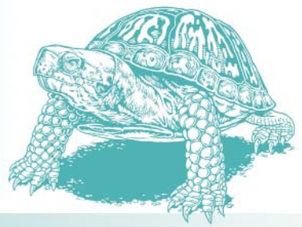
Variety in the Plain

Wildlife Action Plan — keep common animals common



In North Carolina's Coastal Plain, water is the hub around which conservation of land and animals revolves.

This is the fourth of a five-part series about North Carolina's Wildlife Action Plan. Each successive story will discuss how the plan is being implemented in a different region, culminating with a final piece about statewide initiatives.

MARCH	INTRODUCTION TO THE PLAN
MAY	MOUNTAIN REGION
JULY	PIEDMONT REGION
SEPTEMBER	**COASTAL PLAIN REGION**
NOVEMBER	STATEWIDE PROJECTS AND PARTNERSHIPS

If you are traveling across the Fall Line, where would you fall? Well, you might tumble down a cascade or two, but you would enter into a region of North Carolina that makes up about 45 percent of the state — the Coastal Plain. The Fall Line, which is actually a zone a couple of miles wide, separates the Piedmont from the Coastal Plain.

Up above the Fall Line, the rivers bubble out of the rocks and springs in the Piedmont and tumble down ancient bedrock and cobble. As water flowing east approaches the Fall Line, somewhere around Interstate 95, rivers exchange their rocky falls and cascades for sandier bottoms and logjam riffles. Large, ancient-looking cypress trees and their knees border the rivers and the wide floodplains, as the surrounding terrain flattens.

The Coastal Plain landscape is home to some of the state's rare creatures and unique habitats. Endangered creatures found only in eastern North Carolina, such as the Carolina madtom and the federally endangered Tar River spinymussel, call the region home. The rivers wind eastward past Tarboro, Greenville and Kinston, Cliffs of the Neuse and Great Dismal Swamp. They meander by Washington, New Bern and Jacksonville, Bladen Lakes and Croatan National Forest.

On the last leg of these rivers' journeys before entering the sounds, the full effect of tannins from the trees are seen in the tributaries and swamps. Water becomes so black that the surface looks like a mirror. The rivers run to the coastline and mingle together in the estuaries and sounds. It is here that submersed vegetation is found, providing refuges and nursery areas for a host of shorebirds and waterfowl, sea turtles, saltwater fish and shellfish.

The Coastal Plain hosts 16 different types of unique habitat such as floodplain forests, longleaf pine stands, grasslands, forested wetlands, coastal dunes and savannas. Dotting the landscape are mysterious Carolina bays and pocosins, which boast unique aquatic fauna such as the Carolina pygmy sunfish, Phelps killifish, Waccamaw silverside and Waccamaw fatmucket mussel. Many terrestrial creatures use these habitats as well: the prairie warbler, red-headed woodpecker, hooded warbler, star-nosed mole, long-tailed weasel, Southern bog lemming, oak toad and many-lined salamander. Ancient sand dunes in the Sandhills boast an amazing diversity of wildlife, including the fox squirrel, Carolina crawfish frog, Northern pine snake, bald eagle and Rafinesque's big-eared bat.

Unfortunately, these places are also some of the most endangered ecosystems in the country. Many of the threats to these systems are related to human population growth — land development, fragmentation, sedimentation, increased wastewater discharges and water withdraws. Many unique Coastal Plain species do not react well to habitat changes and loss. Fortunately, the state is planning ahead by using partnerships and land conservation to preserve many of these habitats, creatures and ecosystem functions.

The Wildlife Action Plan addresses these threats to our unique Coastal Plain habitats and wildlife. But planning and action are not just for the sake of animals; people will benefit too. As we work to protect wildlife and the places it lives, we will be working to protect our drinking water, our recreation areas, our farmland and our quality of life.

CATFISH IN A COAL MINE

The Tar and Neuse rivers exist entirely within North Carolina. They are born in the Piedmont and flow through the Coastal Plain into the Pamlico Sound. The rivers host many of the same fish, freshwater mussels and other aquatic organisms. On both waterways, the fall zone is an area where many rare fishes and

written by **ROB NICHOLS**

SURVEYING THE SEABOARD This is a sampling of the many Wildlife Diversity projects occuring in North Carolina's Coastal Plain. Some of these projects are also occuring in numerous other locations.

1. **OYSTERCATCHER RESEARCH**
   OREGON INLET, DARE COUNTY
   COASTWIDE SURVEYS ARE CONDUCTED TO MONITOR POPULATIONS OF NESTING WATERBIRDS.

2. **RED-COCKADED WOODPECKER RESEARCH**
   CRAVEN COUNTY
   WILDLIFE DIVERSITY PROGRAM BIOLOGISTS WORK WITH PARTNERS TO PROMOTE CONSERVATION OF THIS RARE BIRD.

3. **MADTOM RESEARCH**
   NEUSE RIVER, WAYNE COUNTY
   SURVEYS ON THE TAR AND NEUSE ARE CURRENTLY UNDER WAY TO UPDATE INFORMATION ON THIS FISH'S STATUS.

4. **SEA TURTLE RESEARCH**
   TOPSAIL BEACH, ONSLOW COUNTY
   BIOLOGISTS DOCUMENTED MORE THAN 150 SEA TURTLE NESTS ON N.C. BEACHES IN 2007.

MAP ILLUSTRATION BY BILL TIPTON

CHANGING CLIMATE,CHANGING COAST

As a result of global warming, temperatures are expected to increase over the next century by 3 to 9 degrees Fahrenheit, and sea level is expected to rise by 7 to 24 inches. These environmental changes would have significant impacts on the beaches and coastal communities of North Carolina. Storm surges may alter the location of inlets, and the sounds are likely to be saltier. If climate change continues unabated, many of our barrier islands and much of the far eastern Coastal Plain would be underwater.

But what about the other residents of our coastal communities — the wild creatures that live on the beaches and in the sounds? While people will have the option to move away from the coast as water levels threaten their homes, wildlife will be more limited because it is often closely tied to the ecosystems it inhabits.

The most serious threat to wildlife is loss of habitat. Rising sea levels would drown beaches and marshes critical for nesting and feeding. While new beaches and sounds would form eventually, it is impossible to know if they will provide suitable habitat to support the animals that currently use our ocean habitats. Increased storm intensity may further threaten nesting success for animals like sea turtles and coastal birds.

Interestingly, even the gender of sea turtles may be impacted as temperatures rise. Clutches that incubate in higher sand temperatures produce more female than male turtles. Under current conditions, Florida nests produce mostly females while North Carolina nests at the cooler, northern extent of nesting grounds hatch nearly half males. As temperature rises, N.C. nests would tend to produce more females. It will be important that suitable nesting areas be available at higher latitudes, where turtles do not currently nest. Protecting potential nesting sites now is one way humans can plan ahead for coastal wildlife.

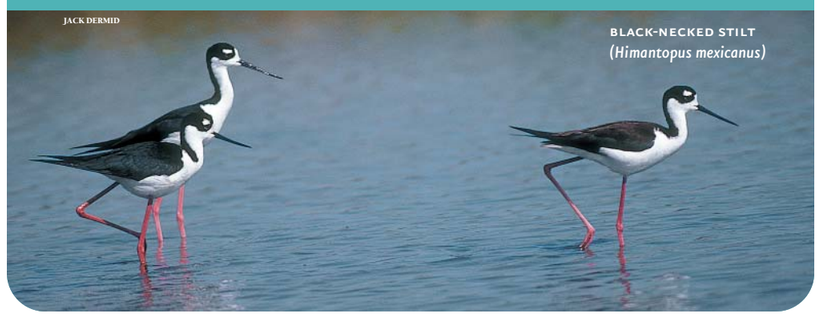
American oystercatchers, piping plovers, black skimmers and least terns are some of the beach-nesting birds that would be impacted as sea level rises. Hotter weather is stressful for nestlings. These waterbirds rely on marsh and estuary ecosystems for food. Increased storm activity, sedimentation in estuaries and changes in salinity are likely to affect the prey species that waterbirds feed on.

The distribution patterns of coastal songbirds also may be altered as the climate changes. The summer ranges of some species may shrink or increase in North Carolina as the rise in temperatures affects the plant and insect communities these birds rely on for food and shelter. Waterfowl would have to adjust their migratory behavior in response to temperature and water conditions. Another big concern in North Carolina is the availability of suitable marsh habitat and winter food resources for ducks, geese and swans as the aquatic habitats throughout the Coastal Plain change.

It is very difficult to foresee the full extent that climate changes would have on North Carolina's wildlife diversity. But there are ways to help wildlife maximize its chances of surviving the impact of climate change. By conserving existing coastal habitats and creating buffer areas with no development, especially near shorelines, protected habitat will be available inland. And most importantly, any steps that we can take now to slow global warming can lessen the impact of climate change for humans and wildlife.

— Carol Price

JACK DERMID



BLACK-NECKED STILT
(Himantopus mexicanus)

mussels are found and where rapid development is occurring. Centers of diversity such as Swift Creek and Fishing Creek in the Tar basin are becoming endangered.

The history of human activity in the two river systems looks quite different. The Neuse River has its origins near the rapidly growing Raleigh-Durham area. This population expansion in the Neuse basin has driven an increased need for drinking water, pollution controls and rapid land development. Sediment and excess nutrients in the Neuse — consequences of rapid growth — have resulted in degraded water quality. The Neuse is now on the top-10 list of the most endangered rivers in the country. Disappearing populations of rare fishes such as the Carolina madtom have reflected the changes in water quality and habitat.

Current projections show an upward population growth in the upper sections of the Neuse and Tar rivers. Because the Tar River basin has been sheltered from many of the impacts that are happening in the Neuse, the Tar has been able to retain some rural characteristics. However, pressure to develop land in the Tar basin is predicted to follow the same path as the Upper Neuse. To see the effects of changes in the Tar and Neuse basins, biologists can monitor populations of sensitive animals.

Like a canary in a coal mine, the Carolina madtom can serve as a warning that things are not well. Biologists are surveying 60 sites in the Tar and Neuse basins and comparing the results to where the fish occurred in the past. The madtom is nocturnal, well camouflaged, and hides in nooks and crannies during the day. To find the fish, biologists put on wetsuits and snorkels and shine dive lights into cavities underneath packs of leaves, sticks, logs and large rocks.

For the madtom to survive and successfully raise young, its hiding places cannot be buried in silt and sediment. Excess nutrients that cause algal growth, and chemicals from wastewater can inhibit reproduction. The madtom has disappeared from many areas in the Neuse River but is faring better in the upper section of the Tar River and its tributaries.

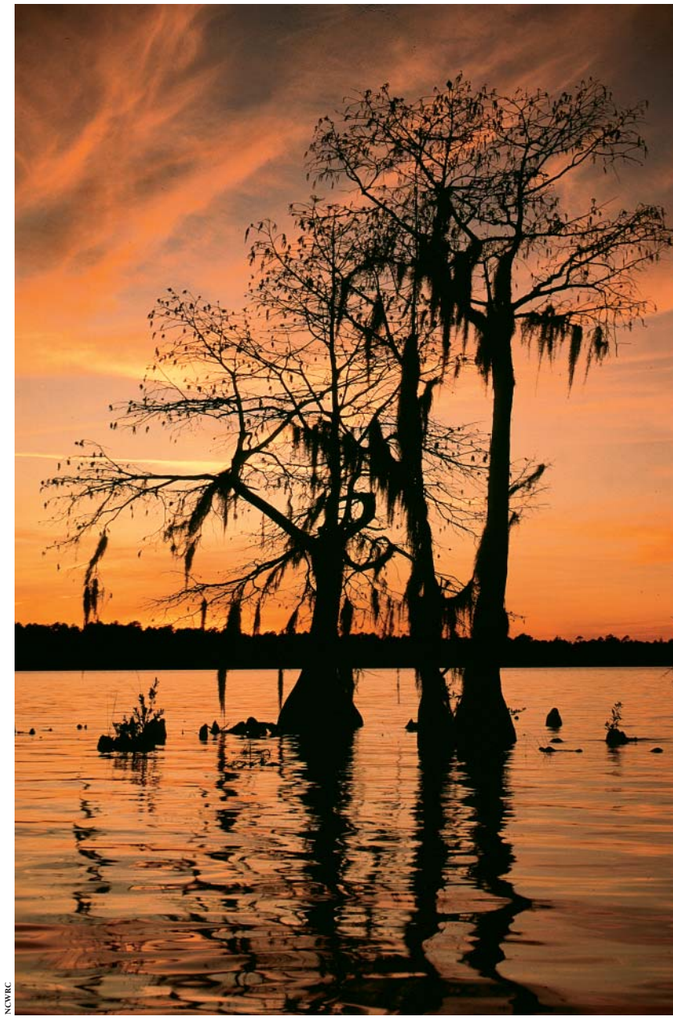
Coastal conservation initiatives are designed to protect animals and habitat such as the piping plover (chicks and eggs in a nest), the marsh rabbit, the barking treefrog and natural Carolina bays such as Singletary Lake.

JAMIE CAMERON

JACK DERMID

JUAN PONS

As we work to *protect wildlife and the places it lives,* we will be working to *protect our drinking water, our recreation areas, our farmland* and our *quality of life.*



NCWRC

UNPRECEDENTED LAND ACQUISITION HELPS PUT WILDLIFE INTO ACTION

During 2007 and 2008, the N.C. Wildlife Resources Commission will acquire 66,000 acres of land formerly owned by International Paper. The purchase represents the largest land conservation action in the Wildlife Commission's history. This massive, landscape-scale acquisition provides an opportunity to put an important part of the N.C. Wildlife Action Plan into practice. The tracts are associated with four major river basins: Chowan, Roanoke, Tar and Juniper Creek in the Lumber basin. Purchasing such large acreages on major waterways also helps protect water quality.

The scale of this acquisition has tremendous benefits for managing wildlife in our state. Acquisition of large pieces of property allows the commission to acquire contiguous, unfragmented habitat that is useful for species that require large interior tracts. These sizable tracts also enable fish and wildlife populations to attain healthier population sizes.

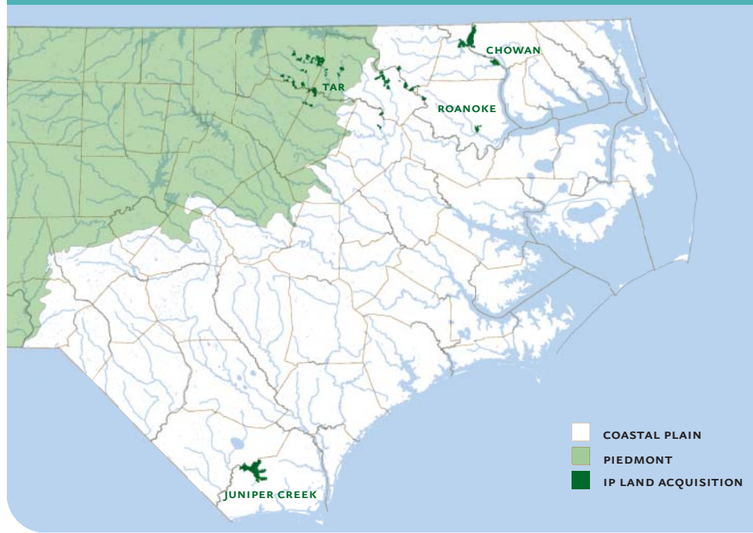
Chowan River
The Chowan River tracts total 15,000 acres of high quality wetlands that serve as a critical nursery for anadromous fish such as river herring, American shad and hickory shad. The eastern portion of the Chowan tracts, known as the "sandbanks," represents the northernmost range of longleaf pine and may prove to be a critical area for recolonizing red-cockaded woodpeckers.

Roanoke River
The bottomlands that border the Roanoke River are part of the most ecologically diverse bottomland hardwood river system in North Carolina, hosting large populations of wild turkeys and deer. These tracts are just upstream of another 50,000 acres of conservation land owned by both the state and federal governments. Protecting this extensive, high-quality habitat corridor also allows for the protection of many species if rising sea levels alter the composition of lower Roanoke game lands.

Tar River
The tracts that will be acquired on the upper Tar River in Warren, Franklin, Nash and Halifax counties help protect water quality in the healthiest streams in North Carolina's Piedmont. Many of the streams running through these properties still provide habitat for a wide range of freshwater mussels, species that are vulnerable to sedimentation coming in from land disturbance and development. These species have long disappeared from many other streams in our state.

Juniper Creek
Juniper Creek represents a large, 18,500-acre bottomland hardwood forest amid the timber plantations and the phenomenal residential development of the state's fastest growing county, Brunswick. As such, it represents a large refuge for interior-dwelling birds such as the Acadian flycatcher and the prothonotary warbler, and is a critical watershed that drains into the Waccamaw River and its nationally significant swamplands.

—George Norris



ROB NICHOLS / NCWRC

The Carolina madtom's population density in coastal rivers indicates water quality.

The Wildlife Action Plan recognizes the sensitive habitat that the Carolina madtom and other creatures inhabit in Swift and Fishing creeks in the Tar basin as unique on the East Coast. Since it is easier to protect wildlife than to restore habitat and populations, the proactive measures in the Wildlife Action Plan provide an opportunity to protect the Tar basin from further impacts. Preserving the quality of the Tar River is one of the goals of the plan.

To do this, conservation partners such as the Tar River Land Conservancy (see "Coordinating Conservation on the Tar," June 2007) and The Nature Conservancy work to broker deals for conservation easements and buffers. Protecting land in priority areas helps reduce sedimentation, buffer the river from adverse impacts and generally maintain the integrity of river basins. It is up to all of us — conservation groups and agencies, local government, industry, agriculture, and citizens — to plan now so the unique resources of the Coastal Plain are healthy for future generations.

Rob Nichols is Eastern aquatic diversity coordinator for the N.C. Wildlife Resources Commission. Jeff Hall is the coordinator of Partners in Amphibian and Reptile Conservation for the commission. George Norris is NCWRC grants and contracts biologist. Carol Price is the commission's Wildlife Action Plan coordinator.

TROUBLE IN THE WETLANDS

Wetlands abound in the Coastal Plain. There are rivers, streams, swamps, pocosins, pine flatwoods, savannas, lakes, ponds and Carolina bays. As a result of these abundant, varied wetlands, amphibian diversity in the Coastal Plain is extremely high. Frogs are particularly diverse — 27 of the 30 species found in the state live in the Coastal Plain. At least 22 species of salamanders call these wetlands home. Researchers are learning more and more about these animals. In some cases, a salamander that has been regarded as a single species for many years is actually a suite of species that look similar, but do not reproduce with one another or share the same geographic distribution.

Unfortunately, Coastal Plain amphibian diversity is in trouble. Two frog species, the Carolina gopher frog and the river frog, are currently listed as threatened and of special concern, respectively (see "The Secret Frog," April 2007, and "The Frog Nobody Missed," Dec. 2005). Of our salamander species, the Eastern tiger salamander is listed as threatened and three others as species of special concern (dwarf salamander, four-toed salamander and Neuse River waterdog). However, there are many other species that also may be suffering declines.

An additional seven frogs (oak toad, Eastern spadefoot, barking treefrog, pine barrens treefrog, Brimley's chorus frog, striped Southern chorus frog and ornate chorus frog) and 10 salamanders (Eastern lesser siren, greater siren, Mabee's salamander, spotted salamander, marbled salamander, Southern dusky salamander, three-lined salamander, four-toed salamander, many-lined salamander and an undescribed species known as the Sandhills Eurycea) are priority species in the N.C. Wildlife Action Plan. Biologists are concerned about these species and will be researching them in the coming years.

Biologists have been looking closely at the Mabee's salamander. Although a terrestrial salamander as an adult, Mabee's salamanders, like other members of the mole salamander family Ambystomatidae, require ephemeral pools for egg deposition and larval development. Researchers from East Carolina University and the Wildlife Commission have searched ponds in Pitt County, the Croatan National Forest and Holly Shelter Game Land for signs of the continued existence of this species. Ponds containing larvae have been found in Pitt County and across the Croatan, but no larvae were found this year in Holly Shelter. So far, much of the research points toward a connection between Mabee's salamanders and Carolina bays, which appear to offer some of the best breeding habitat for this species.

Although the Coastal Plain is rich in aquatic habitats, not all of these hold the same value for amphibians. Nearly all of the protected and priority amphibian species listed above spend part or all of their lives in small, temporary wetlands. These ephemeral pools can be quite small and still be invaluable to amphibians. They can range in size from several acres to no bigger than a bathtub. Vernal pools usually fill in the spring, while autumnal ponds typically fill during the fall.

One of the reasons these wetlands are so rich in amphibian fauna is their hydrology. Some of these ponds dry up once a year, some of them dry up every few years, and still others may hold water for many years and only dry up occasionally. The fact that these ponds do dry up makes them wonderful sites for amphibians. When they dry, invertebrate predators such as giant water bugs, crayfish and dragonfly larvae are reduced or eliminated in many of these wetlands. Only the hardiest of fish species such as mud minnows and mosquito fish are able to endure in a few of these wetlands Many ephemeral ponds are completely free of fish.

Ephemeral wetlands are being lost due to development and many of the most valuable of these temporary pools are found in wet pine savannas. These same savannas also host a wide variety of reptiles, mammals, birds, invertebrates and plants. Outright draining or filling in of these wetlands, along with fragmentation of our landscapes, have caused declines in amphibian species across the Coastal Plain. Increased runoff can overload these small ponds, eventually causing them to become permanently dry.

There are plenty of ways we can help amphibians: reduce the amount of chemicals added to yards, retain large upland buffer zones around wetlands, do not add fish to waters that are currently fish-free, and create small depressions on your land that will only hold water during part of the year. Amphibians will travel considerable distances to get to breeding ponds. Chances are good that if you create one of these ponds on your land, you will have breeding amphibians .

—Jeff Hall

JEFF HALL / NCWRC

MANY-LINED SALAMANDER
(Stereochilus marginatus)