



# NORTH CAROLINA

## Introduction and General Description

North Carolina prides itself upon its diversity both ecologically and culturally. Its rich reputation of pristine beaches, wide seafood-filled sounds and estuaries, sprawling floodplains, sweltering Sandhills with swaying longleaf pines, rolling hills, winding rivers, crashing waterfalls, and awesome mountain peaks has provided home for such species as sea turtles, brown pelicans, Venus flytraps, blue crabs, ducks, red-cockaded woodpeckers, bald eagles, fresh water mussels, and Indiana bats. Ironically, it is these types of Federal trust resources and the habitats they depend upon, that have attracted so many people and businesses to North Carolina. Today urban sprawl, growing industry, and associated development threaten the very resources that have made North Carolina so appealing and successful.

The Coastal Plain, Piedmont, and Mountain regions of North Carolina houses 5,700 plant species, 990 vertebrate species, and 25-30,000 species of invertebrates. Of those, 1,112 are presently considered rare, threatened, or endangered according to Federal and State agencies and private conservation organizations. The rivers of North Carolina's Eastern Seaboard

support striped bass, a commercial and recreational fish that holds an important position in the aquatic food web. The once imperiled species, commercially exploited in the late 1800s, is now recovering through harvest management. North Carolina also provides habitats essential for many migratory birds such as ducks, geese, swans, songbirds, hawks, and shorebirds. Over half of the Atlantic Flyway population of tundra swans winter in North Carolina. In the Piedmont, where Daniel Boone once lived and explored and passenger pigeons darkened the sky, today interstates, shopping centers, and neighborhoods prevail. But, even now this area still provides breeding and wintering grounds for species such as bald eagles and several rare plants. Among the coniferous and mature northern hardwood forests of the Appalachian Mountains, Carolina northern flying squirrels feed on lichens, fungi, seeds, sap, and insects through the night.

Ten National Wildlife Refuges, covering 391,000 acres in North Carolina, are protected and managed for many of the State's important species. Other government agencies such as Department of Defense, National Park Service, U.S. Forest Service, North Carolina Wildlife Resources Commission, and North Carolina Department of Parks and

Recreation manage and protect valuable conservation lands.

An active system of Land Trusts, the North Carolina Chapter of The Nature Conservancy, and many other non-profit organizations also manage and protect many of North Carolina's valuable ecosystems.

The fact remains that 90 percent of the land in North Carolina is privately owned. Without conservation efforts on private lands, our trust resources would simply not survive. Private landowners in North Carolina want to conserve and restore habitats, but often lack the technical and financial support necessary to manage their land so that it can support wildlife and meet their needs financially. The U.S. Fish & Wildlife Service's Partners for Fish and Wildlife Program helps satisfy this need.



## Habitats of Special Concern

The U.S. Fish & Wildlife Service's Partners for Fish and Wildlife Program in North Carolina assists with the restoration and enhancement of every ecosystem in the State that benefits Federal trust resources. Wetland systems such as mountain bogs, spring seeps, rivers, streams, flood plains, bottomland hardwoods, pocosins, Carolina bays, and marshes are all candidates for restoration through Partners for Fish and Wildlife. In addition, other non-wetland habitat types in North Carolina are important to trust resources such as longleaf pine, upland hardwoods, and native grasslands. Some Partners projects are educational in nature, providing the necessary materials and opportunities for children and adults to learn the significance of the State's natural resources. Most of the Partners projects have occurred in the following four habitat types:

### ***Forested Wetlands - bottomland hardwoods, non-alluvial swamp forest, pocosins***

Bottomland hardwoods, occurring along the brown water streams of North Carolina, receive rich layers of soil during frequent over bank flooding events and thus are some of our most productive forested wetlands. Important tree species are the many wetland oaks, sugarberry, elms, green ash, red maple, box elder, and sweetgum; with water tupelo and cypress in the lower, wetter zones.

Non-alluvial swamp forests occur in broad "flats" with poorly defined drainage systems. They do not receive "over bank" flooding, but are primarily flooded by rainfall. These forested wetlands, along with pocosins, once covered

thousands of square miles of eastern North Carolina. Dominant tree species are black gum, loblolly bay, red maple, sweet gum, cypress, and Atlantic white cedar. This assemblage of forested wetland types are important for high priority species such as cerulean warbler, Swainson's warbler, prothonotary warbler, black-throated green warbler, American woodcock, yellow-throated warbler, red wolf, and black bear.

### ***Longleaf Pine***

The longleaf pine ecosystem that once covered 92 million acres of the southeastern United States from Texas to Maryland included over 9 million acres of central and eastern North Carolina.

Remnants of longleaf pine in North Carolina still play a vital role for many wildlife species.



This naturally diverse ecosystem supports several federally listed species including red-cockaded woodpeckers, Mичeaux's sumac,

American chaffseed, and rough-leaf loosestrife. It is also an important habitat for migratory birds such as Bachman's sparrow, pine warbler, and brown-headed nuthatch.

### ***Piedmont Prairies***

From 1540 to 1750, European explorers and traders in the Piedmont region of North and South Carolina reported many prairie-like openings ranging in size up to 25 miles across.

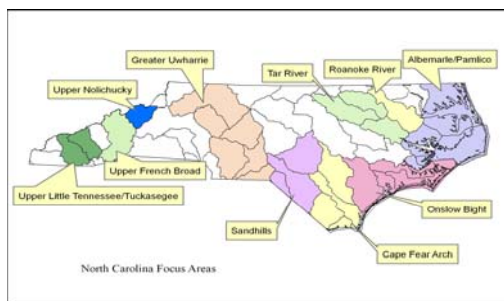


Historical and meteorological evidence suggests that these prairies were primarily the products of Native American burning and agriculture. Piedmont prairies, also known as grasslands, early successional habitat, savannahs, or xeric hardpan forests contain a whole suite of native bird and rare plant species such as Schweinitz's sunflower and smooth coneflower (both federally-listed endangered species), Georgia aster, loggerhead shrike, savannah sparrow, field sparrow, prairie warbler, Henslow's sparrow, and Northern bobwhite.

## ***Streams and Riparian Areas***

Streams and surrounding riparian areas are rich and diverse in North Carolina. They perform many ecological functions such as regulating stream flow, storing water, removing harmful materials, and providing habitat for aquatic and terrestrial plants and animals. Streams and riparian areas in North Carolina are essential habitat for many imperiled species such as the federally-listed Appalachian elktoe mussel, littlewing pearl mussel, spotfin chub, and Virginia spiraea. Many other Federal species of concern depend on water quality and the condition of streams for their existence.

Geographic focus areas in North Carolina were developed in collaboration with many partners. Most of our project activities are expected to occur in these areas over the next five years (2007-2011).



## **Threats**

Large scale land clearing in North Carolina has created many problems for wildlife and water quality, especially in the coastal region. These problems include complete destruction of forested wetlands (i.e., conversion to agriculture), drainage and conversion to loblolly pine plantations, drainage and destructive logging techniques, release of nutrients and mercury due to oxidation of organic soils, and habitat fragmentation. In a study on wetland losses done by the USFWS National Wetland Inventory, North Carolina stood out among all southeastern states with the highest acreage of net wetland loss, an estimated 1.2 million acres. Nearly all the losses were from forested and scrub/shrub wetlands and were concentrated in the “Coastal Flats” region of North Carolina.



Threats to the longleaf pine ecosystem and Piedmont prairies are the exclusion of fire, urban sprawl, development, and conversion to loblolly pine plantations. Fire, an essential element in the management and maintenance of the longleaf pine ecosystem and native prairies, has been largely squelched due to a lack of understanding and education about its importance and difficulty of burning at the urban interface.

Riparian (streamside) areas have been abused and misused for decades. Timbering and various agricultural practices have traditionally taken place in riparian habitat. Negative effects include sedimentation from bank sloughing, livestock tromping, and de-vegetation; over-eutrophication from livestock access, fertilizers used in near-stream row cropping, and lack of filtering buffers; pollution from multiple sources; and various developmental activities. All of these activities contribute silt, nutrients, and pollutants to streams, thus affecting their living inhabitants.

## **Conservation Strategies**

The North Carolina Wildlife Resources Commission in collaboration with stakeholders, including the Service, developed the North Carolina Wildlife Action Plan, a comprehensive blueprint for fish and wildlife conservation statewide. The Plan originated with the purpose of securing funding for state fish and wildlife agencies to take preventative actions that help keep rare species from becoming endangered and keep common species common. The Service’s Partners for Fish and Wildlife Program recognizes the priority species and habitats identified in the Plan and will continue to work cooperatively with the State and other partners to carry out the Plan whose success will be measured by cultivation of lasting conservation partnerships and by the promise of fish and wildlife resources for future North Carolinians. The North Carolina

Wildlife Action Plan is available at:  
<http://www.ncwildlife.org>

### ***Forested Wetlands***

Restoring forested wetlands begins by restoring the hydro-period (water access and duration). This is accomplished by plugging drainage canals with earthen plugs and/or installing water control structures. Sometimes dikes have to be built to allow site specific restoration without re-flooding neighboring lands. Though variable, the average cost to restore the water to a site is between \$10 and \$100 per acre. The next step is reforestation. Reforestation costs range from \$125 to \$400 per acre, with the largest variable being site preparation for planting.

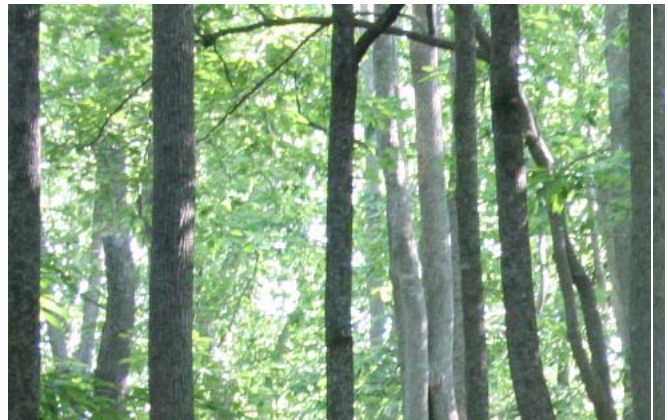
### ***Longleaf Pine***



Restoration and enhancement of longleaf pine is relatively easy. The reintroduction of fire, controlling invasive hardwood species, and planting longleaf pine trees is a straight forward process with known successful results. Even reintroduction of native understory herbaceous plants is becoming a reality. Restoration costs vary widely since some sites only need the reintroduction of fire while others require mechanical site preparation or the removal of hardwood trees by hand. Costs range from \$30 to \$175 per ac

### ***Prairies***

Prairie restoration can be accomplished by applying management techniques such as burning or mowing, thinning overstory vegetation and re-planting or transplanting native species. Depending on the site and need, restoration costs range between \$30 (just burning) and \$450/acre



(full restoration with herbicides, local seeds, equipment, and labor).



### ***Stream Restoration***



Streams that are unstable or degraded can be restored using natural channel design and bioengineering techniques which help reestablish stream channel stability and restore habitat for aquatic species. Costs to plan and implement such a restoration can range from \$30 to \$275/linear foot of stream. Techniques such as riparian fencing, tree

plantings, streambank stabilization, livestock stream crossings, and alternate watering sources (e.g., water tanks, ponds) are less expensive and easier to implement and can have a significant positive impact.



One-on-one conversations with the landowner is a critical component of the restoration strategy as landowners must first understand how their habitat type is designed to function naturally, the benefits it has in its natural state, and how we can accomplish restoration economically and in a way that is compatible with farming operations. Demonstration sites, interpretive materials, and publications are often used for education.

## Partners

Atlanta Botanical Garden  
Atlantic Coast Joint Venture  
Audubon Society  
Cape Fear River Watch  
Carolina Lands Conservancy Network  
Carolina Mountain Land Conservancy  
Catawba College  
Catawba Lands Conservancy  
Conservation Trust for North Carolina  
Cooleemee Historical Association  
Core Sound Museum  
Ducks Unlimited  
Environmental Defense  
Environmental Impact RC&D, Inc.  
Environmental Protection Agency  
Farm Service Agency  
Fayetteville Public Works Commission  
HARP, Inc.  
International Paper  
Land Trust for Central North Carolina  
Land Trust for the Little Tennessee

Little Tennessee Watershed Association  
Mecklenburg Co. Parks & Recreation Dept.  
Mitchell River Coalition  
Mountain Valleys RC&D  
National Committee for the New River  
National Fish and Wildlife Foundation  
National Park Service  
National Tree Trust  
Natural Resources Conservation Service  
NC Clean Water Management Trust Fund  
NC Coastal Land Trust  
NC Coastal Federation  
NC Cooperative Extension Service  
NC Department of Cultural Resources  
NC Forest Service  
NC Herpetological Society  
NC Natural Heritage Program  
NC Parks and Recreation Department  
NC Soil and Water Conservation Districts  
NC State Museum of Natural Sciences  
NC State University  
NC Stream Restoration Program  
NC Stream Restoration Institute  
NC Wesleyan College  
NC Wildlife Resources Commission  
NC Zoological Park  
Pamlico-Tar River Foundation  
Piedmont Land Conservancy Pilot View R C&D, Inc.  
Plume Creek Corporation  
Quail Unlimited  
Roanoke/Cashie River Center  
Roanoke/Chowan Community College  
Roanoke River Basin Regional Council  
Salisbury Foundation  
Soil and Water Conservation Districts  
Tar River Land Conservancy  
Tennessee Valley Authority  
The Nature Conservancy, NC Chapter  
Town of Pine bluff  
Town of Troy  
Town of Windsor  
University of North Carolina at Greensboro  
U.S. Forest Service  
Virginia Power  
Western North Carolina RC&D Council  
Z. Smith Reynolds Foundation  
Zoo Atlanta

## Accomplishments

The Partners for Fish and Wildlife Program began

in the early 1990's by North Carolina's National Wildlife Refuges where wetlands were developed for migratory birds. The program evolved to include many habitat types throughout the State and many creative restoration techniques.

- \* Nearly 15,000 acres of uplands and

## Future Needs

Opportunities abound for restoration in North Carolina.

- \* Forested wetland restoration is needed on approximately 580,000 acres.
- \* There are approximately 100,000 acres of degraded longleaf pine that need of restoration and another 100,000 acres could be replanted to longleaf pine habitat.
- \* There is potential to restore 1,000 acres to native Piedmont prairies.
- \* About 25,000 miles of all North Carolina streams and streambanks are in need of restoration.
- \* In addition to the featured habitat types, there are over 1 million acres of restoration and enhancement needs for other wetland types such as Carolina bays and mountain bogs and upland types such as hardwood forests.
- The need for an educational component associated with these projects grows with the growing human population.

wetlands restored

- \* 30 miles of streams restored
- \* Over 230 projects accomplished under the Partners for Fish and Wildlife Program.

## CONTACT

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