watershed and protect water quality for trout populations and in tributaries to critical habitat for the Spotfin chub (LTR)
- Buffer national forest, state forest and state park lands from encroachment.
- Buffer the Appalachian Trail, Mountains to Sea Trail and other scenic or recreational trails and routes.
- Provide habitat corridors for wildlife populations.

Potential Partnering Entities

Black Family Land Trust
Blue Ridge Rural Land Trust
Carolina Mountain Land Conservancy
Emerald Land Trust
Foothills Conservancy of North Carolina

High Country Conservancy
Land Trust for Central North Carolina
Land Trust for the Little Tennessee
National Committee for the New River
Pacolet Area Conservancy
Southern Appalachian Highlands Conservancy
North Carolina Division of Forest Resources
North Carolina Division of Parks and Recreation
North Carolina Wildlife Resources Commission
USDA Forest Service
Highlands-Cashiers Land Trust
Highlands Biological Station
Little Tennessee Watershed Association
Western North Carolina Alliance

Boundary Description

See Appendix B. Forest Legacy Area Descriptions

Area 2 - Northern Tier /Roanoke River / Great Dismal Swamp

Description of Forest Legacy Area and Important Environmental Values

The Piedmont Northern Tier FLA extends along the state's border with Virginia and includes all or parts of Alamance, Bertie, Beaufort, Tyrrell, Dare, Hyde, Caswell, Camden, Chowan, Currituck Edgecombe, Franklin, Halifax, Hertford, Gates Nash, Pitt, Person, Rockingham, Stokes, Durham, Granville, Martin, Orange, Pasquotank, Perquimans Stokes, Surry, Vance, Warren, Yadkin, Washington and Wake Counties.
Water resources of note include Dan River, Bellews Lake, Mayo Reservoir, Roxboro Reservoir/ Hyco Lake, Lake Michie, and Falls Lake. The FLA incorporates much of the Roanoke River basin in North Carolina west of US15, small portions of the Cape Fear and Yadkin-Pee Dee river basins and headwaters of the Neuse and Tar Rivers. Several headwater areas and downstream segments contain freshwater mussel populations of regional and national importance. The areas in the vicinity of the Tar and Roanoke River basins have extremely productive sites and soils for high quality hardwood production and also produce high quality habitat for wild turkey, white-tailed deer, and many non-game species. The Tar and Roanoke river basins contains some of the highest quality waters in the region, and both the striped bass recovery program and viable runs of anadromous fish species (e.g., white and hickory shad) depend on high quality water protected by forests in this FLA. The FLA includes the headwaters drainages of the Tar River, which are noted for populations of freshwater mussels. Potential exists for development of eco-tourism, as significant expansion of natural heritage presence and existing conservation easements is possible in the Lower Roanoke.

Gamelands created throughout this FLA are a major environmental feature. Butner-Falls of the Neuse Gamelands, Caswell Game Lands, Sauratown Plantation Game Lands support large white-tail deer and wild turkey populations that use extensive areas as home ranges.

State parks in this large FLA include Eno River, Hanging Rock, Medoc Mountain, Merchants Millpond and Dismal Swamp are several of the of the recreational sites in this FLA that would benefit from protection on their perimeters. Pilot Mountain State Park is adjacent to US52 and would benefit from protection near its eastern boundary.

NC State University's Hill Forest, north of Durham, serves as a key educational and research resource of historic importance. The Duke Forest is proximal to this FLA and serves research, teaching and recreational functions similar to the Hill Forest.

The Upper Chowan and Dismal Swamp region within this FLA is the oldest settled area in the state yet contains a diversity of forest types from bottomland hardwood swamps (tupelo-cypress) to upland mixed hardwoods and mixed-pine and hardwoods. Wetter sites are typically remnants of the Great Dismal Swamp and often include Atlantic whit cedar. Relatively undisturbed and remote swamplands include large sections of bottomland hardwood swamp and significant natural heritage areas associated with the Great Dismal Swamp. The Chowan River Game Lands consist of several thousand acres that serve as a centerpiece for the western part of this FLA. Timber company lands (Union Camp) and the Great Dismal Swamp National Wildlife Refuge as well as the Merchants Millpond State Park are important components of this area.

The forests in this area provide habitat for the black bear, bobcat, wild turkey, prothonatary warbler, osprey, and bald eagle.

Significant Natural Heritage Areas include Chowan Sandbanks, Chowan/Bennets Creek/ Catherine Creek Swamps, Chowan River White Cedar Swamp, Dismal Swamp Megasite, Holiday Island, Horsepen Pocosin, Meherrin River Macrosite, Merchants Millpond, The Pot Holes, Union Camp/Chowan River Natural Areas, Upper Wiccacon River Swamp, Warwick Creek Oak Flats and Slopes, Wiccacon River Freshwater Marsh, Wyanoke Sandhills.

Current and Future Conversion Pressures

Residential and commercial development from the Piedmont Triad and Research Triangle urban complexes is rapidly eroding southern margins of the large contiguous blocks of rural land in this area. All along the I-85/I-40 corridor from Durham to Burlington to Greensboro and Winston-Salem, urbanization is creating extensive development pressure. Urban workers seeking less congested areas are quite willing to commute from this region, and developers have already made inroads, seeking less expensive land for future development. Rural development threatens the connectivity and utility of the numerous areas of gamelands in this FLA. Water quality in proximity to headwaters of several rivers

that support native freshwater mussel populations is threatened by sedimentation and polluted runoff from advancing development.

Properties such as Eno River State Park and NC State University's Hill Forest, north of Durham, are already being surrounded by residential development that threatens their ability to function effectively. The Duke Forest, proximal to this FLA, is already experiencing changing land use and development pressures throughout its scattered properties.

In Northeastern North Carolina, creasing population south of the Virginia line is largely coming from suburban Tidewater Suffolk and Virginia Beach to the northeast. This movement is encroaching on the rural character of this area. All areas along the northern shore of Albemarle Sound have been platted for potential development, especially expanding waterfront development.

A poor agricultural economy results in farmers cutting timber that in many cases leads to conversion to non-forest uses. While a majority of the bottomland area along the Chowan River is presently timber company land, new industry has been proposed, which would lead to new development

Goals and Objectives of FLA for Public Benefit

- Maintain large contiguous blocks of working forest lands.
- Create and maintain landscape-scale corridors connecting large designated areas of managed habitat.
- Contribute to population interchanges between the Coastal Plain and foothills of the Appalachians.
- Protect water quality and habitat for freshwater mussels.
- Enhance protection of water quality supplies and protect headwaters of the Neuse and Tar Rivers.
- Buffer Chowan River Game Lands, Great Dismal Swamp National Wildlife Refuge, Merchants Millpond State Park and other Natural Heritage Areas
- Conserve bottomland hardwood swamp forests and promote effective forest regeneration.
- Enhance protection of the Chowan River's Nutrient Sensitive Waters

Potential Partnering Entities

Black Family Land Trust
Eno River Association
Land Trust for Central North Carolina
North Carolina Coastal Land Trust
Foothills Conservancy of North Carolina

Tar River Land Conservancy
Piedmont Land Conservancy
North Carolina Division of Forest Resources
North Carolina Division of Parks and Recreation
North Carolina Wildlife Resources Commission
The Nature Conservancy
Triangle Land Conservancy
Triangle Greenways Council
Hunt Clubs in the region

Boundary Description

See Appendix B. Forest Legacy Area Descriptions

Area 3 – Waccamaw / Cape Fear Arch / Onslow Bight

Description of Forest Legacy Area and Important Environmental Values

Historically dominated by longleaf pine and its associated plant and animal communities or by bottomland hardwood swamp communities, the Waccamaw/Cape Fear/Onslow Bight FLA includes some of North Carolina's most extensive forest expanses. This spans Robeson, Bladen, Columbus, Brunswick, Sampson, Pender Onslow, Carteret, Craven, Duplin, Pender, Pamlico, Pitt, Beaufort, Robeson, Hoke, Cumberland, Sampson Lenoir, and New Hanover Counties. This area contains much of the geographically important Carolina Bay complex. Much of the area has been converted to modern pine plantations, but within these expanses, the variety of natural plant community types is still extraordinary, including such unique plants as the carnivorous Venus fly trap. Black bear habitat exists in immense blocks including virtually inaccessible swamplands.

From the Lumber River State Park on the west to extensive forest industry lands on the east, this FLA incorporates a full range of partners engaged in sustaining values of working forests in North Carolina. The Nature Conservancy manages the Green Swamp to preserve its unique natural features systems, and International Paper Company manages extensive lands primarily for timber and paper production. The NC Division of Forest Resources manages Bladen Lakes State Forest on the northern boundary of this area. Linking large public holdings, from Angola Bay and Holly Shelter Game Lands to the Croatan National Forest and the Hofmann Forest, this FLA includes immense pocosins, Carolina bays, riverine habitats and significant red-cockaded woodpecker habitat. Camp Lejeune Marine Corps Base and the New River estuary are central to this FLA. Some natural longleaf pine communities remain intact, but significant acreages have been planted in loblolly pine. The size of contiguous forest areas in this FLA is remarkable. Both intensively managed and relatively unmanaged areas exist. Features of particular interest found in this area include Great Dover Swamp, a number of large pocosins, estuaries of the White Oak and New

Rivers, red-cockaded woodpecker colonies concentrated on Camp Lejeune and the Croatan National Forest,

Natural communities of particular interest found in this area include Coastal Fringe Evergreen forest, Maritime evergreen forest, Maritime deciduous forest, Small depression pond, Vernal pool, Pine savanna, Wet pine flatwoods, Small depression pocosin, Bay forest, Peatland Atlantic white cedar forest, Pond pine woodland, High pocosin, and Low pocosin. Natural Heritage Areas that have been identified in the FLA include Lower Buck Landing Swamp, Piney Island Swamp, Net Hole Swamp, Bluff Swamp, Princess Anne Swamp, Big Sandy Ridge, Fair Bluff Swamp, Boiling Spring Lakes.

Current and Future Conversion Pressures

Historically, agricultural conversion led to drainage in extensive areas of pocosins and associated natural communities. Forests returned or were planted on much of the abandoned land. Temporary drainage and conversions of low production areas to pine plantations increased the acreage of forested land.

Now, along the coast, this area is among the fastest growing in North Carolina. Suburban sprawl surrounds Wilmington. Golf course and retirement communities are expanding at a tremendous rate on the mainland along the southern coast in Columbus and Brunswick Counties. Proximity to barrier islands and beaches prompts commercial development to take advantage of the seasonal influx of vacationers. Federal and state wetland regulations have placed a premium value on upland forested sites where development can occur. Development in the small urban centers of New Bern, Kinston, and Jacksonville has been progressively faster over recent decades and is expected to continue to accelerate. For example, highway corridor studies by the City of Jacksonville, NC, project extensive growth north and east of the city. Morehead City, Havelock, and Newport are expanding in response to the growth of the beach and retirement influx. Beach related and retirement community development in this area, as elsewhere along the North Carolina coast is predicted to continue at current or higher levels for some time into the future.

Tax burdens on working forest lands proximal to advancing development are driving the conversion process. Already forest products companies are abandoning silviculture on lands along the urban-rural interface and in some cases are developing such lands themselves rather than persist in traditional forest management in areas where congestion and proximal neighbors are likely to create adverse conditions for effective forestry.

Goals and Objectives of FLA for Public Benefit

- Maintain large contiguous blocks of working forest lands.
- Enhance protection of the Cape Fear River's Nutrient Sensitive Waters.

- Buffer unique natural areas (such as the Green Swamp, pocosins and Carolina bays) from encroaching subdivision and development.
- Enhance protection of Nutrient Sensitive Waters and forested wetlands in the Neuse and White Oak River Basins
- Provide habitat for black bears, RCWs, and a number of other protected species found in the region.
- Connect designated preserves and reduce landscape fragmentation.
- Connect Angola Bay and Holly Shelter Game Lands, Camp Lejuene, Hofmann Forest, and Croatan NF with viable corridors enabling wildlife population interactions among these large contiguous blocks.
- Buffer key habitat blocks from secondary development effects.
- Encourage prescribed burning and management for early successional species.

Potential Partnering Entities

Black Family Land Trust
Lumber River Conservancy
Northeast New Hanover Conservancy
North Carolina Coastal Land Trust
North Carolina Division of Forest Resources
North Carolina Division of Parks and Recreation
North Carolina Wildlife Resources Commission
The Nature Conservancy
North Carolina State University Forestry Foundation
USDA Forest Service
US Marine Corps

Boundary Description

See Appendix B. Forest Legacy Area Descriptions

Area 4 – Sandhills / Uwharries / Triassic Basin

This area encompasses important lands extending east and south from the Uwharrie National Forest, including the Birkhead Wilderness Area, through the Sandhills region. This FLA is located in the south-central portion of North Carolina, occupying all of Lee, Montgomery, Moore, and Richmond Counties. It also includes parts of Alamance, Anson, Chatham, Cumberland, Davidson, Harnett, Hoke, Orange, Durham, Randolph, Rowan, Robeson, Scotland, Stanley, and Wake Counties.

This FLA incorporates the central and upper Cape Fear river basin, the upper Lumber river basin, upper Neuse river basin, and the lower Yadkin-Pee Dee river basin. Water quality is important, and the included portion of the Cape Fear is designated critical habitat for the Cape Fear shiner. Headwaters of blackwater river systems are found here, and associated botanical communities are considered especially important. The Yadkin-Pee Dee river basin contains

several rare, threatened, or endangered aquatic species (i.e., robust redhorse, Carolina redhorse, highfin carpsucker). The red-cockaded woodpecker, St. Francis' satyr butterfly, and three plant species (American chaffseed, rough-leaved loosestrife, and Michaux's sumac) are federally listed species inhabiting this area. About a dozen more species are candidates for future federal listing. Recreation and scenic beauty are very important components of desirable sites for golf courses and retirement communities that have existed historically and have increased in prominence in this region.

The Sandhills has long been recognized as a biologically distinct area, with a complex of plant and animal species requiring special attention. Transitional between the Coastal Plain and Piedmont, the Sandhills supports species of both physiographic regions. The Sandhills is recognized as one of the last large remaining pockets of longleaf pine. In addition to Uwharrie National Forest, which includes more than 700 historic and cultural resource sites, the Fort Bragg Military Reservation and Sandhills Game Lands are significant managed properties within this area. NC State University's Goodwin Forest is located in the center of this FLA. The Triangle Land Conservancy owns a tract at the confluence of the Deep and Rocky Rivers. Open space and recreation are important considerations in the vicinity of the Uwharrie National Forest, the Yadkin lakes and the NC Zoological Park. Alcoa and Progress Energy own lands along the Yadkin/Pee Dee. Wildlife habitat conservation is represented by the Uwharrie Gamelands

Natural communities of particular interest in the Sandhill areas include Sandhill seeps, Small depression pocosins, Streamhead Atlantic white cedar forest, Streamhead pocosin, and Piedmont transitional longleaf. An effort to develop Habitat Conservation Planning and Safe harbor agreements under USFWS leadership seeks to enhance recovery potential of RCW populations and associated species occurring in the same habitat. Longleaf restoration efforts have been initiated on several sites throughout this FLA.

The upper cape Fear River includes Triassic Basin areas and associated flood plains. Steep north facing slopes occur especially along the margins of the Triassic Basin, due to the sharp drop in elevation and consequent increased stream cutting. These areas now harbor remnant, relictual communities that are rare in the Piedmont. Another feature associated with the Triassic Basin is diabase outcrops. These diabase areas provide habitat for unique natural communities. While such geologic formations are found mostly in Durham and Granville counties, several exposures of diabase occur near Orange County's eastern border. Recent urban development in Orange County has disturbed most of these habitats.*

The Natural Communities most commonly found in the Triassic Basin include Piedmont/Mountain Bottomland Forests, Piedmont/Mountain Levee Forests, and associated slopes, especially Basic Mesic Forest. Diabase sills and dikes are nutrient rich uplands associated with the Triassic Basin, and they also support several rare plant species.

The rare species include: Cardamine dissecta (Significantly Rare – SR), Cardamine douglassii (SR), Carex jamesii (SR), Corallorhiza wisteriana (SR), Dirca palustris (Watch List), Enemion biternatum (SR), Hexastylis lewisii (Watch List), Hybanthus concolor (Watch List), Phacelia covillei (SR + FSC),

Philadelphus hirsutus (Watch List), Philadelphus inodorus (Watch List), Gillenia stipulata (SR), Ptelea trifoliata (Watch List), Quercus muehlenbergii (Watch List).

In Lee County, the primary remaining natural areas are: (1) sites such as north-facing bluffs and slopes with Mesic Mixed Hardwood Forest (predominantly, but not exclusively, in the northern two-thirds of the county), (2) river floodplains supporting somewhat disturbed Piedmont/Low Mountain Alluvial Forest (and occasionally Piedmont Bottomland Forest), (3) uplands supporting secondary Dry-Mesic Oak-Hickory Forest, and (4) Streamhead Pocosins and Streamhead Atlantic White Cedar Forests at headwaters of small streams. Equally important, but occurring with less frequency, are examples of (5) Basic Mesic Forest, (6) Pine/Scrub Oak Sandhill and Xeric Sandhill Scrub, and (7) Rocky Bar and Shore

Current and Future Conversion Pressures

Golf course and retirement communities economically dominate developed portions of the FLA. As connecting roads such as NC87 and US1 near Sanford are upgraded, increasing development pressure is coming from the north as Research Triangle and Piedmont Triad commuters seek exurban housing. Fayetteville's expansion from the east also threatens. Changes in tax rates as a result of proximal development is leading to liquidation of large tracts and loss of forested lands. Subdividing large tracts for individual and community residential development is increasing in all parts of this FLA. Proximity of residences and commercial properties to
managed forests is creating problematic conditions for necessary burning prescriptions that the native vegetation communities need in order to be perpetuated.

Goals and Objectives of FLA for Public Benefit

- Maintain large contiguous blocks of working forest lands.
- Restore and conserve longleaf pine communities.
- Maintain and establish corridors connecting large managed wildlife areas.
- Provide habitat for the red-cockaded woodpecker, St. Francis' satyr butterfly, and three plant species (American chaffseed, rough-leaved loosestrife, and Michaux's sumac). All of the protected species require some degree of forest disturbance or manipulation for suitable habitat to be maintained.
- Enhance protection of water supply segments of the Cape Fear, Neuse, Yadkin-Pee Dee and Lumber Rivers.
- Protect habitat for the Cape Fear Shiner (Notropis mekistocholas) and Robust Redhorse **(***Moxostoma robustum*)
- Enhance protection of Nutrient Sensitive Waters in the Cape Fear, Neuse, Lumber and Yadkin – Pee Dee River Basins.

Potential Partnering Entities

Black Family Land Trust

Land Trust for Central North Carolina
Lumber River Conservancy
Eno River Association
NC State University College of Forest Resources
North Carolina Division of Forest Resources
North Carolina Division of Parks and Recreation
North Carolina Wildlife Resources Commission
Piedmont Land Conservancy
Sandhills Area Land Trust
USDA Fish and Wildlife Service
The Nature Conservancy
Triangle Land Conservancy
Triangle Greenways Council
Hunt Clubs in the region

Boundary Description for Sandhills and Uwharries FLA

See Appendix B. Forest Legacy Area Descriptions

Response to Feedback From 8/14/2009 Stakeholders Meeting:

A WebEx/conference call was held on Friday, August 14 with members of the State Stewardship Committee, Forest Legacy Advisory and review Committee (FLARC) and the North Carolina Forest Assessment Sustainability Working Group. The meeting was called to keep stakeholders informed as to the method used to identify the new AON areas. Endorsements by these state-level advisory committees led to creation of this assessment of need (AON) document and a process to gather information to create the new forest legacy areas (FLAs).

The following are questions were generated from the meeting:

1. Compare One NC Naturally Conservation Planning Tool Biodiversity and Wildlife Habitat Assessment (BWHA) model with SFLA T&E species to see if any advantage would be gained from using the BWHA model to represent high wildlife values.
    a. The T&E species layer is very generalized (each pixel represents a quarter-quad) and the BWHA model is very specific (each pixel represents 30 x 30 meters).
    b. The models were compared and generally highlighted the same areas for wildlife habitat.
    c. The specificity introduced by the BWH model would have emphasized core wildlife habitat areas while reducing surrounding areas.
    d. Because the SFLA T&E layer is generalized, it includes connective habitat that is exceptionally suitable for working forest.
    e. We will continue using the SFLA T&E species layer.

2. Compare the Outstanding Resource Water (ORW) watersheds layer to a layer derived from DWQ excellent biohabitat sample points.
    a. Excellent biohabitat is determined solely on scientific sampling criteria
    b. ORW is a classification that includes both biological criteria and a rulemaking process.
    c. More area is included if all watersheds with excellent biohabitat ratings are selected than if all watersheds containing ORW areas are selected.
    d. We will use excellent biohabitat sampling points to include areas of high water quality rather than ORW areas.
3. Evaluate the effect of considering adjacency to protected lands.
    a. Using buffers of conserved lands to increase scores near conserved lands creates breaks in the continuity of Forest Legacy Areas.
    b. Areas that have historically been successful working forests, and do not have outstanding topographical or historical values, tend to decrease in model value, while areas in the mountains and coast tend to increase.
    c. We will not add a layer representing adjacency to conserved lands.
4. Consider the effects of access to forestry product markets.
    a. There is no data that directly shows forestry markets and infrastructure in a format that can be readily integrated into a model of this type.
    b. There is promise of data becoming available, but it will be several months before that data can be ready. Some technical challenges to represent this data in an appropriate format must be overcome.
    c. We will reevaluate the effect of forestry market data when it becomes available.

State Stewardship Committee Members

Wib Owen
State Forester and Director, North Carolina Division of Forest Resources

Jennifer Bumgarner
Agriculture Advisor, Governor's Office

Marisue Hillard
Forest Supervisor, USDA Forest Service

Mike Eaves (Acting Director)
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Isaac Harrold
Section Manager, Wildlife Resources Commission

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Dean, College of Forest Resources

Dr. Dan Richter
Dean, Duke University Nicholas School of the Environment

Mary Combs
State Conservationist, Natural Resources Conservation Service

Patricia Harris
Director, Soil and Water Conservation

Ed Jones
Associate Leader, Natural Resources/Community Development, NCSU Coop Extension

Pete Benjamin
Field Supervisor, US Fish & Wildlife

The Forest Stewardship Program also seeks direction, input, and cooperation with the following members of its Resource and Advisory Committee on an ongoing basis, especially during major program changes, planning efforts and procedural changes.

The Nature Conservancy

North Carolina Wildlife Federation

North Carolina Division of Water Quality

North Carolina Farm Bureau

North Carolina Society of Consulting Foresters

North Carolina Division of Land Resources

North Carolina Soil and Water Conservation Society

Society of American Foresters, North Carolina Division

North Carolina Department of Agriculture

North Carolina Forestry Association, Inc.

North Carolina Division of Water Resources

Sierra Club

North Carolina Recreation and Parks Society

North Carolina Division of Parks and Recreation

North Carolina Audubon Council

North Carolina State Grange

Southern Appalachian Multiple-Use Council

Western North Carolina Alliance

Western North Carolina Development Association, Inc., Forestry Commission

The Wildlife Society - North Carolina Chapter

North Carolina Environmental Defense Fund

Local Government Representative

State Council of Quail Unlimited

Private landowners

National Woodland Owners Association

The Conservation Trust of North Carolina

The NC Tree Farm Program

Forest Stewards Guild

NC Forestry Council

Southern Environmental Law Center

US Fish& Wildlife Service

Concerned Citizens of Tillery

Sandhills Heritage Family Trust

Cherokee Indian Agency Branch of Forestry – Bureau of Indian Affairs

Black Family Land Trust

For information concerning representatives of these organizations, please contact the North Carolina Forest Legacy Coordinator, (919) 857-4833.

Forest Legacy Application and Review Committee (FLARC)

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References

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Appendices

Appendix A. NC Forest Legacy Program Application

Forest Legacy Parcel Evaluation Package

Appendix B. Forest Legacy Area Descriptions

North Carolina Map of Forest Legacy Areas

Area 1: Appalachian Mountains

Area 2. Northern Tier/Roanoke River/ Great Dismal Swamp

Area 3. Waccamaw/ Cape Fear Arch/ Onslow Bight

Area 4. Sandhills/Uwharries/Triassic Basin

Appendix A.

North Carolina Forest Legacy Program Application

FOR OFFICE USE ONLY

Received by: _____ Application Number: _____

Date: _____

APPLICANT INFORMATION:
Landowner's Name: _____
Mailing Address: _____
_____
Daytime Telephone Number: _____
Landowner's Agent: _____
Mailing Address: _____
_____
_____
Daytime Telephone Number: _____

House District: _____
Senatorial District: _____

PROPERTY INFORMATION:
Legal Description: County _____
Tax Map # _____
Accessories Plat and Lot Numbers: _____
Deed Reference (Book and Page Number): _____
Current Local Zoning (where property is located)

(Include minimum lot size and road frontage requirements): _____
_____
_____
Property's Total Forested Acres: _____
Forested Acres of Tract Offered for Forest Legacy: _____
Acres of Cleared/Open Land: _____

LANDOWNER GOALS AND OBJECTIVES

Describe your long term goals and objectives for this parcel:

TRADITIONAL FOREST VALUES

What is/are the "Traditional" use(s) of this forest land?

LANDOWNER COMMENTS

In your opinion, is there a "Threat of Conversion to Non-Forest Use" of the parcel proposed for enrollment in the Forest Legacy Program? Be Specific:

Do you currently have a forest management plan? _____
If so, please provide a copy.

It is important that the following section be carefully and fully completed. The information you supply will directly affect the desirability of the parcel as well as its appraised value and, therefore, the ranking. Note that checking "yes" does not limit your ability to negotiate price and options in the future; it merely assists the Forest Legacy Committee when evaluating your parcel.

Indicate which of the following interests you desire to retain: (These should be the rights you want to retain. All other rights will become the property of the State of North Carolina upon successful completion of negotiations between the State of North Carolina and yourself.)

YES MAYBE

____ ___ Timber and wood product rights

___ ___ Water rights

___ ___ Mineral rights

___ ___ No public access

___ ___ Hunting

___ ___ Fishing

___ ___ Camping

___ ___ Hiking or other passive recreation

___ ___ Bicycling

___ ___ Horseback Riding

___ ___ Grazing

___ ___ Farming

___ ___ Construction of roads

___ ___ Motorized access

___ ___ Expansion of existing improvements

___ ___ Mushroom/Ginseng/Craft Material Collection

___ ___ Other: _____

CONFIDENTIAL

The following information shall remain strictly confidential until such time as: (1) the application is approved and all financial transactions are concluded or (2) all title holders give written permission to release the information.

FINANCIAL INFORMATION

State the value of the interests to be enrolled in the Forest Legacy Program, and the method used to determine that value (appraisal, landowner estimate, etc.)

What is/are the estimated sale price(s) of the interests being offered?

State the value of the landowner(s) contribution, if any, either in donated value of in-kind services or financial.

LIENS AND ENCUMBRANCES

List any and all liens and encumbrances on the property proposed for enrollment in the Forest Legacy Program. Examples: Utility easements, public rights of way, water flow or use restrictions, septic systems or water easements, deed restrictions, tax liens, etc.

The information provided above is true to the best of my/our knowledge and belief.

ALL TITLE HOLDERS MUST SIGN.

PRINT NAME(S) SIGNATURE DATE

_____ _____ _____

_____ _____ _____

_____ _____ _____

FOR OFFICE USE ONLY

Application Number: _____ Date: _____

FOREST LEGACY PROGRAM - Checklist

With your Forest Legacy Program application package, please submit four (one original and three copies) of the following for each contiguous parcel:

_____ Completed Application

_____ Name(s) and address (es) of other owner(s) of record for this tract

_____ Signed consent agreement

_____ Copy of road map indicating location of the property

_____ Copy of plat or survey map of the parcel

_____ Aerial photo (can be obtained through your local Farm Services Agency Office)

_____ Legal Description (if available)

_____ List of existing permanent improvements on the tract, including houses, barns, lakes, ponds, dams, wells, roads and other structures, and the total number of acres occupied by improvements.

_____ Map identifying all dams, dumps, or waste disposal sites on the property.

_____ Forest management plan

NOTE: All materials become the property of the State of North Carolina and are not returnable.

DISCLOSURE OF THIS INFORMATION IS VOLUNTARY; HOWEVER, FAILURE TO COMPLY MAY RESULT IN THIS FORM NOT BEING PROCESSED.

NORTH CAROLINA

FOREST LEGACY PARCEL EVALUATION PACKAGE

Directions for completing the Forest Legacy Program
Evaluation Package

COVER SHEET: The first part of the cover sheet is to be completed with information supplied on the enrollment application form. The landscape description is meant to include the physical characteristics of the surrounding area including topography, soils, and surface and ground water hydrologies: brief inventories of major vegetative groups, fish and wildlife resources, scenic resources and any other forest resources; as well as surrounding land uses. The parcel description is meant to include an in-depth description of the above mentioned items, but as they pertain to the parcel.

PARCEL EVALUATION - PART A: These pages are to be completed by the field personnel directed to do so by the land agency, in consultation with other pertinent state and local agencies or groups.

Note: both Parcel Evaluation Parts A and B forms will be used to set goals for acquiring the parcel.

SCORING: The final score will not be used as the sole factor in determining which parcel/interest should be acquired but merely as a guide to the relative values of the resource under evaluation.

Subject to funding, priority will be given to those tracts with the greatest need for conservation of the forest and related resources.

PART B. EVALUATION FACTORS FOR SPECIFIC PARCELS

The following factors will be used to quantify and qualify information that will satisfy the criteria requirements:

1. Threat by conversion to non-forest uses:

Type and Level of Threat

Various kinds and degrees of threat to valuable forested areas exist, such as encroaching housing development, improved roads, sewer and power line extension into undeveloped areas, and fragmentation of land ownership in smaller parcels. In determining the threat to a parcel, factors to consider include, but are not limited to the following:

- is in danger of conversion to non-forest use within 5 years,
- may remain wooded, but will become further fragmented,
- is currently on the open market/listed by realtors (securing one or more sites now will stem further development),
- is remote, but vulnerable,
- remnant of a forest type, and/or
- others

Factors Affecting Acquirability

Even if a forested parcel is threatened with conversion to non-forest use, protecting it under the Forest Legacy Program can only be accomplished if certain conditions exist which favor implementation. In determining prospects for a successful effort under the Forest Legacy Program, factors to consider include the following:

- property is specifically identified in terms of priority, timing, and cost in local land use plans, the state Conservation Outdoor Recreation Plan, Open Space Plans and others as appropriate,
- parcel may be available at below fair market value,
- intensity and expense of management activities to protect the property's value is economically feasible,
- protection of the property would increase protection of public properties and protected areas, or enhance the linking of greenways,
- property can accommodate proposed priority uses and/or management activities without endangering or degrading its natural value, and/or
- property can be protected from future degradation by activities occurring on neighboring properties.

2. Contain one or more important values:

Scenic Resources:

The scenic aspects of a natural resource area may often be subjective, but there are several means of measuring the special qualities that make a given parcel stand out. In identifying scenic amenities of a parcel, these factors must be considered:

- includes locally important panoramic views and/or exceptional short view, and/or
- is situated along a designated scenic river, road or trail corridor.

Public Recreation Opportunities:

Existing or potential recreational use (especially public access) of a proposed parcel is an important component to be weighed. The following factors must be considered:

- water based recreation
- trail based and/or day use recreation
- natural resource based recreation
- adjacent land is protected

Riparian Areas:

One of the most important "products" of forest areas is water. Proper management of forest lands through institution of a Forest Legacy Area can increase the quality and quantity of water for residents of North Carolina. Factors to be included in determining the riparian value of a parcel include the following:

- is situated on a river or stream
- has extensive (over 300') river or wetland shoreline,
- includes floodplain,
- contains a minimum 50 foot strip of native trees and shrubs as a natural buffer and sediment filter,
- parcel is situated within a water supply watershed, or groundwater aquifer recharge area
- parcel provides immediate watershed/water supply protection,
- contains important wetlands.

Fish and Wildlife Habitat:

Preventing fragmentation of forest tracts into smaller units is crucial to maintaining viable populations of wildlife species. Factors to consider:

- Parcel contains desirable habitat and other ecologically recognized criteria for one or more species that include: forest interior nesting birds, significant populations of resident species, neotropical migratory birds, areas for resting and feeding of migratory species, forest inhabiting mammals, reptiles, amphibians and invertebrates.
- Parcel exhibits connective habitats, corridors, habitat linkages and areas that reduce biological isolation.

Known Threatened and Endangered Species:

As urbanization and fragmentation of forest lands continue, the need to give special attention to threatened species of fish, wildlife and plants increases. Parcels nominated for the Forest Legacy Program should be inventoried for such natural habitats that may contain imperiled species (on State list as Endangered, Threatened or of Special Concern). Factors to be considered:

- Parcel provides habitat supporting occurrence of rare, threatened or endangered species.
- Parcel is within a designated Natural Heritage Area.
- Parcel provides suitable habitat for reoccupation by rare, threatened or endangered species (either naturally or through translocation).
- Parcel adjoins or is proximal to forests included in a Habitat Conservation Plan or Safe Harbor agreement and would thereby contribute to species conservation goals.

Known Cultural/Historical Resources:

Material evidence of the earlier human occupation in North Carolina comprises a unique and irreplaceable resource, as do historic features and vernacular landscapes. Factors considered:

- Parcel contains forest related cultural resources (i.e., historic forest, historic mill or other forest industry site.)
- other historic or archeological resources (native American sites)

Other Ecological Values:

In addition to the characteristics already outlined, a parcel may exhibit additional or exceptional conditions that are important and add to the quality of the Forest Legacy Area, such as:

- parcel is part of a large block of contiguous forest land,

- will provide a corridor between other large contiguous blocks,
- includes ecological communities which are dwindling in North Carolina, and/or
- contains late successional growth forests (natural area).

3. Provide opportunities for continuation of traditional forest uses:

Maintaining traditional forest uses is important. It permits owners to remain on the land without requiring high-cost services. Positive factors which reinforce this include:

- will remain available for timber and other forest products management under a Stewardship Plan,
- will continue to serve watershed and water filtration role,
- will continue to provide fish and wildlife habitat,
- will continue to provide outdoor recreation opportunities, and
- provide opportunities for environmental education.

4. Reflect important regional values:

Through careful selection parcels should provide regional, not just local significance. The features and functions of these parcels should include:

- linkages for recreational values, such as trails, especially along rivers, greenbelts, bluffs and parcels which connect existing publicly-owned and protected lands,
- public access to boating and swimming relative to the needs of local population centers and the effects of projected land use change,
- public or private drinking water supply protection (ground or surface water),
- scenic qualities having their basis in natural and cultural landscapes,
- public benefits identified within goals and objectives for Forest Legacy Area where tract is located.

COVER SHEET

FOREST LEGACY PARCEL EVALUATION PACKAGE

_____ Forest Legacy Area

File Number: _____ Date of Evaluation: _____

Landowner's Name: _____

Parcel Location: _____

Legal Description: _____

Investigator(s): _____
_____
_____

Landscape Description:

Parcel Description:

Landowner's Name: _____ File Number: _____
Evaluator(s): _____

FOREST LEGACY PARCEL EVALUATION - PART A

I. Reasons for inclusion in the Forest Legacy Program. Prioritize the following reasons for enrollment of the parcel in the Forest Legacy Program:

___ Prevent conversion/development/fragmentation of an important forest resource

___ Protection of scenic resources

___ Provide/enhance public recreation opportunities

___ Protect/enhance a watershed or important drinking water supply

___ Protect/enhance an important riparian/hydrologic area

___ Provide linkage between public properties, protected areas and greenways

___ Protect/enhance/restore fish and/or wildlife habitat

___ Protect/enhance/restore habitat of rare, threatened, and/or endangered species of plant and/or animal

___ Provide for the continuation of traditional forest uses

___ Provide opportunity to implement Forest Stewardship practices

___ Provide opportunities for environmental education

___ Provide historical/cultural uniqueness or protection

___ Provide buffers (scenic, riparian, etc.)

___ Other _____

II. Degree of threat of development/fragmentation/conversion to non-forest uses.

Yes No

___ ___ A. Parcel is in danger of conversion within 5 years.

___ ___ B. Parcel may remain wooded, but will become further fragmented

___ ___ C. Parcel is currently on the open market, or listed by realtors

___ ___ D. Securing one or more sites now will stem further development

___ ___ E. Parcel is remote, but vulnerable

___ ___ F. Parcel is under a state or federal forest management program

___ ___ G. Parcel is remnant of a forest type

___ ___ H. Parcel may remain wooded, but is in danger of being over-harvested

___ ___ I. Other

III. Factors affecting acquirability. These factors are to be taken into consideration when prioritizing parcels for acquisition.

Yes No N/A

___ ___ ___ A. The property is specifically identified in terms of priority, timing, and cost in the local land use plan, state recreation plan or open space plans.

___ ___ ___ B. Parcel may be available at below fair market value.

___ ___ ___ C. Intensity and expense of management activities to protect the propertyís values is economically feasible.

___ ___ ___ D. Conservation of the property would increase the protection of existing natural areas or enhance the linking of greenways.

___ ___ ___ E. Property can accommodate proposed priority uses and/or management activities without endangering or degrading its natural value.

___ ___ ___ F. Property is/can be protected against future degradation from activities occurring on neighboring properties.

Comments:

Landowner's Name: _____ File Number: _____

Evaluator(s): _____

FOREST LEGACY PARCEL EVALUATION - PART B

I. If parcel contains one or more of the following important public values, place a check mark as indicated, circle appropriate score and tally score in column to the right.

Yes No

A. Scenic Resources (maximum score 100 points)

___ ___ 1. Parcel is adjacent to or in a viewshed visible from a scenic road, river, or trail designated by the State of North Carolina or the United States.

___ ___ 2. Parcel includes locally important panoramic views and/or exceptional short views.

Scenic resources total score _____

B. Existing or Potential Public Recreational Opportunities
(Maximum score 100 points)

___ ___ 1. Water-based recreation - boating, swimming, fishing, rafting, canoeing
___ ___ 2. Trail-based and/or day use recreation - hiking, picnicking, horseback riding, cross-country skiing
___ ___ 3. Natural resource based recreation - camping, hunting, nature touring
___ ___ 4. Adjacent land is protected or is within an adopted expansion area for a public park, forest, natural area, private nonprofit preserve, etc.

Public recreation opportunities total score _____

C. Riparian/hydrologic areas (Maximum score 150 points)

___ ___ 1. Parcel is situated on a river or stream
___ ___ 2. Parcel has extensive (over 300') river or wetland shoreline
___ ___ 3. Parcel included in 100 year flood plain
___ ___ 4. Parcel contains a minimum 50' strip of native trees and shrubs as a natural buffer and sediment filter, or such a buffer will be restored
___ ___ 5. Parcel includes a natural wetland or prior converted area that will be restored
___ ___ 6. Parcel is situated within a water supply watershed, or groundwater aquifer recharge area
___ ___ 7. Parcel provides immediate watershed/water supply protection

Riparian/hydrologic areas total score _____

Yes No
D. Fish and Wildlife Habitat (Maximum score 100 points)

___ ___ 1. Parcel contains outstanding habitat and other ecologically recognized criteria for one or more species that include:
Forest interior nesting birds
Significant populations of resident species
Neotropical migrant species
Areas for resting and feeding of migratory species
Forest inhabiting mammals, reptiles, amphibians and invertebrates
___ ___ 2. Parcel exhibits connective habitats, corridors, habitat linkages and areas that reduce biological isolation
___ ___ 3. Parcel will provide a functional buffer to protect a core habitat or corridor

Fish and Wildlife habitat total score _____

E. Known rare, threatened and endangered species. Species to be considered under this criterion are those currently listed by the Natural Heritage Program and those listed in the

Federal Register.
(Maximum score 100 points)

___ ___ 1. Parcel provides habitat supporting the occurrence of rare or endangered species
___ ___ 2. Parcel is within a designated Natural Heritage Area
___ ___ 3. Parcel provides suitable habitat for reoccupation by rare, threatened, or endangered species (either naturally or through translocation)
___ ___ 4. Parcel provides functional buffer to protect habitat for species of concern, species that are significantly rare, or that are on the NC watch list

Endangered species total score _____

F. Known cultural/historical areas (Maximum Score 100 points)

___ ___ 1. Parcel contains forest related cultural resources (i.e., historic forest, historic mill or other forest industry site, etc.)
___ ___ 2. Other historic or archeological resources (e.g., native American sites, battlegrounds, etc.)

Cultural/historic areas total score _____

G. Other ecological values (Maximum score 100 points)

___ ___ 1. Parcel is part of a large block of contiguous forest land
___ ___ 2. Parcel provides a mix of native ecological communities
___ ___ 3. Parcel includes ecological communities which are dwindling in North Carolina
___ ___ 4. Parcel contains late successional growth forests, (natural area)

Other ecological values score _____

Yes No
H. Provides opportunity for continuation of existing traditional forest uses (Maximum score 100 points)

___ ___ 1. Parcel will remain available for timber and other forest products management under a Stewardship Plan
___ ___ 2. Parcel will continue to serve watershed and water filtration roles
___ ___ 3. Parcel will continue to provide fish and wildlife habitat
___ ___ 4. Parcel will continue to provide outdoor recreation opportunities
___ ___ 5. Parcel will continue to provide environmental education opportunities
___ ___ 6. Parcel will continue to provide natural resources based research opportunities

Traditional forest uses total score _____

Yes No

I. Provides the Priority Public Benefit defined for the Forest Legacy Area where it is located. (Maximum score 150 points)

___ ___ Retains large contiguous blocks of forest (FLAs 1, 2, 3, 4, 5, 6, 7, 8)

___ ___ Protects drinking water supplies (FLAs 1, 2, 3, 4, 6, 8)

___ ___ Provides corridors for wildlife migration (FLAs 1, 2, 3, 4, 5, 6, 7, 8)

___ ___ Protects trout, mussel and/or anadromous fish habitats (FLAs 1, 3, 4, 5, 6, 7, 8)

___ ___ Provides habitat or buffers protected species habitat (FLAs 1, 2, 4, 5, 7, 8)

___ ___ Protects key scenic vistas (FLAs 3, 6, 8)

Priority benefits total score _____

TOTAL SCORE _____

Comments:

Recommendations:

Appendix B. Forest Legacy Area Descriptions

North Carolina Map of Forest Legacy Areas

Area 1: Appalachian Mountains

The HUC12 field has the ID number for the 12-digit HUC, and the HU_12_Name is the unique name of the 12-digit HUC.

HUC_12	HU_12_NAME	ACRES
030501011002	Grassy Creek-Lower Little River	17844
030501010903	Lower Middle Little River	14960
030501010901	Upper Little River	30162
030501011004	Glade Creek-Lower Little River	11309
030501010902	Upper Middle Little River	23621
030501011001	Lambert Fork	9321
030401020105	Patterson Creek	22624
030401010103	Kings Creek	17791
030401020101	Headwaters South Yadkin River	34212
030401020106	Lower Rocky Creek	22795
030401010201	Beaver Creek	13201
030401020104	Upper Rocky Creek	19700
030401010203	Warrior Creek	16515
030401010301	Moravian Creek	15858
030401010206	Community of Ferguson-W Kerr Scott Reservoir	21239
030401020201	Headwaters Hunting Creek	36517
030401010307	Cub Creek-Yadkin River	16832
030401010407	Briar Creek-Yadkin River	9226
030401010204	South Prong Lewis Fork	23252
030401010205	North Prong Lewis Fork	22417
030401010305	Reddies River	22238
030401010406	Roaring River	10413
030401010303	Middle Fork Reddies River-South Fork Reddies River	19168
030401010304	North Fork Reddies River	18277
030401010306	Mulberry Creek	31521
030401010403	West Prong Roaring River	14750
030401010404	Middle Prong Roaring River	27922
050500010207	Naked Creek-South Fork New River	18664
030401010503	Snow Creek	11756
030401010502	South Fork Mitchell River	16103
030401010705	Lower Fisher River	24285
030401010405	East Prong Roaring River	36264
050500010209	Peak Creek-South Fork New River	17584
050500010208	Cranberry Creek	24751
050500010404	Pine Swamp Creek-Little River	14770
030401010504	Lower Mitchell River	22641
030401010702	Upper Fisher River	17316
030401010501	Upper Mitchell River	18730
050500010405	Brush Creek	22091
060101051203	Shut-in Creek-French Broad River	21991
030501010502	Upper Wilson Creek	25774

060101080603	Big Rock Creek	25985
030501010201	Armstrong Creek	18303
060101080301	Headwaters Cane River	25999
050500010204	Old Fields Creek-South Fork New River	15393
060101051201	Meadow Fork	14590
060101051103	Big Pine Creek-French Broad River	25979
060101051101	Walnut Creek	10860
060101050804	Bull Creek	14806
060101050802	Little Ivy Creek	29816
060101080302	Price Creek	14368
030501010403	Lower Warrior Fork	10049
060101080303	Upper Cane River	15563
060101080105	Big Crabtree Creek	15765
030501010402	Irish Creek	22067
060101051001	Upper Big Laurel Creek	22282
060101080203	Lower South Toe River	14732
060101051004	Lower Big Laurel Creek	27198
060101080202	Little Crabtree Creek	13932
060101051003	Lower Shelton Laurel Creek	16187
060101080305	Middle Cane River	20504
030501010506	Lower Johns River	16165
060101080304	Bald Mountain Creek	10130
030501010202	North Fork Catawba River	36054
030501010302	Lower Linville River	14878
060101080104	Grassy Creek-North Toe River	12593
060101080601	Jacks Creek	13392
060101080106	Bear Creek-North Toe River	18608
060101051002	Upper Shelton Laurel Creek	19107
030501010401	Upper Warrior Fork	23781
060101080103	Threemile Creek-North Toe River	24821
060101080205	Pigpen Creek-North Toe River	18269
060101080306	Lower Cane River	14454
030501010504	Lower Wilson Creek	18305
060101080204	Cane Creek	19621
030501010505	Middle Johns River	20501
060101080102	Plumtree Creek-North Toe River	15963
060101080602	Little Rock Creek	14788
060101080604	Hollow Poplar Creek-Nolichucky River	30081
030501010503	Mulberry Creek	26579
060101080101	Headwaters North Toe River	29438
030501010301	Upper Linville River	28375
030401010105	Laytown Creek-Yadkin River	14322
030501010501	Upper Johns River	26796

030401010102	Headwaters Yadkin River	27096
030401010101	Buffalo Creek	21149
060101030201	Upper Elk River	26842
060101030301	Headwaters Watauga River	16804
060101030303	Dutch Creek-Watauga River	19145
050500010201	Headwaters South Fork New River	22411
030401010104	Elk Creek	32340
030401010202	Stony Fork	24223
060101030202	Lower Elk River	26077
050500010202	Meat Camp Creek-South Fork New River	23548
060101030302	Cove Creek	22293
060101030304	Beaverdam Creek	13157
050500010203	Elk Creek-South Fork New River	21191
050500010205	Pine Swamp-South Fork New River	22388
050500010206	Beaver Creek-South Fork New River	26260
050500010101	Three Top Creek	15150
050500010103	Headwaters North Fork New River	26660
050500010106	Upper North Fork New River	32257
060101030102	Roane Creek Upper	25827
060101030104	Roane Creek Lower	34606
060101030305	Beech Creek-Watauga River	41109
060101030403	Little Doe River	21054
060101080605	North Indian Creek	37913
060101030402	Doe River Upper	19417
060101030401	Buck Creek	8731
060101080701	Horse Creek	13858
060101080606	Martin Creek-Nolichucky River	16610
060101080702	Camp Creek	21262
060101080402	Middle South Indian Creek	28144
060101051401	Paint Creek	16022
060101080401	South Indian Creek Upper	11226
060101051402	French Broad River-Wolf Creek	25791
060101051301	Gulf Fork Big Creek	30855
060101051302	Trail Fork Big Creek	20871
060200020601	Dooley Creek-Nottely River	18742
060200030204	Hothouse Creek	16742
060200020602	Rapier Mill Creek-Nottely River	17829
060200020302	Lower Brasstown Creek	33576
060102020306	Fontana Lake-Nantahala River	10675
060101050402	South Fork Mills River	26523
060102040401	Lake Cheoah-Little Tennessee River	23562
060102020503	Hazel Creek	32752
060102030403	Noland Creek	13351

060101050803	Upper Ivy Creek	20439
060102020101	Betty Creek-Headwaters Little Tennessee River	23187
060200020603	Nottely River	10313
060200020703	Lake Cherokee-Persimmon Creek	15931
060200020105	Shooting Creek	32606
060102020102	Middle Creek-Little Tennessee River	29103
060200020404	Lower Valley River	8848
060200020702	Grape Creek-Hiwassee Lake	22912
060102020103	Coweeta Creek-Little Tennessee River	21633
060102020302	Headwaters Nantahala River	23559
060200020202	Fires Creek	14866
060102020104	Upper Cartoogechaye Creek	14903
030601010102	Toxaway River-Lake Jocassee	16111
060102020105	Lower Cartoogechaye Creek	21853
060200020903	Shuler Creek	12250
060102020203	Lower Cullasaja River	24152
060200020401	Headwaters Valley River	26541
060102030102	Thorpe Lake-West Fork Tuckasegee River	23517
060101050102	West Fork French Broad River	18958
060102020401	Lake Emory-Little Tennessee River	27883
060101050105	Cherryfield Creek-French Broad River	14192
060102020403	Burningtown Creek	17080
060101050201	Carson Creek-French Broad River	12623
060102040104	West Buffalo Creek	10625
060102020402	Cowee Creek	16564
060102030104	Cedar Cliff Lake-Tuckasegee River	26689
060102040102	Sweetwater Creek	9013
060101050203	Williamson Creek-French Broad River	14890
060102030101	Wolf Creek-Tuckasegee River	27691
060102030301	Savannah Creek	26219
030501050402	Cane Creek	16195
060102040107	Yellow Creek-Cheoah River	26407
060101050202	Davidson River	30181
060102030303	Scott Creek-Tuckasegee River	10586
030501050103	Cove Creek-Green River	25471
030501050501	Richardson Creek-Broad River	29716
060102030304	Conley Creek-Tuckasegee River	35066
060102020505	Lower Fontana Lake-Little Tennessee River	28273
060101060101	Lake Logan-West Fork Pigeon River	21152
060102030302	Headwaters Scott Creek	32615
060101050403	Mills River	20437
060101060103	East Fork Pigeon River	33874
030501050201	Walnut Creek	11335

060102030402	Kirkland Creek-Tuckasegee River	13087
060101050302	Clear Creek	28782
060101060203	Upper Johnathans Creek	22397
030501050701	Brushy Creek	18565
060102030401	Deep Creek	28192
030501050302	Hickory Creek-Broad River	17695
030501050303	Lake Lure-Broad River	16800
030501050604	Hinton Creek	12878
030501050304	Cedar Creek	16496
060102030202	Upper Raven Fork	14817
030501050301	Headwaters Broad River	25827
060101060301	Upper Cataloochee Creek	27558
060101060205	Crabtree Creek-Pigeon River	29952
030501050603	Wards Creek-First Broad River	24748
030501050601	Headwaters First Broad River	20844
060101060303	Walters Lake-Pigeon River	28333
060101050602	Upper Swannanoa River	14183
060101060304	Big Creek	23266
030501010102	Headwaters Catawba River	23971
060101050906	Sandymush Creek	31437
060101060305	Cold Springs Creek-Pigeon River	28333
060101050601	North Fork Swannanoa River	20316
030501010602	South Muddy Creek	25459
030501010603	North Muddy Creek-Muddy Creek	15954
060101050801	Dillingham Creek	18364
030501020101	Upper Henry Fork	33992
030501010104	Buck Creek	16435
060101051202	Spring Creek	31342
030501090203	Middle Saluda River	31502
030501051201	Upper North Pacolet River	28603
060102040403	Chilhowee Lake	31602
060102040402	Slick Rock Creek	10465
060102040305	Tellico River Upper	40877
060102040301	North River	11916
060102040303	Tellico River Headwaters	20771
060102040302	Bald River	13867
060200020902	Apalachia Lake-Hiwassee River	19623
060102020405	Brush Creek-Little Tennessee River	17496
060200020203	Sweetwater Creek-Hiwassee River	27748
060200020901	South Shoal Creek	12412
060200020303	Fall Branch-Hiwassee River	15484
060102020301	Buck Creek	9685
060200020705	Hiwassee Lake-Hiwassee River	15938

060200020201	Tusquitee Creek	27433
060102020201	Upper Cullasaja River	21905
030601010104	Whitewater River	31928
060200020403	Middle Valley River	13523
030601010202	Eastatoe Creek	31814
060102020106	Skeenah Creek-Little Tennessee River	16378
060200020701	Hanging Dog Creek	26091
060200020704	Beaverdam Creek	19508
060102020303	Nantahala Lake-Nantahala River	25026
030601010103	Horsepasture River	22943
060200020402	Upper Valley River	26034
030601010101	Lake Toxaway-Headwaters Toxaway River	15661
060101050103	East Fork French Broad River	16546
060102020202	Ellijay Creek	13206
060102020304	Whiteoak Creek-Nantahala River	28363
060102040101	Tulula Creek	18349
060102030103	Trout Creek-West Fork Tuckasegee River	13715
060102040103	Snowbird Creek	29950
060101050204	Upper Little River	26472
060102020404	Tellico Creek-Little Tennessee River	19871
060101050104	Catheys Creek	9258
060102020305	Big Creek-Nantahala River	14894
060102040105	Santeetlah Creek	20916
060102030106	Cullowhee Creek	15017
030501050101	Lake Summit-Green River	26992
060101050205	Lower Little River	12079
060102040106	Santeetlah Lake	22450
060101050101	North Fork French Broad River	24193
030501050305	Upper Cove Creek	27449
030501010303	Lake James-Catawba River	33788
060102030107	Wayehutta Creek-Tuckasegee River	12973
060102020502	Stecoah Creek	11875
060102020501	Panther Creek	14790
060102020406	Alarka Creek	22431
030501050506	Suck Creek-Broad River	23414
060102030105	Caney Fork	32864
060102020407	Upper Fontana Lake-Little Tennessee River	8984
060101050401	Boylston Creek	9889
060102030405	Fontana Lake-Tuckasegee River	18563
030501050104	Lake Adger-Green River	21247
030501050102	Hungry River	13725
060101060201	Upper Richland Creek	22753
030501050204	Wheat Creek-Green River	24137

030501050704	Beaverdam Creek	15190
060102030206	Soco Creek	28830
060101060102	Little East Fork Pigeon River-West Fork Pigeon River	20234
060101050702	Hoopers Creek	10247
060102030207	Lower Oconaluftee River	17839
030501050308	Knob Creek-Broad River	22239
030501050306	Lower Cove Creek	7532
060102030205	Lower Raven Fork	17181
060101050501	South Hominy Creek	24611
060101050705	Bent Creek-French Broad River	23831
060102030203	Bradley Fork	12742
060101050701	Upper Cane Creek	27388
030501050401	Big Camp Creek	12343
060102030201	Straight Fork Raven Fork	15586
060101060302	Lower Cataloochee Creek	11661
030501050602	Brier Creek-First Broad River	20109
030501050404	Headwaters Second Broad River	29026
030501010103	Crooked Creek	22653
060101050603	Middle Swannanoa River	25293
060101050903	Reems Creek	23313
030501020201	Upper Jacob Fork	27909
030501010101	Curtis Creek	10922
030501010604	Upper Silver Creek	17185
060101051102	Little Pine Creek-French Broad River	24106
060101080201	Upper South Toe River	27646
030501010801	McGalliard Creek-Rhodhiss Lake	30408
030501090101	Upper North Saluda River	16267
030501090102	Lower North Saluda River	32163
030501090202	Upper South Saluda River	35169
060102040404	Citico Creek	45619
030601020101	Headwaters Tallulah River	19730
030601020204	Reed Creek-Chattooga River	24550
030601020202	Headwaters West Fork Chattooga River	28024
030601020201	Headwaters Chattoga River	17957
060200020905	Coker Creek	15603
060200020907	Towee Creek-Hiwassee River	35182
060200020904	Turtletown Creek	22504
060200030208	North Potato Creek	12771
060200030201	Wolf Creek-Toccoa River	31200
050500010403	Brush Creek-New River	23865
050500010302	Grassy Creek-New River	15487
030401010701	Headwaters Fisher River	22062

050500010109	Lower North Fork New River	8743
050500010210	Prather Creek-South Fork New River	17947
050500010401	Elk Creek-New River	24605
050500010407	Crab Creek-Little River	18594
030401010804	Headwaters Stewarts Creek	22593
050500010406	Glade Creek-Little River	23311
050500010108	Helton Creek	28954
050500010107	Middle North Fork New River	17843
050500010105	Big Horse Creek	22648
060101020202	Elliot Branch-Laurel Creek	26260
050500010102	Big Laurel Creek	18661
050500010104	Little Horse Creek	13508
050500010301	Wilson Creek	23423
030401010302	Town of Wilkesboro-Yadkin River	11039
030401010401	Fishing Creek	11537
030401010402	Rock Creek-Yadkin River	7600
060101060402	Pigeon River-Cripple Creek	24405
060200020106	Chatuge Lake	17483
030501010106	Toms Creek-Catawba River	17337
030501050503	Big Horse Creek-Broad River	16039
030501010105	Mackey Creek-Catawba River	24641
060102020504	Eagle Creek	19329
060102030404	Forney Creek	19236
060102030204	Upper Oconaluftee River	13271
030501010601	North Muddy Creek	21692
050500010305	Bridle Creek-New River	16266
030401010703	Little Fisher River	24529
050500010603	Chestnut Creek	39005

Area 2. Northern Tier/Roanoke River/ Great Dismal Swamp

HUC_12	HU_12_NAME	ACRES
030101030107	Double Creek	8464
030101030302	Town Fork Creek-Dan River	17072
030101070503	Coniott Creek-Roanoke River	13378
030201010801	Flat Rock Branch-Swift Creek	21331
030201010802	White Oak Swamp	12640
030101070903	Town of Plymouth-Roanoke River	26843
030201040302	Van Swamp	13982
030401011007	Bashavia Creek-Yadkin River	30343
030101070404	Outlet Hardison Mill Creek	15990

030102030205	Cole Creek-Sarem Creek	20895
030202020403	Creeping Swamp	20216
030201030605	Town of Grimesland-Tar River	25615
030201030401	Tyson Creek-Tar River	22854
030201040104	Beaverdam Swamp	10675
030201030506	Aggie Run	29343
030201030505	Middle Tranters Creek	21970
030201040601	Acre Swamp-Pungo Swamp	27306
030201030402	Johnsons Mill Run	17424
030401011202	Forbush Creek	17564
030101070403	Headwaters Hardison Mill Creek	29093
030201030204	Town of Falkland-Tar River	12642
030202010502	Lick Creek	13947
030201010603	Biddie Toe Creek-Tar River	20158
030101070401	Headwaters Sweetwater Creek	8841
030102051003	North River	47162
030102050301	Great Dismal Swamp-Headwaters Perquimmans River	24514
030102030503	Merchants Millpond-Bennetts Creek	11207
030102030504	Bennetts Creek	19261
030202010701	Richland Creek	9052
030102050805	Swan Creek Lake-Swan Creek	9561
030202010302	Sevenmile Creek-Eno River	25120
030101070601	Gardener Creek	26132
030201050302	Pains Bay-Long Shoal River	31224
030201030202	Town Creek-Tar River	19716
030201010405	Town of Bunn-Tar River	11524
030401011302	Headwaters Muddy Creek	22398
030202010304	Crooked Creek-Eno River	26361
030202010303	Stony Creek-Eno River	30514
030101070405	Outlet Sweetwater Creek	10293
030202010601	New Light Creek	14096
030201010602	Turkey Creek	11198
030401011005	Little Yadkin River	18870
030102050803	Gum Neck Creek-Alligator River	17409
030201010402	Lower Cedar Creek	11432
030102050807	Grapevine Bay-Alligator River	23109
030101030204	Lick Creek-Lower Town Fork Creek	14349
030401011006	Grassy Creek-Yadkin River	24683
030101070901	Welch Creek	18098
030102050802	Southwest Fork-Northwest Fork Alligator River	35331
030201010401	Upper Cedar Creek	30180
030102050806	Whipping Creek Lake-Whipping Creek	23230

030101070508	Lower Conoho Creek	22173
030202010202	South Fork Little River	25041
030101070603	Broad Creek-Roanoke River	16469
030102051504	Stumpy Point Bay-Pamlico Sound	40785
030201010501	Peachtree Creek-Boddies Millpond	30271
030101070602	Devils Gut-Roanoke River	30018
030202010402	Lower Knap of Reeds Creek	12045
030202010503	Beaverdam Creek	33613
030102050103	Headwaters Kendrick Creek	24765
030202010203	Mountain Creek-Little River	21043
030401011003	West Prong Little Yadkin River	10990
030202010201	North Fork Little River	21034
030101070509	City of Williamston-Roanoke River	15369
030102050809	Stumpy Point-Alligator River	37003
030101070502	Town of Hamilton-Roanoke River	11824
030101070807	Broad Creek-Cashie River	8234
030201010704	Red Bud Creek	12136
030101030108	Vade Macum Creek	11166
030202010104	Lake Michie-Flat River	26422
030101070803	Outlet Roquist Creek	18490
030101070806	Swamp Creek-Cashie River	12131
030201010303	Bear Swamp Creek-Tar River	21155
030201010803	Moccasin Creek-Swift Creek	37086
030201020606	Outlet Fishing Creek	17637
030201010706	Lower Sandy Creek	12416
030201010204	Middle Creek-Tar River	33206
030202010401	Upper Knap of Reeds Creek	18373
030201020501	Beaverdam Swamp	11944
030201010106	Aycock Creek-Tar River	19695
030102050901	Sawyer Lake-Milltail Creek	31968
030401010902	Toms Creek	24602
030202010102	South Flat River	36181
030101070805	Wading Place Creek	17199
030201010705	Middle Sandy Creek	33446
030102050903	Goose Creek-Alligator River	28949
030101030109	Flat Shoals Creek-Dan River	28244
030201010301	Kings Creek-Tar River	18998
030102050902	Second Creek	27626
030101030504	Rock House Creek-Dan River	26960
030102050206	Riders Creek-Scuppernong River	30463
030101070305	Blue Hole Swamp-Roanoke River	27335
030102050207	Bull Creek-Deep Creek	28053
030201020504	Town of Bricks-Fishing Creek	23843

030101040201	South Country Line Creek	28426
030101030106	Big Creek	28634
030201010302	Lynch Creek	22587
030101030305	Beaver Island Creek	24780
030201020503	Town of Hickory-Fishing Creek	17085
030201010105	Rocky Creek-Tar River	28125
030101040104	Upper Hogans Creek	29155
030201020104	Lower Shocco Creek	17839
030101040202	Upper Country Line Creek	35469
030101070802	Headwaters Roquist Creek	23675
030201010101	Cub Creek	10978
030101040504	Middle South Hyco Creek	17530
030101070501	Indian Creek	20517
030201020102	Little Shocco Creek	9051
030201020304	Crooked Swamp-Fishing Creek	25383
030101030409	Town of Mayodan-Mayo River	18831
030102050904	Little Alligator River	26676
030202010103	Deep Creek	23601
030201020206	Lower Little Fishing Creek	15058
030201010703	Upper Sandy Creek	13921
030102050907	Lewis Point-Albemarle Sound	9533
030201010203	Tabbs Creek	26083
030101040502	Hyco Creek	36344
030201010202	Ruin Creek	19371
030201010104	North Fork Tar River	14455
030101070302	Flag Run Gut-Roanoke River	14359
030101040501	Reedy Fork	10257
030201010201	Fishing Creek	30051
030201020103	Middle Shocco Creek	15528
030102030703	Cricket Swamp	8119
030201010103	Shelton Creek	16158
030201010102	Headwaters Tar River	17115
030101070801	Hoggard Mill Creek	31110
030101040108	Rattlesnake Creek	15662
030101070205	Looking Glass Run	10566
030201020303	Maple Branch-Fishing Creek	31234
030101040506	Hyco Creek-Hyco Lake	13216
030101040107	Lower Moon Creek	11306
030201020205	Middle Little Fishing Creek	20867
030101040604	Headwaters Mayo Creek	21397
030101070203	Headwaters Conoconnara Swamp	23387
030201020502	Bellamy Lake-Rocky Swamp	25476
030201020302	Possumquarter Creek-Fishing Creek	20744

030101020801	Little Grassy Creek	15466
030101020802	Mountain Creek-Grassy Creek	23582
030201020202	Reedy Creek	22558
030201020203	Upper Little Fishing Creek	22471
030201020201	Bens Creek	10375
030201020401	Upper Marsh Swamp	18910
030102040803	Headwaters Urahaw Swamp	17054
030201020204	Bear Swamp	28720
030101020901	Little Island Creek	13558
030102030404	Chinkapin Creek	15599
030101070105	Occoneechee Neck-Roanoke River	20229
030101060403	Deep Creek	18752
030102050709	Pasquotank River	12328
030102030405	Wiccacon River	19881
030102030603	Holiday Island-Chowan River	20398
030101070201	Occoneechee Creek	17449
030101070202	Gumberry Swamp	22729
030101070103	Arthurs Creek-Roanoke River	18052
030102030206	Sarem Creek-Chowan River	19777
030102030601	Trotman Creek	16972
030102030203	Beasley Branch-Buckhorn Creek	11073
030102030502	Raynor Swamp	12993
030102051002	Great Swamp-North River	32282
030102030204	Headwaters Cole Creek	21111
030102050701	Folly Swamp	30245
030102051107	Tull Creek	16502
030101030105	Peters Creek-Dan River	26180
030101030404	Crooked Creek-Lower South Mayo River	25425
030101030902	Cascade Creek	27012
030101030103	Little Dan River	20611
030102040706	Mill Swamp-Fontaine Creek	36334
030101030408	Pawpaw Creek-Mayo River	19924
030101030301	Snow Creek	28004
030101040701	Headwaters Aarons Creek	18007
030401010801	Headwaters Ararat River	25677
030101060302	Great Creek-Lake Gaston	24748
030101030102	Archies Creek-Dan River	24659
030101030407	Koger Creek-North Mayo River	33906
030101030104	Elk Creek-Dan River	12423
030102040901	Cypress Creek	19703
030102020505	Union Camp Holding Pond-Blackwater River	24956
030102030202	Town of Winton-Chowan River	15090
030102050606	Cross Canal-Dismal Swamp Canal	29416

030101040601	After Bay Reservoir-Hyco River	14368
030101040203	Lower Country Line Creek	24818
030102051102	Culpeper Island-Dismal Swamp	12698
030101060303	Sixpound Creek	11406
030101020805	Beaver Pond Creek North-Grassy Creek	12039
030101040109	Cane Creek-Dan River	25015
030101040607	Big Bluewing Creek	16909
030102040902	Buckhorn Swamp-Meherrin River	27565
030102040705	Jacks Swamp	15285
030102040904	Lower Tarrara Creek	13331
030101020806	Beaver Pond Creek South-Grassy Creek	11696
030102030501	Duke Swamp	27996
030101040702	Aarons Creek-John H Kerr Reserrvoir	25145
030101020803	Beech Creek-Johnson Creek	23363
030101020804	Spewmarrow Creek-Grassy Creek	16005
030101060301	Hawtree Creek	16915
030101040105	Lower Hogans Creek	24769
030102030103	March Swamp-Somerton Creek	31614
030101020902	Island Creek	32497
030102011206	Round Gut-Nottoway River	24989
030101040603	Bowes Branch-Hyco River	16903
030102051104	Indian Creek-Northwest River	16371
030102030201	Buckhorn Creek	10328
030102011205	Mill Creek	24132
030102040908	Town of Murfreesboro-Meherrin River	20769
030102050804	Winn Bay-Alligator River	17416
030201010904	Penders Mill Run-Tar River	21851
030201010601	Lake Sagamore-Cyprus Creek	20221
030102050808	The Frying Pan-The Straights	27031
030101070902	Conaby Creek	17160
030201010304	Jumping Run-Tar River	25545
030201020601	Maple Swamp	11661
030101030502	Jacobs Creek	24027
030101030306	Reed Creek-Dan River	25839
030102050104	Outlet Kendrick Creek	31839
030101070804	Town of Windsor-Cashie River	13430
030101040503	Upper South Hyco Creek	18570
030102050106	Town of Skinnersville-Chapel Swamp	13394
030201010702	Devils Cradle Creek	9657
030101030503	Massy Creek-Dan River	17462
030202010101	North Flat River	25704
030101070303	Cypress Swamp	14385
030201020405	Cow Haul Swamp-Beech Swamp	29129

030201020602	Town of Dawson Crossroads	7922
030201020603	Upper Deep Creek	9127
030101030901	Town Creek-Dan River	22544
030201020404	Burnt Coat Swamp-Beech Swamp	24690
030101040505	Lower South Hyco Creek	15959
030101030905	Lower Wolf Island Creek	25982
030101070301	Sandy Run-Roanoke River	20198
030201020402	Beaverdam Swamp	19734
030101070204	Outlet Conoconnara Swamp	12247
030101040602	Storys Creek	27201
030201020403	Lower Marsh Swamp	21390
030101070206	Bridgers Creek-Roanoke River	21826
030102040802	Headwaters Potecasi Creek	24495
030102040906	Rogers Swamp-Corduroy Swamp	27551
030102050702	Newland Drainage Canal	32584
030102051105	Moyock Run	9707
030101030505	Matrimony Creek-Dan River	35679
030101030903	Trotters Creek-Dan River	27785
030101040605	Mayo Creek-Mayo Reservoir	17539
030101030906	Danville-Dan River	12177
030102051108	Tull Bay-Northwest River	11749
030102051206	Milldam Creek-North Landing River	14494
030102051103	US Naval Reservation-Northwest River	31139
030102040905	Barretts Crossroads-Meherrin River	27286
030401010904	Outlet Ararat River	17454
030101040106	Upper Moon Creek	20233
030401011201	Logan Creek	16915
030201030603	Headwaters Chicod Creek	16390
030201030606	Tranters Creek-Tar River	12897
030201030602	Outlet Grindle Creek	22742
030201030203	Otter Creek	31489
030202010504	Little Lick Creek-Neuse River	19822

Area 3. Waccamaw/ Cape Fear Arch/ Onslow Bight

HUC_12	HU_12_NAME	ACRES
030402080201	Upper Shallotte River	9136
030402080107	Town of Long Beach-Montgomery Slough	7610
030402060702	Big Creek-Waccamaw River	22415
030402060703	Buck Creek	35623
030402080202	Middle Shallotte River	12294
030402080105	Mill Creek	8014

030402060605	Regan Branch-Waccamaw River	8272
030300050802	Jump and Run Creek-Gully Creek	16444
030402060603	Wet Ash Swamp	19766
030300050801	Walden Creek	7588
030402060604	Bear Branch-Waccamaw River	8145
030402060506	Grissett Swamp-Seven Creeks	13162
030402080104	Scotts Branch-Lockwoods Folly River	11221
030402080103	Royal Oak Swamp	20178
030402080101	Middle Swamp	17975
030300050703	Orton Creek	13234
030402060404	Alligator Swamp	9304
030402080102	Headwaters Lockwoods Folly River	11633
030402060602	Gore Lake-Gore Creek	21879
030300050701	Liliput Creek	15875
030402060601	Horse Pen Swamp-Waccamaw River	14505
030402060403	Upper Juniper Creek	33617
030402060401	Bear Pen Islands Swamp	9459
030300050602	Bell Swamp-Rice Creek	28958
030300050502	Town of Woodburn-Sturgeon Creek	10143
030300050503	Brunswick River-Cape Fear River	18254
030402060303	Green Swamp-Big Creek	28017
030300050302	Middle Livingston Creek	17637
030402031103	Lower Porter Swamp	25426
030300050303	Lower Livingston Creek	18229
030402060305	Bogue Swamp	24937
030300050406	Hood Creek	26939
030300050204	Middle Turnbull Creek	13903
030300060802	Canty Mill Creek-Black River	17058
030402060405	Lower Juniper Creek	29279
030402031404	Lumber River	21401
030402060402	Honey Island Swamp	25520
030300060801	Clear Run-Black River	15390
030300070605	Angola Creek	16838
030300060408	Turtle Branch-Great Coharie Creek	11170
030300070604	Upper Holly Shelter Creek	17651
030300060206	Peters Creek-South River	21409
030300060506	Lower Stewarts Creek	14548
030202040404	Northwest Creek-Neuse River	15919
030402031104	Flowers Swamp-Lumber River	24452
030300050501	Indian Creek-Cape Fear River	18164
030300050407	Grist Mill Branch-Cape Fear River	10537
030402060302	Slap Swamp	10938
030300070809	Ness Creek-Northeast Cape Fear River	17715
030402060301	Sasspan Branch-Boggy Branch	27921
030300050405	Mitchell Landing-Cape Fear River	20187
030300070807	Prince George Creek-Northeast Cape Fear River	20474
030402030904	Brier Creek-Big Swamp	18772
030300060807	Cross Way Creek-Black River	13578
030300050403	Carvers Creek	13672
030300070705	Lower Long Creek	13709

030300060806	Lyon Creek	27705
030402031005	River Swamp-Lumber River	13009
030402060103	Elkton Swamp	26271
030300070806	Turkey Creek	9315
030402030902	Peters Branch-Big Swamp	12287
030300070805	Island Creek-Northeast Cape Fear River	24429
030300060704	Lower Moores Creek	12225
030300070803	Trumpeter Swamp	12809
030402031003	Jacob Swamp-Lumber River	17138
030300050401	Hammond Creek	22686
030300050402	Frenchs Creek-Cape Fear River	27225
030300070704	Middle Long Creek	18495
030300060603	Lower Colly Creek	25879
030300070804	Harrisons Creek	23433
030300070703	Rileys Creek	21117
030300060805	Rowan Creek-Black River	26201
030300060804	Colvins Creek	13427
030300070802	Pike Creek-Northeast Cape Fear River	34936
030300060703	Middle Moores Creek	20620
030300060602	Middle Colly Creek	25695
030300050206	White Lake-Cape Fear River	19631
030300060701	White Oak Branch	12659
030300070610	Ashes Creek	21209
030300070801	Burgaw Creek	19660
030300050205	Lower Turnbull Creek	21187
030300070607	Middle Shaken Creek	22963
030300070701	Bee Branch-Cypress Creek	13945
030300070608	Lower Shaken Creek	11230
030300070606	Upper Shaken Creek	20016
030402030705	Lewis Mill Branch-Big Swamp	13924
030300070702	Upper Long Creek	22653
030300060803	Kings Branch-Black River	22499
030300060702	Upper Moores Creek	13400
030402030703	Goodman Swamp	12550
030300060208	Lake Creek-South River	34298
030300070609	Lower Holly Shelter Creek	16451
030300060601	Upper Colly Creek	26250
030203020209	Stones Creek	7641
030203010103	Black Swamp Creek	22402
030203010106	Black Swamp Creek-White Oak River	11511
030202020607	Hog Island-Neuse River	8214
030402060204	Cypress Creek-White Marsh	25414
030300050504	Barnards Creek-Cape Fear River	14319
030300050601	Upper Town Creek	34294
030300050603	Lower Town Creek	17585
030402031303	Ashpole Swamp	8669
030402031207	Coward Swamp-Ashpole Swamp	8789
030300050301	Upper Livingston Creek	28745
030402060306	Boggy Swamp-Waccamaw River	27875
030202040501	Goose Creek	23793

030300070611	Lewis Creek-Northeast Cape Fear River	34873
030300050104	Phillips Creek-Cape Fear River	28162
030300060207	Smith Mill Pond Run-South River	23267
030300070503	Lower Doctors Creek	20861
030300070603	Shelter Swamp Creek	31806
030300060205	Cypress Creek	12046
030300070502	Upper Doctors Creek	14686
030300070602	Headwaters Sandy Run Swamp	17044
030300050201	Ellis Creek	35249
030300070601	Angola Swamp	31400
030300060510	Tarkill Branch-Six Runs Creek	12424
030300050203	Upper Turnbull Creek	21411
030300070501	Duff Creek	13426
030203020206	Wallace Creek	13320
030300070401	Ninemile Creek	11532
030300070405	Oakie Branch-Northeast Cape Fear River	22039
030300050103	Harrison Creek	31171
030300060509	Quewhiffle Creek-Six Runs Creek	16639
030300070403	Cypress Creek	22327
030300070504	Upper Rockfish Creek	30981
030300060204	Beaver Dam Creek	16439
030300060305	Rattlesnake Branch-Little Coharie Creek	20507
030300060203	Gum Swamp-South River	17204
030203020204	Headwaters Southwest Creek	17029
030203020202	Little Northeast Creek	14999
030203010201	Grants Creek	8660
030300070305	Maxwell Creek-Stocking Head Creek	22353
030203010203	Mulberry Creek-White Oak River	8515
030300070402	Back Swamp	23361
030203010204	Hadnet Creek	11427
030203020201	Wolf Swamp-Northeast Creek	21334
030203010104	Starkys Creek	9870
030203010401	Upper Newport River	21381
030203020104	Blue Creek-New River	39327
030300070307	Persimmon Branch-Northeast Cape Fear River	26683
030203010105	Holston Creek	9751
030203010402	Middle Newport River	24602
030203010403	Black Creek	8540
030203020103	Cowhorn Swamp-New River	18267
030203010404	Harlowe Creek	7959
030203010202	Hunters Creek	21766
030203010405	Core Creek	8079
030300070206	Dark Branch-Northeast Cape Fear River	12181
030203010101	Headwaters White Oak River	17332
030203010102	Town of Maysville-White Oak River	20289
030203010602	Great Island-Horse Island	10082
030202040504	Cherry Point-Hancock Creek	18155
030300070105	Lower Goshen Swamp	23273
030202040602	Clubfoot Creek	23611
030202040103	Outlet Tuckahoe Swamp	21338

030202040301	Mill Creek	23049
030202040105	Town of Comfort-Trent River	35131
030201050402	Styron Bay-Cedar Inlet	23375
030202040303	Headwaters Brice Creek	28772
030202040502	Cherry Point Marine Corps Air Station-Slocum Creek	37612
030202040604	Adams Creek	35299
030202040201	Chinquapin Branch	11857
030202040104	Joshua Creek-Trent River	12636
030202040701	South River	33065
030202040901	West Thorofare Bay-Long Bay	25622
030202040302	Island Creek-Trent River	26684
030202040204	Town of Trenton-Trent River	43012
030202040203	Health Mill Run-Beaver Creek	13686
030202040503	Beard Creek	17390
030202020605	Headwaters Bachelor Creek	23570
030202020601	Headwaters Core Creek	20898
030202040403	Outlet Upper Broad Creek	11606
030202040704	Turnagain Bay-Rattan Bay	21365
030202040402	Headwaters Upper Broad Creek	19639
030202040801	Upper Bay River	26415
030202020602	Outlet Core Creek	26615
030202020604	Pinetree Creek-Neuse River	21063
030202020306	Mosley Creek	31867
030202020506	Swift Creek	16940
030202020504	Headwaters Little Swift Creek	25490
030201040205	Headwaters South Creek	25919
030202020603	Halfmoon Creek-Neuse River	31962
030202020505	Fisher Swamp-Little Swift Creek	18356
030202020502	Mauls Swamp	10746
030201040202	Headwaters Durham Creek	24964
030201040701	Campbell Creek-Goose Creek	33998
030201040106	Headwaters Blounts Creek	27766
030201040203	Outlet Durham Creek	13917
030201040109	Duck Creek-Pamlico River	25394
030201040108	Goose Creek	9568
030402060704	Bellamy Branch-Waccamaw River	13189
030402060701	Cawcaw Swamp	25907
030300070505	Sills Creek	14359
030300050404	Weyman Creek	16516
030402030802	Jackson Swamp-Big Swamp	27591
030402030704	Bryan Millpond-Black Swamp	7997
030202040206	Town of Pollocksville-Trent River	17523
030202040106	Little Chinquapin Branch-Trent River	8532
030202040304	Outlet Brice Creek	13661
030202040205	Beaverdam Creek-Trent River	22898
030202040305	City of New Bern-Trent River	14458
030202020606	Outlet Bachelor Creek	16387
030202040401	City of New Bern-Neuse River	14210
030402060304	Lake Waccamaw	10125

Area 4. Sandhills/Uwharries/Triassic Basin

HUC_12	HU_12_NAME	ACRES
030401040104	Goulds Fork	16201
030402040101	Headwaters Gum Swamp Creek	21542
030402030301	Town of Wagram-Lumber River	20658
030401040105	Lower Brown Creek	30032
030402010301	Cartledge Creek	19543
030401040503	Savannah Creek	9125
030402030203	Big Muddy Lake-Big Muddy Creek	12465
030300030303	Lower Mclendons Creek	19772
030401030503	Barnes Creek	15414
030401030605	Beaverdam Creek-Yadkin River	42390
030300030601	Big Govenors Creek	26153
030402010402	Headwaters Thompson Creek	26769
030402030403	Mill Branch-Lumber River	13925
030402010306	Whortleberry Creek-Pee Dee River	10209
030402010502	Whites Creek	19762
030402010401	Deadfall Creek	20139
030402010303	Mill Creek	12244
030402010506	Crooked Creek-Lake Wallace	37244
030402030303	Town of Maxton-Lumber River	14950
030402010302	Solomons Creek	15141
030401040102	Upper Brown Creek	26054
030402040102	Richmond Mill Lake-Upper Gum Swamp Creek	13327
030402040103	Joes Creek	21755
030402010305	Everetts Lake-Marks Creek	29287
030402010203	Williams Mill Creek-Jones Creek	17998
030300040703	Carvers Creek	10835
030300040706	City of Fayetteville-Cape Fear River	18506
030300040304	James Creek	21809
030401040203	Pee Dee River-Lake Tillery	34639
030401030602	Cabin Creek	13254
030402040303	Headwaters Shoe Heel Creek	14010
030402030504	Middle Raft Swamp	24711
030402010304	Island Creek-Pee Dee River	29795
030401040103	Middle Brown Creek	28697
030402040301	Jordan Creek	12388
030402040302	Juniper Creek	23608
030402030603	Upper Big Marsh Swamp	15950
030401040501	Cedar Creek	9888
030402010102	Upper Hitchcock Creek	28323
030401040506	Pee Dee River-Blewett Falls Lake	25058
030401050706	Cribs Creek	12473
030300040604	Upper Rockfish Creek	18504
030402030206	Lower Drowning Creek	34143
030401040502	Dry Creek-Pee Dee River	14296

030402030204	Middle Drowning Creek	11214
030402010101	Rocky Fork Creek	24944
030401040205	Leak Island-Pee Dee River	21453
030401040504	Little Mountain Creek	15423
030402030205	Quewhiffle Creek	14411
030401040403	Buffalo Creek	10024
030402030104	Big Branch-Upper Drowning Creek	16785
030300040605	Upper Puppy Creek	14220
030300040603	Nicholson Creek	12448
030300040601	Juniper Creek	8370
030401040404	Little River	20080
030300040602	Headwaters Rockfish Creek	29460
030402030202	Aberdeen Creek	24075
030402030103	Naked Creek	25026
030402030201	Horse Creek	27846
030401040505	Mountain Creek	32563
030401040402	Big Town Creek-Little River	27580
030300040402	Deep Creek-Little River	11019
030401040401	Cheek Creek	20719
030402030101	Jackson Creek	17555
030300040303	Crystal Lake-Mill Creek	12808
030300040301	Nicks Creek	17645
030402030102	Headwaters Drowning Creek	23711
030401040204	Clarks Creek	21240
030300040403	Hector Creek-Little River	12657
030401040202	Wood Run-Lake Tillery	11358
030300040308	Flat Creek-Little River	25852
030300040302	Thagards Lake-Little River	24796
030401040306	Eury Dam-Little River	31951
030300040404	Muddy Creek	10440
030300040401	Buffalo Creek	12974
030300040702	Town of Lane	11370
030401040305	Rocky Creek	18792
030300040408	Town of Twin Lakes-Little River	19677
030401040201	Mountain Creek	20796
030300040406	Jumping Run Creek	18185
030300030301	Upper Mclendons Creek	28495
030300030402	Upper Cabin Creek	19035
030401030505	Outlet Uwharrie River	20265
030300030403	Lower Cabin Creek	32284
030300040409	Stewarts Creek-Little River	17744
030401040303	Densons Creek	22263
030401030603	Riles Creek	19787
030300030302	Parkwood Branch-Richland Creek	16483
030300030405	Lower Bear Creek	8780
030300030404	Upper Bear Creek	32961
030401040304	Dicks Creek-Little River	20548
030300030406	Grassy Creek-Deep River	11392
030401030604	Tuckertown Reservoir-Yadkin River	24371
030401030504	Crow Creek-Uwharrie River	28957

030401040302	West Fork Little River	23318
030300030401	Fork Creek	30909
030401030502	Hannahs Creek-Uwharrie River	21057
030300030408	Tysons Creek-Deep River	27018
030300030407	Buffalo Creek-Deep River	30939
030401030501	Betty McGees Creek-Uwharrie River	20037
030300030604	Smiths Creek-Deep River	17172
030300030602	Indian Creek	16578
030300030208	Flat Creek-Deep River	21852
030401030405	Taylor Creek	7211
030300040101	Lick Creek	31010
030300040105	Daniels Creek-Cape Fear River	23468
030401040301	Headwaters Little River	29255
030300030605	Cedar Creek	8442
030300040106	Avents Creek-Cape Fear River	23387
030401030601	Lick Creek	21942
030300040502	Hector Creek-Cape Fear River	27434
030300030607	Georges Creek-Deep River	24816
030300030205	Lower Richland Creek	24194
030300030204	Upper Richland Creek	18082
030300040104	Gulf Creek-Cape Fear River	18695
030300030508	Harts Creek-Bear Creek	16818
030401030406	Jackson Creek-Uwharrie River	25516
030401030304	Flat Swamp Creek-High Rock Lake	31161
030300030207	Lower Brush Creek	24970
030300030608	Rocky Branch-Deep River	14483
030300040103	Buckhorn Creek	21347
030300030509	Rocky River	21305
030300030504	Tick Creek-Rocky River	19162
030300020705	Shaddox Creek-Haw River	13658
030300030505	Landrum Creek	11194
030300020703	Roberson Creek	18282
030401030401	Little Uwharrie River	27778
030300030506	Harlands Creek	10095
030300040102	White Oak Creek	29748
030300020704	Stinking Creek-Haw River	15113
030202010901	UpperMiddle Creek	36323
030401030404	Caraway Creek	31270
030401030402	Headwaters Uwharrie River	26444
030300020508	Terrells Creek	18644
030300020702	Pokeberry Creek-Haw River	18550
030300020610	New Hope River-B Everett Jordan Lake	35063
030300020701	Dry Creek-Haw River	22356
030300020509	Terrells Creek-Haw River	19017
030300020607	Morgan Creek	19077
030300020507	Collins Creek	12524
030300020506	Marys Creek-Haw River	18499
030300020606	University Lake	19052
030300020503	Cane Creek	25118
030300020601	Headwaters New Hope Creek	33303

030402010105	Lower Hitchcock Creek	8591
030402010103	Hinson Lake-Falling Creek	15864
030402010104	Middle Hitchcock Creek	13499
030300030507	Headwaters Bear Creek	16270
030401050708	Camp Branch-Rocky River	12719
030401050707	Hardy Creek-Rocky River	25830

Appendix D. Acres planted by cost share program

TABLE *D*-1.—North Carolina acres planted by cost share program (1970-2008)

Fiscal Year	FIP	ACP/EQIP	CRP	FDP	FRRP	FLEP	NCA	CREP	WRP	SIP	FRP	Total
1970*		*										12,357
1971*		*										15,795
1972		*										20,114
1973*		*										15,779
1974*		*										12,781
1975	26,875	1,336										28,211
1976	15,396	488										15,884
1977	24,062	2,002										26,064
1978	21,258	1,485										22,743
1979	22,872	1,622		7,172								31,666
1980	23,365	1,302		17,544								42,211
1981	21,709	1,963		18,124								41,796
1982	14,447	2,731		15,669								32,847
1983	13,033	3,172		14,731								30,936
1984	10,895	1,898		22,170								34,963
1985	13,163	2,900		25,510								41,573
1986	17,446	3,025		23,796								44,267
1987	12,828	3,113	14,807	29,307								60,055
1988	17,397	3,823	29,474	38,723								89,417
1989	17,976	2,738	20,762	36,359			343					78,178
1990	13,934	2,653	12,554	34,192			694					64,027
1991	17,702	2,272	1,714	39,732			785					62,205
1992	20,038	1,281	4,756	38,441			482					64,998
1993	19,218	911	3,130	37,932			820					62,011
1994	22,701	1,496	143	44,730			516		46			69,632
1995	9,938	526	57	51,285			580		54			62,440
1996	9,255	750	1,165	66,286			772					78,228
1997	5,963	531	168	60,583			454		185			67,884
1998	6,489	63	1,561	48,442	15,263		463			452		72,733
1999	4,193	36	1,005	46,441	25,805		676		389	344		78,889
2000	5,248	20	4,669	46,972	12,373		646		656	62		70,646
2001	5,005		13,399	58,595	4,759		1,323	1,777				84,858
2002	2,990		2,209	61,286	864		505	4,146	218			72,218
2003	450	15	774	54,446			339	3,065	392			59,481
2004	169		3,253	52,826		912	311	4,091				61,562
2005	35		1,598	50,273		266	182	2,959			12	55,325
2006		3	1,926	44,597		1,792	648	1,983			1,747	52,696
2007		59	2,941	47,563		1,071	461	722			455	53,272
2008		31	2,320	42,476		2,652	169	356				48,004
Total	416,050	44,245	124,385	1,176,203	59,064	6,693	11,169	19,099	1,940	858	2,214	

Represents no program that year *Prior to cost share, may include small amount of ACP

FIP=Forestry Incentives Program; ACP/EQIP=Agricultural Conservation Program/Environmental Quality Incentives Program; CRP=Conservation Reserve Program; FDP=Forest Development Program: FRRP=Forest Recovery and Rehabilitation Program; FLEP=Forestland Enhancement Program; NCA=NC Agricultural Costshare Program: CREP=Conservation Reserve Enhancement Program; WRP=Wetland Reserves Program; SIP=Stewardship Incentives Program; FRP=Forest Recovery

Appendix E: Game and Priority Species in North Carolina

TABLE *E*-1.—Game Species in North Carolina

Game species	Ecoregion		
	Southern Blue Ridge	Piedmont	Mid-Atlantic Coastal Plain
BIRDS			
Coot, American (*Fulica americana*)		X	X
Crow, American (*Corvus brachyrhynchos*)	X	X	X
Crow, fish (*Corvus ossifragus*)			X
Dove, mourning (*Zenaida macroura*)	X	X	X
Duck, American wigeon (*Anas americana*)		X	X
Duck, black (*Anas rubripes*)	X	X	X
Duck, black scoter (*Melanitta nigra*)			X
Duck, blue-winged teal (*Anas discors*)	X	X	X
Duck, bufflehead (*Bucephala albeola*)	X	X	X
Duck, canvasback (*Aythya valisineria*)	X	X	X
Duck, common eider (*Somateria mollissima*)			X
Duck, common goldeneye (*Bucephala clangula*)		X	X
Duck, common merganser (*Mergus merganser*)	X	X	X
Duck, gadwall (*Anas strepera*)		X	X
Duck, greater scaup (*Aythya marila*)			X
Duck, green-winged teal (*Anas crecca carolinensis*)	X	X	X
Duck, harlequin (*Histrionicus histrionicus*)			X
Duck, hooded merganser (*Lophodytes cucullatus*)	X	X	X
Duck, lesser scaup (*Aythya affinis*)	X	X	X
Duck, long-tailed (*clangula hyemalis*)			X
Duck, mallard (*Anas platyrhynchos*)	X	X	X
Duck, mottled (*Anas fulvigula*)			X
Duck, northern shoveler (*Anas clypeata*)		X	X
Duck, pintail (*Anas acuta*)		X	X
Duck, red-breasted merganser (*Mergus serrator*)		X	X
Duck, redhead (*Aythya americana*)		X	X
Duck, ring-necked (*Aythya collaris*)	X	X	X
Duck, ruddy (*Oxyura jamaicensis*)		X	X
Duck, surf scoter (*Melanitta perspicillata*)			X
Duck, white-winged scoter (*Melanitta fusca deglandi*)			X
Duck, wood (*Aix sponsa*)	X	X	X
Goose, brant (*Branta bernicla*)			X
Goose, Canada (*Branta canadensis*)	X	X	X
Goose, snow (*Chen caerulescens caerulescens*)			X
Grouse, ruffed (*Bonasa umbellus*)	X		
Pheasant, ringnecked (*Phasianus colchicus*)			X
Quail, northern bobwhite (*Colinus virginianus*)	X	X	X
Rail, clapper (*Rallus longirostris*)			X
Rail, Common moorhen (*Gallinula chloropus*)			X
Rail, King (*Rallus elegans*)		X	X
Rail, purple gallinule (*Porphyrio martinica*)			X
Rail, Sora (*Porzana carolina*)	X	X	X
Rail, Virginia (*Rallus limicola*)		X	X
Snipe, common (*Capella gallinago*)	X	X	X
Swan, tundra (*Cygnus columbianus*)			X
Turkey, eastern wild (*Meleagris gallopavo*)	X	X	X
Woodcock, American (Scolopax *minor*)	X	X	X

Game species	Ecoregion		
	Southern	Piedmont	Mid-Atlantic
MAMMALS			
Black bear (*Ursus americanus*)	X	X	X
Bobcat (*Felis rufus*)	X	X	X
Coyote (C*anis latrans*)	X	X	X
Eastern cottontail rabbit (*Sylvilagus floridanus*)	X	X	X
Fox squirrel (*Sciurus niger*)	X	X	X
Gray fox (*Urocyon cinereoargenteus*)	X	X	X
Gray squirrel (*Sciurus carolinensis*)	X	X	X
Groundhog (*Marmota monax*)	X	X	X
Marsh rabbit (*Sylvilagus palustris*)		X	X
Raccoon (*Procyon lotor*)	X	X	X
Red fox (*Vulpes vulpes*)	X	X	X
Red squirrel (*Tamiasciurus hudsonicus*)	X		
Virginia opossum (*Didelphis virginiana*)	X	X	X
White-tailed deer (*Odocoileus virginianus*)	X	X	X
Wild boar (*Sus scrofa*)	X		
FURBEARERS			
Beaver (*Castor canadensis*)	X	X	X
Least weasel (*Mustela nivalis*)	X		
Long-tail weasel (*Mustela frenata*)	X	X	X
Mink (*Mustela vison*)	X	X	X
Muskrat (*Ondatra zibethicus*)	X	X	X
Nutria (*Myocastor coypus*)		X	X
River otter (*Lutra canadensis*)	X	X	X
Spotted Skunk (*Spilogale putorius*)	X		
Striped Skunk (*Mephitis mephitis*)	X	X	X

TABLE *E*-2.—Priority aquatic species in North Carolina

Priority aquatic Species	River Basin															
	HR[1]	LT	FB	WT	NW	SH	BR	CT	YP	RO	CF	NE	TP	CH	PQ	LP	WO
FISH																	
American Brook Lamprey (*Lampetra appendix*)			X														
Atlantic Sturgeon (*Acipenser oxyrhynchus*)										X	X	X	X	X	X		X
Banded Killifish (*Fundulus diaphanus*)										X	X	X	X	X			
Banded Pygmy Sunfish (*Elassoma zonatum*)										X	X	X	X			X	
Banded Sunfish (*Enneacanthus obesus*)										X	X	X	X	X	X	X	X
Bigeye Jumprock (*Scartomyzon ariommus*)										X							
Blackbanded Darter (*Percina nigrofasciata*)						X											
Blackbanded Sunfish (*Enneacanthus chaetodon*)										X	X	X	X	X	X	X	X
Blotched Chub (*Erimystax insignis*)	X		X														
Blotchside Logperch (*Percina burtoni*)		X															
Blotchside Darter (*Percina burtoni*)			X														
Bluefin Killifish (*Lucania goodei*)											X						
Blue Ridge Sculpin (*Cottus caeruleomentum*)										X							
Blueside Darter (*Etheostoma jessiae*)			X														
Bluntnose Minnow (*Pimephales notatus*)	X		X	X	X												
Bridle Shiner (*Notropis bifrenatus*)												X					
Broadtail Madtom (*Noturus n. sp.*)											X					X	
Brook Silverside (*Labidesthes sicculus*)		X															
Cape Fear Shiner (*Notropis mekistocholas*)											X						
Carolina Darter (*Etheostoma collis*)								X	X	X	X	X	X				
Carolina Madtom (*Noturus furiosus*)												X	X				
Carolina Pygmy Sunfish (*Elassoma boehlkei*)																X	
Carolina Redhorse (*Moxostoma sp.*)									X		X						
Comely Shiner (*Notropis amoenus*)										X	X	X	X	X			
Cutlip Minnow (*Exoglossum maxillangua*)										X							

Priority aquatic Species	River Basin																
	HR[1]	LT	FB	WT	NW	SH	BR	CT	YP	RO	CF	NE	TP	CH	PQ	LP	WO
Dollar Sunfish (*Lepomis marginatus*)								X	X		X	X	X			X	
Everglades Pygmy Sunfish (*Elassoma evergladei*)											X					X	
Glassy Darter (*Etheostoma vitreum*)										X		X	X	X			
Highfin Carpsucker (*Carpiodes velifer*)								X	X		X						
"Hiwassee" Greenside Darter (*Etheostoma sp.cf. blenniodes*)	X																
"Hiwassee" Redline Darter (*Etheostoma sp.cf. rufilineatum*)	X																
Ironcolor Shiner (*Notropis chalybaeus*)										X	X	X	X	X	X	X	X
Johnny Darter (*Etheostoma nigrum*)										X		X	X				
Kanawha Darter (*Etheostoma kanawhae*)					X												
Kanawha Minnow (*Phenacobius teretulus*)					X												
Lake Chubsucker (*Erimyzon sucetta*)											X	X	X	X	X	X	X
Lake Phelps Killifish (*Fundulus cf. diaphanus*)															X		
Least Brook Lamprey (*Lampetra aepyptera*)												X	X				
Least Killifish (*Heterandria formosa*)											X						
Lined Topminnow (*Fundulus lineolatus*)									X	X	X	X	X	X		X	X
Logperch (*Percina caprodes*)			X		X												
Longhead Darter (*Percina macrocephala*)			X														
Mimic Shiner (*Notropis volucellus*)		X	X		X							X	X				
Mountain Brook Lamprey (*Ichthyomyzon greeleyi*)	X	X	X														
Mountain Madtom (*Noturus eleutherus*)			X														
Notchlip Redhorse (*Moxostoma collapsum*)							X	X	X	X	X	X	X				
Olive Darter (*Percina squamata*)	X	X	X														
Orangefin Madtom (*Noturus gilberti*)										X							
Pinewoods Darter (*Etheostoma mariae*)																X	
Pinewoods Shiner (*Lythrurus matutinus*)											X	X	X				
Quillback (*Carpiodes cyprinus*)			X				X	X	X	X		X					
River Carpsucker (*Carpiodes carpio*)			X														

Priority aquatic Species	River Basin															
	HR[1]	LT	FB	WT	NW	SH	BR	CT	YP	RO	CF	NE	TP	CH	PQ	LP	WO
Riverweed Darter (*Etheostoma podostemone*)										X							
Roanoke Bass (*Ambloplites cavifrons*)											X	X	X				
Roanoke Hog Sucker (*Hypentelium roanokense*)										X							
Robust Redhorse (*Moxostoma robustum*)									X								
Rosyface Chub (*Hybopsis rubifrons*)						X											
Rosyface Shiner (*Notropis rubellus*)					X												
Rustyside Sucker (*Thoburnia hamiltoni*)										X							
Sailfin Molly (*Poecilia latipinna*)											X					X	
Sandhills Chub (*Semotilus lumbee*)									X		X					X	
Sea Lamprey (*Petromyzon marinus*)											X	X		X	X		
Sharphead Darter (*Etheostoma acuticeps*)			X														
Sharpnose Darter (*Percina oxyrhynchus*)					X												
Shorthead Redhorse (*Moxostoma macrolepidotum*)								X	X	X	X	X	X	X			
Shortnose Sturgeon (*Acipenser brevirostrum*)									X		X			X			
Sicklefin Redhorse (*Moxostoma sp.*)	X	X															
Silver Shiner (*Notropis photogenis*)	X	X	X	X	X												
Smallmouth Buffalo (*Ictiobus bubalus*)			X														
"Smoky" Dace (*Clinostomus funduloides ssp.*)	X	X															
Snail Bullhead (*Ameiurus brunneus*)						X	X	X	X	X	X	X				X	
Spotfin Chub (*Cyprinella monacha*)		X															
Spotted Sunfish (*Lepomis punctatus*)											X					X	
Stonecat (*Noturus flavus*)		X	X														
Striped Shiner (*Luxilis chrysocephalus*)			X														
Taillight Shiner (*Notropis maculatus*)									X		X					X	
Tangerine Darter (*Percina aurantiaca*)	X	X	X	X													
Thinlip Chub (*Cyprinella sp. (cf. zanema)*)									X		X					X	
Tonguetied Minnow (*Exoglossum laurae*)					X												

Priority aquatic Species	River Basin																
	HR[1]	LT	FB	WT	NW	SH	BR	CT	YP	RO	CF	NE	TP	CH	PQ	LP	WO
Turquoise Darter (*Etheostoma inscriptum*)						X											
V-lip Redhorse (*Moxostoma pappillosum*)							X	X	X	X	X	X	X	X			
Waccamaw Darter (*Etheostoma perlongum*)																X	
Waccamaw Killifish (*Fundulus waccamensis*)																X	
Waccamaw Silverside (*Menidia extensa*)																X	
Wounded Darter (*Etheostoma vulneratum*)		X	X														
Yellowfin Shiner (*Notropis lutipinnis*)						X											
MUSSELS																	
Alewife Floater (*Anodonta implicata*)									X	X				X			
Appalachian Elktoe (*Alasmidonta raveneliana*)		X	X														
Atlantic Pigtoe (*Fusconaia masoni*)									X	X	X	X	X				
Barrel Floater (*Anodonta couperiana*)											X						
Box Spike (*Elliptio cistellaeformis*)								X	X		X	X	X			X	
Brook Floater (*Alasmidonta varicosa*)								X	X	X	X	X					
Cape Fear Spike (*Elliptio marsupiobesa*)											X	X				X	
Carolina Creekshell (*Villosa vaughaniana*)								X	X		X						
Carolina Elktoe (*Alasmidonta robusta*)								X	X								
Carolina Fatmucket (*Lampsilis radiata conspicua*)									X			X					
Carolina Heelsplitter (*Lasmigona decorata*)								X	X								
Carolina Slabshell (*Elliptio congaraea*)									X		X	X	X				
Creeper (Squawfoot) (*Strophitus undulatus*)							X		X	X	X	X	X				
Cumberland Bean (*Villosa trabalis*)	X		X														
Dwarf Wedgemussel (*Alasmidonta heterodon*)												X	X				
Eastern Creekshell (*Villosa delumbis*)								X	X		X					X	
Eastern Lampmussel (*Lampsilis radiata radiata*)									X		X	X	X	X		X	
Eastern Pondmussel (*Ligumia nasuta*)									X	X	X		X	X			

Priority aquatic Species	River Basin																
	HR[1]	LT	FB	WT	NW	SH	BR	CT	YP	RO	CF	NE	TP	CH	PQ	LP	WO
Green Floater (*Lasmigona subviridis*)				X	X					X		X	X				
James Spinymussel (*Pleurobema collina*)										X							
Littlewing Pearlymussel (*Pegias fabula*)	X	X															
Longsolid (*Fusconaia subrotunda*)	X	X	X														
Mountain Creekshell (*Villosa vanuxemensis*)	X																
Notched Rainbow (*Villosa constricta*)								X	X	X	X	X	X	X			
Pod Lance (*Elliptio folliculata*)									X		X					X	
Purple Wartyback (*Cyclonaias tuberculata*)					X												
Rainbow (*Villosa iris*)	X	X															
Roanoke Slabshell (*Elliptio roanokensis*)									X	X	X	X	X				
Savannah Lilliput (*Toxolasma pullus*)									X		X						
Slippershell Mussel (*Alasmidonta viridis*)		X	X														
Spike (*Elliptio dilatata*)	X	X			X												
Tar River Spinymussel (*Elliptio steinstansana*)												X	X				
Tennessee Clubshell (*Pleurobema oviforme*)	X	X	X														
Tennessee Heelsplitter (*Lasmigona holstonia*)		X	X														
Tennessee Pigtoe (*Fusconaia barnesiana*)	X	X															
Tidewater Mucket (*Leptodea ochracea*)										X			X	X		X	
Triangle Floater (*Alasmidonta undulata*)									X	X	X	X	X	X			
Variable Spike (*Elliptio icterina*)							X	X	X	X	X	X	X			X	X
Waccamaw Fatmucket (*Lampsilis fullerkati*)																X	
Waccamaw Spike (*Elliptio waccamawensis*)																X	
Wavyrayed Lampmussel (*Lampsilis fasciola*)	X	X	X														
Yellow Lampmussel (*Lampsilis cariosa*)											X	X	X			X	
Yellow Lance (*Elliptio lanceolata*)												X	X				
CRAYFISH																	
Broad River Spiny Crayfish (*Cambarus spicatus*)							X										
Broad River Stream Crayfish (*Cambarus lenati*)							X										

Priority aquatic Species	River Basin																
	HR[1]	LT	FB	WT	NW	SH	BR	CT	YP	RO	CF	NE	TP	CH	PQ	LP	WO
Carolina Ladle Crayfish (*Cambarus davidi*)											X	X					
Chowanoke Crayfish (*Orconectes virginiensis*)										X				X			
Croatan Crayfish (*Procambarus plumimanus*)											X	X					X
Edisto Crayfish (*Procambarus ancylus*)											X					X	
French Broad River Crayfish (*Cambarus reburrus*)		X	X			X											
Greensboro Burrowing Crayfish (*Cambarus catagius*)									X		X						
Hiwassee Crayfish (*Cambarus hiwaseensis*)	X																
Hiwassee Headwaters Crayfish (*Cambarus parrishi*)	X																
Knotty Burrowing Crayfish (*Cambarus nodosus*)	X																
Little Tennessee River Crayfish (*Cambarus georgiae*)		X															
North Carolina spiny crayfish (*Orconectes carolinensis*)												X	X				
No Common Name (*Orconectes sp. cf. spinosus*)		X															
Oconee Stream Crayfish (*Cambarus chaugaensis*)						X											
Sandhills Spiny Crayfish (*Cambarus hystricosus*)											X						
Santee Crayfish (*Procambarus blandingii*)																X	
Spinytail Crayfish (*Cambarus acanthura*)	X																
Tar River crayfish (*Procambarus medialis*)												X	X				
Tuckasegee Stream Crayfish (*Cambarus tuckasegee*)		X															
Waccamaw Crayfish (*Procambarus braswelli*)																X	
SNAILS																	
Christy's Elimia (*Elimia christyi*)	X																
Greenfield Rams-horn (*Helisoma eucosmium*)											X						
Magnificent Rams-horn (*Planorbella magnifica*)											X						
Panhandle pebblesnail (*Somatogyrus virginicus*)												X					
Rotund Mysterysnail (*Viviparus intertextus*)											X	X				X	
Seep Mudalia (*Leptoxis dilatata*)					X												
Smooth Mudalia (*Leptoxis virigata*)	X																

Priority aquatic Species	River Basin															
	HR[1]	LT	FB	WT	NW	SH	BR	CT	YP	RO	CF	NE	TP	CH	PQ	LP	WO
Waccamaw Siltsnail (*Cincinnatia sp.*)																X	
Waccamaw Snail (*Amnicola sp.*)																X	

[1]RIVER BASINS KEY: HR: Hiwassee River Basin, LT: Little Tennessee River Basin, FB: French Broad River Basin, WT: Watauga River Basin, NW: New River Basin, SH: Savannah River Basin, BR: Broad River Basin, CT: Catawba River Basin, YP: Yadin-Pee Dee River Basin, RO: Roanoke River Basin, CF: Cape Fear River Basin, NE: Neuse River Basin, TP: Tar-Pamlico River Basin, CH: Chowan River Basin, PQ: Pasquotank River Basin, LP: Lumber/Lower Pee Dee River Basin, WO: White Oak River Basin,

TABLE *E*-3.—Priority species for the Mid-atlantic Coastal Plain ecoregion

Priority Species	Coastal Plain Ecoregion Habitat Types									
	OPF[1]	CMF	DCW	LLP	POC	WPS	FPF	SWC	TSF	MFS
BIRDS										
American Bittern (*Botaurus lentiginosus*)									X	
American Kestrel (*Falco sparverius*)			X	X		X				
American Woodcock (*Scolopax minor*)							X			
Anhinga (*Anhinga anhinga*)							X		X	
Bachman's Sparrow (*Aimophila aestivalis*)			X	X		X				
Bald Eagle (*Haliaeetus leucocephalus*)							X		X	
Black Rail (*Laterallus jamaicensis*)									X	
Black-necked Stilt (*Himantopus mexicanus*)									X	
Brown-headed Nuthatch (*Sitta pusilla*)			X	X		X				
Cerulean Warbler (*Dendroica cerulea*)							X			
Chimney Swift (*Chaetura pelagica*)							X			
Chuck-will's-widow (*Caprimulgus carolinensis*)	X		X	X						
Common Moorhen (*Gallinula chloropus*)									X	
Common Nighthawk (*Chordeiles minor*)			X							
Cooper's Hawk (*Accipiter cooperii*)	X		X							
Eastern Painted Bunting (*Passerina ciris*)										X
Eastern Wood-Pewee (*Contopus virens*)	X	X	X	X			X			
Glossy Ibis (*Plegadis falcinellus*)									X	
Hairy Woodpecker (*Picoides villosus*)	X	X					X			
Henslow's Sparrow (*Ammodramus henslowii*)				X		X				
Hooded Warbler (*Wilsonia citrina*)	X	X			X		X			
Kentucky Warbler (*Oporornis formosus*)		X					X			
King Rail (*Rallus elegans*)									X	
Least Bittern (*Ixobrychus exilis*)									X	
Little Blue Heron (*Egretta caerulea*)									X	
Mississippi Kite (*Ictinia mississippiensis*)							X			
Nelson's Sharp-tailed Sparrow (*Ammodramus nelsoni*)									X	
Northern Bobwhite (*Colinus virginianus*)			X	X		X				
Northern Flicker (*Colaptes auratus*)	X	X	X	X	X	X				
Northern Harrier (*Circus cyaneus*)									X	
Prairie Warbler (*Dendroica discolor*)				X	X	X				
Red-cockaded Woodpecker (*Picoides borealis*)			X	X	X	X				
Red-headed Woodpecker (*Melanerpes erythrocephalus*)	X	X	X	X	X	X	X			
Saltmarsh Sharp-tailed Sparrow (*Ammodramus caudacutus*)									X	
Sedge Wren (*Cistothorus platensis*)									X	
Short-eared Owl (*Asio flammeus*)									X	
Snowy Egret (*Egretta thula*)									X	
Sora (*Porzana carolina*)									X	
Swainson's Warbler (*Limnothlypis swainsonii*)		X			X		X			
Swallow-tailed Kite (*Elanoides forficatus*)							X		X	
Virginia Rail (*Rallus limicola*)									X	
Wayne's Black-throated Green Warbler (*Dendroica virens waynei*)					X		X			

Priority Species	Coastal Plain Ecoregion Habitat Types									
	OPF[1]	CMF	DCW	LLP	POC	WPS	FPF	SWC	TSF	MFS
Whip-poor-will (*Caprimulgus vociferus*)	X		X	X						
Wood Stork (*Mycteria americana*)									X	
Wood Thrush (*Hylocichla mustelina*)	X	X					X			
Worm-eating Warbler (*Helmitheros vermivorous*)		X	X		X		X			
Yellow Rail (*Coturnicops noveboracensis*)									X	
Yellow-billed Cuckoo (*Coccyzus americanus*)	X	X					X			
Yellow-crowned Night-heron (*Nyctanassa violacea*)							X		X	
MAMMALS										
Cotton Mouse (*Peromyscus gossypinus*)		X			X		X			
Eastern Fox Squirrel (*Sciurus niger*)	X		X	X						
Eastern Mole (*Scalopus aquaticus*)	X	X								
Eastern Woodrat (*Neotoma floridana haematoreia*)							X			
Least Shrew (*Cryptotis parva*)									X	
Long-tailed Weasel (*Mustela frenata*)	X	X			X	X				
Marsh Rabbit (*Sylvilagus palustris*)					X		X		X	
Northern Yellow Bat (*Lasiurus intermedius*)		X					X			
Rafinesque's Big-eared Bat (*Corynorhinus rafinesquii*)							X			
Rock Vole (*Microtus chrotorrhinus*)										
Seminole Bat (*Lasiurus seminolus*)			X	X			X			
Silver-haired Bat (*Lasionycteris noctivagans*)		X								
Southeastern Bat (*Myotis austroriparius*)							X			
Southern Bog Lemming (*Synaptomys cooperi helaletes*)					X			X		
Southern Pygmy Shrew (*Sorex hoyi winnemana*)							X			
Star-nosed Mole (*Condylura cristata*)					X		X	X	X	
White-footed Mouse (*Peromyscus leucopus easti*)										X
AMPHIBIANS										
Barking Treefrog (*Hyla gratiosa*)		X		X		X		X		
Brimley's Chorus Frog (*Pseudacris brimleyi*)		X				X		X		
Carolina Gopher Frog (*Rana capito*)		X		X		X		X		
Dwarf Salamander (*Eurycea quadridigitata*)						X	X	X		
Eastern Lesser Siren (*Siren intermedia intermedia*)								X		
Eastern Spadefoot (*Scaphiopus holbrookii*)	X	X		X		X	X	X		X
Eastern Tiger Salamander (*Ambystoma tigrinum*)				X		X		X		
Four-toed Salamander (*Hemidactylium scutatum*)	X	X					X	X		
Mabee's Salamander (*Ambystoma mabeei*)		X				X	X	X		
Many-lined Salamander (*Stereochilus marginatus*)					X					
Marbled Salamander (*Ambystoma opacum*)	X	X					X	X		
Northern Slimy Salamander (*Plethodon glutinosus sensustricto*)	X	X		X		X	X			
Oak Toad (*Bufo quercicus*)				X	X	X		X		X
Ornate Chorus Frog (*Pseudacris ornate*)		X		X		X		X		
Pine Barrens Treefrog (*Hyla andersonii*)				X	X	X		X		
Sandhills Salamander (*Eurycea sp*)							X			
Southern Dusky Salamander (*Desmognathus auriculatus*)					X		X			X
Spotted Salamander (*Ambystoma maculatum*)	X	X					X	X		

Priority Species	Coastal Plain Ecoregion Habitat Types									
	OPF[1]	CMF	DCW	LLP	POC	WPS	FPF	SWC	TSF	MFS
Striped Southern Chorus Frog (*Pseudacris nigrita nigrita*)		X				X		X		
Three-lined Salamander (*Eurycea guttolineata*)							X			
REPTILES										
American Alligator (*Alligator mississippiensis*)									X	
Black Swamp Snake (*Seminatrix pygaea*)								X		
Broad-headed Skink (*Eumeces laticeps*)	X	X				X	X			
Common Rainbow Snake (*Farancia erytrogramma erytrogramma*)									X	
Common Ribbonsnake (*Thamnophis sauritus sauritus*)							X	X	X	
Corn Snake (*Elaphe guttata*)	X	X		X		X	X			
Eastern Box Turtle (*Terrapene carolina*)	X	X					X			
Eastern Chicken Turtle (*Deirochelys reticularia*)								X		
Eastern Coachwhip (*Masticophis flagellum*)				X						X
Eastern Coral Snake (*Micrurus fulvius*)				X						X
Eastern Diamondback Rattlesnake (*Crotalus adamanteus*)				X						
Eastern Hog-nosed Snake (*Heterodon platirhinos*)	X		X	X		X				
Eastern Kingsnake (*Lampropeltis getula getula*)							X			X
Eastern Mudsnake (*Farancia abacura abacura*)								X	X	
Eastern Slender Glass Lizard (*Ophisaurus attenuatus longicaudus*)				X		X				
Eastern Smooth Earthsnake (*Virginia valeriae valeriae*)	X	X								
Glossy Crayfish Snake (*Regina rigida*)								X		
Mole Kingsnake (*Lampropeltis calligaster rhombomaculata*)	X	X		X		X				
Northern Pinesnake (*Pituophis melanoleucus melanoleucus*)				X						
Northern Scarletsnake (*Cemophora coccinea copei*)	X			X						X
Outer Banks Kingsnake (*Lampropeltis getula sticticeps*)										X
Pigmy Rattlesnake (*Sistrurus miliarius*)			X	X		X				
Pine Woods Littersnake (*Rhadinaea flavilata*)		X				X				
Scarlet Kingsnake (*Lampropeltis triangulum elapsoides*)				X		X				
Southeastern Crowned Snake (*Tantilla coronata*)			X	X						
Southern Hog-nosed Snake (*Heterodon simus*)				X						X
Spotted Turtle (*Clemmys guttata*)		X					X	X		
Striped Mud Turtle (*Kinosternon baurii*)									X	
Timber (Canebrake) Rattlesnake (*Crotalus horridus*)	X	X	X	X			X			

[1]HABITAT TYPES KEY: OPF: Oak/Pine Forest, CMF: Coastal Mesic Forest, DCW: Dry Coniferous Woodlands, LLP: Longleaf Pine Forest, POC: Pocosin Forest, WPS: Wet Pine Savanna, FPF: Floodplain Forest, SWC: Small Wetland Communities, TSF: Tidal Swamp Forest, MFS: Maritme Forest/Shrub

TABLE *E*-4.—Priority species for the Piedmont ecoregion

Priority Species	Piedmont Ecoregion Habitat Types				
	DCW[1]	OPF	PMF	FPF	SWC
BIRDS					
American Kestrel (*Falco sparverius*)	X				
American Woodcock (*Scolopax minor*)				X	
Bald Eagle (*Haliaeetus leucocephalus*)				X	
Brown-headed Nuthatch (*Sitta pusilla*)	X				
Chuck-will's-widow (*Caprimulgus carolinensis*)	X				
Cooper's Hawk (*Accipiter cooperii*)	X	X	X		
Eastern Wood-Pewee (*Contopus virens*)	X	X	X	X	
Hairy Woodpecker (*Picoides villosus*)	X	X	X	X	
Hooded Warbler (*Wilsonia citrina*)		X	X	X	
Kentucky Warbler (*Oporornis formosus*)			X	X	
Northern Flicker (*Colaptes auratus*)	X	X	X	X	
Red-headed Woodpecker (*Melanerpes erythrocephalus*)	X	X	X	X	X
Sharp-shinned Hawk (*Accipiter striatus*)	X		X		
Swainson's Warbler (*Limnothlypis swainsonii*)				X	
Whip-poor-will (*Caprimulgus vociferus*)	X	X		X	
Wood Thrush (*Hylocichla mustelina*)		X	X	X	
Worm-eating Warbler (*Helmitheros vermivorous*)		X	X	X	
Yellow-billed Cuckoo (*Coccyzus americanus*)		X	X	X	
Yellow-crowned Night-heron (*Nyctanassa violacea*)				X	X
MAMMALS					
Allegheny Woodrat (*Neotoma magister*)			X		
Eastern Mole (*Scalopus aquaticus*)		X	X		
Long-tailed Weasel (*Mustela frenata*)		X	X		
Rafinesque's Big-eared Bat (*Corynorhinus rafinesquii*)				X	
Seminole Bat (*Lasiurus seminolus*)	X			X	
Silver-haired Bat (*Lasionycteris noctivagans*)			X		
Smoky Shrew (*Sorex fumeus*)				X	
Southeastern Bat (*Myotis austroriparius*)				X	
AMPHIBIANS					
Barking Treefrog (*Hyla gratiosa*)			X		X
Dwarf Salamander (*Eurycea quadridigitata*)					X
Eastern Spadefoot (*Scaphiopus holbrookii*)		X			X
Eastern Tiger Salamander (*Ambystoma tigrinum*)					X
Four-toed Salamander (*Hemidactylium scutatum*)		X	X	X	X
Marbled Salamander (*Ambystoma opacum*)		X	X	X	X
Mole Salamander (*Ambystoma talpoideum*)			X	X	X
Northern Gray Treefrog (*Hyla versicolor*)		X	X	X	X
Northern Slimy Salamander (*Plethodon glutinosus sensustricto*)		X	X	X	
Spotted Salamander (*Ambystoma maculatum*)		X	X	X	X
Three-lined Salamander (*Eurycea guttolineata*)				X	X

Priority Species	Piedmont Ecoregion Habitat Types				
	DCW[1]	OPF	PMF	FPF	SWC
REPTILES					
Bog Turtle (*Clemmys muhlenbergii*)				X	
Broad-headed Skink (*Eumeces laticeps*)		X	X	X	
Common Ribbonsnake (*Thamnophis sauritus sauritus*)				X	X
Corn Snake (*Elaphe guttata*)		X	X	X	
Eastern Box Turtle (*Terrapene carolina*)		X	X	X	
Eastern Hog-nosed Snake (*Heterodon platirhinos*)				X	
Eastern Kingsnake (*Lampropeltis getula getula*)				X	
Eastern Slender Glass Lizard (*Ophisaurus attenuatus longicaudus*)		X			
Eastern Smooth Earthsnake (*Virginia valeriae valeriae*)		X	X		
Mole Kingsnake (*Lampropeltis calligaster rhombomaculata*)		X	X		
Northern Scarletsnake (*Cemophora coccinea copei*)		X			
Pigmy Rattlesnake (*Sistrurus miliarius*)	X				
Scarlet Kingsnake (*Lampropeltis triangulum elapsoides*)		X			
Southeastern Crowned Snake (*Tantilla coronata*)	X				
Spotted Turtle (*Clemmys guttata*)			X	X	X
Timber Rattlesnake (*Crotalus horridus*)	X	X	X	X	

[1]HABITAT TYPES KEY: DCW: Dry Coniferous Woodlands, OPF: Oak/Pine Forest, PMF: Piedmont Mesic Forest. FPF: Floodplain Forest, SWC: Small Wetland Communities

TABLE *E*-5.—Priority species for the Southern Blue Ridge ecoregion

Priority Species	Southern Blue Ridge Ecoregion Habitat Types									
	SFF[1]	NHW	CFT	DCW	OPF	HER	LER	CAM	BAW	FPF
BIRDS										
Alder Flycatcher (*Empidonax alnorum*)									X	
Black-billed Cuckoo (*Coccyzus erythropthalmus*)		X	X		X					
Black-capped Chickadee (*Poecile atricapilla*)	X	X			X					
Brown Creeper (*Certhia americana*)	X	X	X		X					
Brown-headed Nuthatch (*Sitta pusilla*)				X						
Canada Warbler (*Wilsonia canadensis*)	X	X			X					
Cerulean Warbler (*Dendroica cerulea*)			X		X					
Chestnut-sided Warbler (*Dendroica pensylvanica*)	X	X								
Cooper's Hawk (*Accipiter cooperii*)		X	X	X	X					
Eastern Wood-Pewee (*Contopus virens*)			X		X					
Golden-winged Warbler (*Vermivora chrysoptera*)		X			X				X	
Hairy Woodpecker (*Picoides villosus*)	X	X	X		X					
Hooded Warbler (*Wilsonia citrina*)			X		X					X
Kentucky Warbler (*Oporornis formosus*)					X					X
Magnolia Warbler (*Dendroica magnolia*)	X									
Northern Flicker (*Colaptes auratus*)			X		X					
Northern Saw-whet Owl (*Aegolius acadicus*)	X	X								
Peregrine Falcon (*Falco peregrinus*)						X	X			
Pine Siskin (*Carduelis pinus*)	X									
Prairie Warbler (*Dendroica discolor*)				X						
Red Crossbill (*Loxia curvirostra*)	X			X						
Red-headed Woodpecker (*Melanerpes erythrocephalus*)				X	X					
Rose-breasted Grosbeak (*Pheucticus ludovicianus*)		X			X					
Sharp-shinned Hawk (*Accipiter striatus*)	X	X	X	X	X					
Swainson's Warbler (*Limnothlypis swainsonii*)			X							X
Whip-poor-will (*Caprimulgus vociferus*)					X					
Willow Flycatcher (*Empidonax traillii*)									X	
Wood Thrush (*Hylocichla mustelina*)			X		X					
Worm-eating Warbler (*Helmitheros vermivorous*)			X	X	X					

Priority Species	Southern Blue Ridge Ecoregion Habitat Types									
	SFF[1]	NHW	CFT	DCW	OPF	HER	LER	CAM	BAW	FPF
Yellow-bellied Sapsucker (*Sphyrapicus varius*)		X	X		X					
Yellow-billed Cuckoo (*Coccyzus americanus*)			X		X					X
MAMMALS										
Allegheny Woodrat (*Neotoma magister*)						X		X		
Appalachian Cottontail (*Sylvilagus obscurus*)		X								
Eastern Fox Squirrel (*Sciurus niger*)					X					
Eastern Mole (*Scalopus aquaticus*)		X	X		X					
Eastern Spotted Skunk (*Spilogale putorius*)							X			
Eastern Woodrat (*Neotoma floridana haematoreia*)							X			
Gray Bat (*Myotis grisescens*)								X		
Hairy-tailed Mole (*Parascalops breweri*)		X			X					
Indiana Bat (*Myotis sodalis*)								X		X
Least Weasel (*Mustela nivalis*)					X					
Long-tailed Weasel (*Mustela frenata*)	X	X	X		X					
Meadow Jumping Mouse (*Zapus hudsonius*)									X	
Meadow Vole (*Microtus pennsylvanicus*)									X	
Masked Shrew (*Sorex cinereus*)	X	X	X		X					
Northern Flying Squirrel (*Glaucomys sabrinus*)	X	X								
Northern Long-eared Bat (*Myotis septentrionalis*)							X	X		
Rafinesque's Big-eared Bat (*Corynorhinus rafinesquii*)								X		
Rock Shrew (*Sorex dispar*)	X	X				X				
Rock Vole (*Microtus chrotorrhinus*)	X					X				
Silver-haired Bat (*Lasionycteris noctivagans*)		X								
Small-footed Bat (*Myotis leibii*)							X	X		
Smoky Shrew (*Sorex fumeus*)	X	X	X		X					X
Southern Pygmy Shrew (*Sorex hoyi winnemana*)		X			X					
Virginia Big-eared Bat (*Corynorhinus townsendii virginianus*)								X		
Water Shrew (*Sorex palustris*)		X								
Woodland Jumping Mouse (*Napaeozapus insignis*)		X	X							
AMPHIBIANS										
Chattahoochee Slimy Salamander		X	X		X					

Priority Species	Southern Blue Ridge Ecoregion Habitat Types									
	SFF[1]	NHW	CFT	DCW	OPF	HER	LER	CAM	BAW	FPF
(*Plethodon chattahoochee*)										
Crevice Salamander (*Plethodon longicrus*)			X		X		X			
Four-toed Salamander (*Hemidactylium scutatum*)					X				X	X
Green Salamander (*Aneides aeneus*)			X		X	X	X			
Junaluska Salamander (*Eurycea junaluska*)										X
Longtail Salamander (*Eurycea longicauda*)								X		X
Marbled Salamander (*Ambystoma opacum*)			X		X				X	X
Mole Salamander (*Ambystoma talpoideum*)									X	X
Mountain Chorus Frog (*Pseudacris brachyphona*)					X					X
Northern Slimy Salamander (*Plethodon glutinosus sensustricto*)	X	X	X		X					X
Pigmy Salamander (*Desmognathus wrighti*)	X	X	X							
Seepage Salamander (*Desmognathus aeneus*)			X		X					X
Southern Ravine Salamander (*Plethodon richmondi*)		X	X		X					
Southern Zigzag Salamander (*Plethodon ventralis*)			X		X		X			
Spotted Salamander (*Ambystoma maculatum*)		X	X		X				X	X
Tellico Salamander (*Plethodon aureolus*)		X	X		X					
Three-lined Salamander (*Eurycea guttolineata*)									X	X
Wehrle's Salamander (*Plethodon wehrlei*)					X					
Weller's Salamander (*Plethodon welleri*)	X	X								
REPTILES										
Bog Turtle (*Clemmys muhlenbergii*)									X	X
Coal Skink (*Eumeces anthracinus*)				X		X	X			
Common Ribbonsnake (*Thamnophis sauritus sauritus*)									X	
Eastern Box Turtle (*Terrapene carolina*)					X					X
Eastern Hog-nosed Snake (*Heterodon platirhinos*)			X							X
Eastern Kingsnake (*Lampropeltis getula getula*)										X
Eastern Slender Glass Lizard (*Ophisaurus attenuatus longicaudus*)					X					
Eastern Smooth Earthsnake (*Virginia valeriae valeriae*)			X		X					

Priority Species	Southern Blue Ridge Ecoregion Habitat Types									
	SFF[1]	NHW	CFT	DCW	OPF	HER	LER	CAM	BAW	FPF
Mole Kingsnake (*Lampropeltis calligaster rhombomaculata*)					X					
Northern Pinesnake (*Pituophis melanoleucus melanoleucus*)					X					
Timber Rattlesnake (*Crotalus horridus*)				X	X	X	X			X

[1]HABITAT TYPES KEY: SFF: Spruce Fir Forest, NHW: Northern Hardwoods, CFT: Cove Forest, DCW: Dry Coniferous Woodlands, OPF: Oak/Pine Forest, HER: High-elevation Rock Outcrops, LER: Low-elevation Rock Outcrops, CAM: Caves and Mines, BAW: Bogs and associated Wetlands, FPF: Floodplain Forest