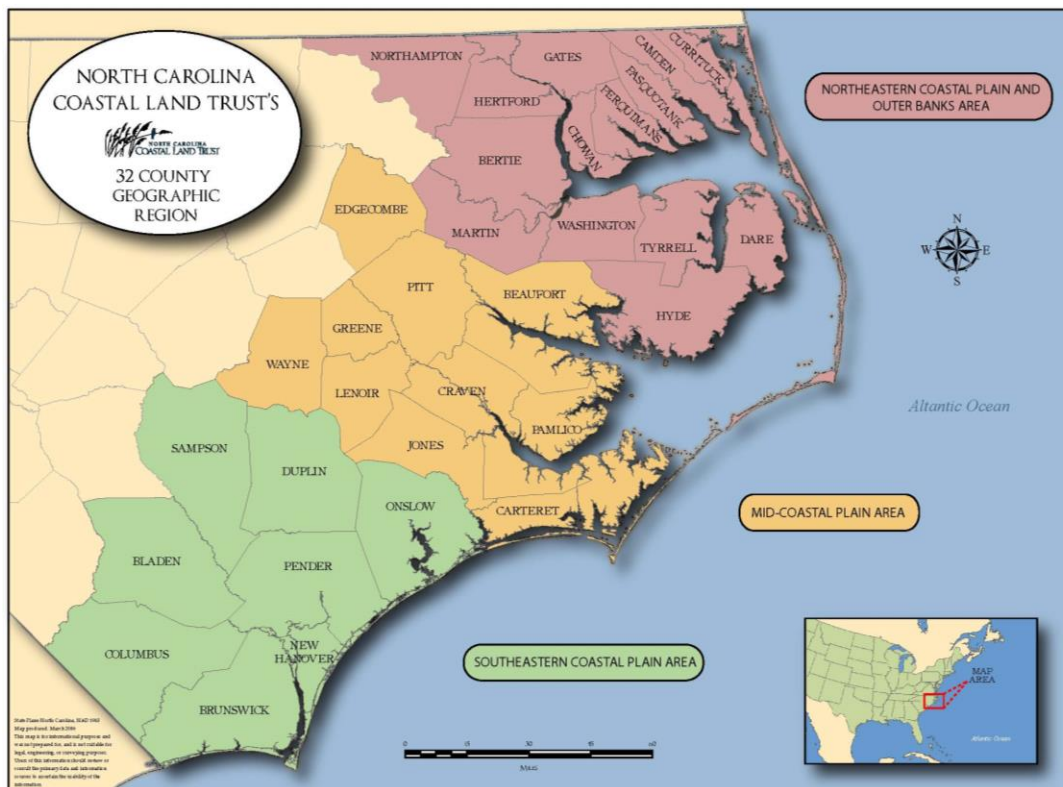




Coastal Region Green Growth Toolbox Appendix

The coastal region is defined by the area of North Carolina from the sandhills to the continental shelf in the Atlantic Ocean. This 32 county geographic region is generally divided into 3 sub-regions: Northeastern Coastal Plain and Outer Banks; Mid-Coastal Plain; and Southeastern Coastal Plain. The Northeastern Coastal Plain is the area surrounding the Albemarle Sound and includes the Pasquotank, Chowan, and Roanoke watersheds. The Mid-Coastal Plain is the area around the Pamlico Sound and includes the Tar-Pamlico, Neuse and White Oak watersheds. The Southeastern Coastal Plain is the area associated with the Cape Fear and Lumber River watersheds.



The coastal plain of North Carolina is distinguished by unusual geology and the greatest biological diversity along the Atlantic Coast north of Florida. A large variety of habitats have nurtured a multitude of plants and animals, many found nowhere else in the world. The coastal plain is a mosaic of barrier islands, estuarine marshes, tidal creeks, sandy pine ridges, pocosins, blackwater and brownwater river corridors.

The two biggest economic engines in this region are tourism and agriculture. Tourism is mainly focused along the coast, with barrier island beaches as the main attraction. Route 17, which runs along the entire North Carolina coast, provides transportation to the islands and coastal communities. On the west side of Route 17, the landscape is dominated by agriculture; everything from small family farms to large corporate operations.

Important Habitats in the Coastal Region

The following habitats are some of the highest priorities for conservation in the coastal region.

Longleaf Pine and Pocosin Ecosystem

Longleaf pine, wet pine savanna, and pocosin habitats intermingle over much of the coastal landscape on interstream terraces.

- Longleaf pine communities have been reduced to just 3% of their previous range throughout the southeast, according to the NC Wildlife Action Plan. It is one of the most endangered habitats in the United States, due to development and lack of fire. Two species that are dependent on longleaf include the fox squirrel (*Sciurus niger*)- state rare; and red-cockaded woodpecker (*Picoides borealis*)- federal and state endangered.
- Wet pine savannas are mineral wetlands characterized by an open canopy of pine and an understory of wiregrass, herbs or shrubs. The Carolina gopher frog (*Rana capito capito*) a state-threatened species, that uses this habitat.
- Pocosins are shrub dominated habitats occurring on peat-filled Carolina Bays and depressions. Many species of wildlife use this habitat, including a variety of neo-tropical migratory birds.

Mesic and Dry Hardwood Forests

- Mesic forest occurs on moist upland habitat that is sheltered from fire by topography or moisture. Natural fires in mesic forests are infrequent and of low intensity. The canebrake rattlesnake (*Crotalus horridus*) is a species of concern that lives in mesic forests.
- Oak forests are no longer common in the coastal plain except in small patches. The quality of these forests depends on the age of the trees, management history and fragmentation. This habitat type also includes remnants of fire-deprived longleaf pine. Larger tracts of this habitat contain a variety of birds, bats, small mammals, reptiles and amphibians.
- Early successional habitats are often found at the edge of agriculture fields and woodlands, and are created by forest clearing. Naturally, these habitats are formed by intense fires, disease, or storms. High quality early successional habitat includes a

variety of pasture, cropland, and open clearings. Grassland birds and small mammals thrive in this habitat.

Barrier Islands and Estuarine Ecosystems

This ecosystem is vulnerable from both natural and human causes. Several globally-threatened species occur in these habitats.

- The beach/dune habitat found on barrier islands is particularly important to nesting sea turtles and shorebirds. These species rely on the dynamic nature of the beach and need storms to re-create wide beaches with bare sand. Loggerhead, Green, Leatherback, and Kemp's Ridley sea turtles are federally-listed species that nest on North Carolina's barrier islands.
- Maritime forest is found on the upper dunes and flats protected by salt water and sea spray. It is one of North Carolina's most endangered habitats due to the development of barrier islands. Maritime forest is important breeding and migration habitat for migratory birds, and key breeding habitat for the eastern painted bunting (*Passerina ciris*)- rare in North Carolina.
- Estuarine communities include a variety of habitats from mud flats and algal mats to marshes and small islands. Waterfowl, birds-of-prey, shorebirds and furbearers all use estuarine habitat during some stage of their life cycles.
- Coastal fringe forest occurs along the mainland edge usually on sand bluffs overlooking estuaries. Small mammals, amphibians and reptiles seek refuge here, along with migrating birds. The Calcareous Coastal Fringe natural community, a variety of coastal fringe forest, is considered globally rare.

Non-Alluvial Mineral Wetlands

Mineral wetlands that are not associated with rivers and streams are found in the coastal plain where high water tables are present. Historically, most of these wetlands were drained for farmland or forestry since they can support heavy machinery better than peatland, and mineral soils are especially fertile. Rafinesque's big-eared bat (*Corynorhinus rafinesquii*) is a state-threatened species that roosts in large hollow trees found in these wetland habitats.

Small Wetland Communities

Small wetlands include vernal pools, cypress savanna, beaver ponds, Carolina bays, and limesinks. These communities provide key habitat for crayfish, amphibians, reptiles and wading

birds. Many species that use these areas also need large buffers of upland habitat to complete their life cycle requirements.

Lakes and Reservoirs

Natural lakes and their shorelines are important foraging, breeding and nesting habitat for birds. Many natural lakes are under public ownership, however shoreline protection varies. Large birds such as the Bald Eagle (*Haliaeetus leucocephalus*)-a federal and state threatened species, and colonies of Wood Stork (*Mycteria Americana*)- a federal and state endangered species, forage and nest around open water.

Forested Floodplains and Riverine Aquatic Communities

These habitat types are associated with the blackwater and brownwater river systems in the coastal plain. The major coastal watersheds, from north to south, include Pasquotank, Chowan, Roanoke, Tar-Pamlico, Neuse, White Oak, Cape Fear and Lumber River watersheds.

- Coastal plain floodplain habitat includes levee forest, cypress gum swamps, bottomland hardwoods, and alluvial floodplains along the blackwater and brownwater rivers in the coastal plain. Wading bird rookeries of heron and egret species are reliant on these floodplain systems.
- Riverine aquatic habitat is important for aquatic animals, as well as species that use aquatic habitat during part of their life cycle (like amphibians). Semi-aquatic wildlife such as otters and beavers rely on this habitat for their food base.

Tidal swamp forest and wetlands

These habitats are found along rivers or sounds, where flooding is caused by lunar or wind tides. The level of flooding and salt content determine what type of vegetation is present. Tidal swamps are found mainly in northeastern North Carolina around Currituck and Albemarle sounds, and sporadically southward alongside estuaries.

Coastal Plain Partnerships

Albemarle-Pamlico Conservation and Communities Collaborative

This collaborative includes institutions interested in balancing the long-term conservation of natural systems with opportunities for the well-being of all the region's citizens. It is intended to provide a forum for working collaboratively whenever feasible. Within their authority and consonant with their missions, these institutions will work to maintain and protect the integrity and function of the region's ecosystems in a way that allows for balanced, sustainable growth.

Onslow Bight Conservation Forum

This Forum of 14 different organizations includes state and federal natural resource agencies and the US military. The Onslow Bight landscape is located in the mid-coastal plain of North Carolina. The mission of the Onslow Bight Conservation Forum is to “provide for open discussion among the participants concerning the long-term conservation and enhancement of biological diversity and ecosystem sustainability throughout the Onslow Bight Landscape compatible with the land use, conservation, and management objectives of the participating organizations and agencies.” The Onslow Bight Conservation Forum is named after the nautical term “Bight” that refers to a wide bay formed by a curve in the shoreline, as is the case in Onslow County. This area is home to spectacular longleaf pine savannahs containing large populations of red cockaded woodpeckers, a federally endangered species.

Cape Fear Arch Conservation Collaboration

This Collaboration of 27 different organizations focuses on land management in the southeastern coastal plain of North Carolina and northeastern South Carolina. The mission of the collaboration is to “develop and implement a community conservation vision to build awareness, protection and stewardship of the region’s important resources.” The Cape Fear Arch Conservation Collaboration is named after the geological feature The Cape Fear Arch, an uplift of sand and limestone deposits formed 35-45 million years ago. The Cape Fear Arch has given rise to unique natural communities and a large diversity of plants and animals. Twenty-two plants and nineteen animals are endemic to the region, meaning they are found nowhere else in the world. This region has been identified in the NC Wildlife Action Plan, The Nature Conservancy’s Mid-Atlantic Coastal Plain Ecoregional Plan and One North Carolina Naturally as one of the highest priority areas for conservation efforts.

Coastal Region GIS Data

Section 2 of the Green Growth Toolbox Handbook presents conservation GIS data layers that apply statewide. Page 24 of the handbook lists the original sources of the statewide data, how frequently they are updated, and who created the data. All of the data layers can be downloaded from the Green Growth Toolbox website at www.ncwildlife.org/greengrowth/Conservation_Data.htm. Most of the data are also available at www.NCOneMap.com. Additional data specific to the coast has been included in this coastal dataset. Copies of these layers are available on the Green Growth website under “Ecological Region Data” (http://www.ncwildlife.org/greengrowth/Conservation_Data.htm).

Hydrologic Units for Streams & Rivers- This hydrologic layer represents watersheds at the scale that is used for watershed planning by the state and federal government. This data was created by the NC Department of Natural Resources Division of Water Resources and can be downloaded from NC One Map.

Ambient Water Quality Monitoring Sites- These points represent routine water quality sampling sites monitored by the NC Department of Environment and Natural Resources, Division of Water Quality. For the associated water quality data for these sites, please contact the Division of Water Quality at 919-733-9960.

Beach Access Areas- This layer represents public water access points developed by the NC Division of Coastal Management. Sites vary in amenities such as restrooms, parking, showers, and picnic tables. Details on the amenities offered can be found in the attribute table for this layer.

Benthic Monitoring Sites- The benthic monitoring sites layer represents aquatic sampling for macroinvertebrates. The “Bioclass” column in the attribute table for this layer notes whether the site is considered excellent to poor. Definitions for these values are below. Questions on specific monitoring data can be directed to NC Department of Environmental Conservation, Division of Water Resources, Biological Assessment Branch at <http://portal.ncdenr.org/web/wq/ess/bau>.

Value	Definition
Excellent	Waters with very diverse benthic macroinvertebrate populations, including many pollutant intolerant species.
Good	Waters with healthy but less diverse benthic macroinvertebrate populations and fewer pollutant intolerant species.
Good-Fair	Waters with average benthic macroinvertebrate populations, numbers & diversity.
Fair	Waters with below average diversity or abundance of benthic macroinvertebrate populations. Tolerant species begin to dominate community.
Poor	Waters with very limited benthic macroinvertebrate populations, low diversity and/or abundance. Tolerant species are generally dominant.
Not Rated	Locations that have been sampled, but not assigned a water quality rating

Fish Sampling Sites- This layer shows sites where fish communities are assessed to help inform water quality conditions. For specific fish data at a sampling site, please contact the USGS NC Water Science Center at (919) 571-4000.

Shellfish Growing Areas- This layer represents marshlands and waterways critical for a healthy oyster fishery and other valued species. The presence of a Shellfish Growing Area in a waterway or marsh may affect adjacent upland areas in terms of recommended shoreline stabilization methods, set-backs, and stormwater treatment requirements to protect this important resource. The original data source for this layer is www.nconemap.com

EEP Watershed Plan Areas- This layer shows those watersheds that have a Watershed Restoration Plan produced by the NC Department of Environment & Natural Resources, Ecosystem Enhancement Program. Specific watershed planning documents and more information can be gathered by calling the Ecosystem Enhancement Program at (919)733-5208. The source for this data is www.nconemap.com

Water Supply Watersheds- This layer represents waters and associated watersheds that are used for human water supplies. The source of this data is www.nconemap.com

Regional Plans

Conservation Plans: These plans are specific to a coastal region or to particular species and/or natural community.

- America’s Longleaf Initiative. 2008. *Conservation Plan, Draft*.
- Cape Fear Arch Conservation Collaboration. 2009. *Cape Fear Arch Conservation Plan, Working Draft*.
- Department of Environment and Natural Resources. 2009. *NC Natural Heritage Program Biennial Protection Plan*. Raleigh, North Carolina.
- Onslow Bight Conservation Forum. 2004. *Onslow Bight Conservation Design Plan*.

County Land Use Plans: The Coastal Area Management Act (CAMA) requires the 20 coastal counties to have a local land-use plan to guide policies, project development, ordinances, and public investments. The following counties have CAMA land use plans, or independent county land use plans.

Northeastern Coastal Plain	Mid-Coastal Plain	Southeastern Coastal Plain
Bertie	Beaufort	Bladen
Camden	Carteret	Brunswick
Dare	Craven	New Hanover
Gates	Lenoir	Onslow
Hyde	Pamlico	Pender
Pasquotank	Pitt	
Perquimans	Wayne	

Basinwide Water Quality Plans: The Department of Environment and Natural Resources’ Division of Water Quality developed these watershed plans to identify water quality problems, restore impaired waters, protect high value resource waters and unimpaired waters while allowing for economic growth. The following coastal watersheds have Basinwide Water Quality Plans.

Northeastern Coastal Plain	Mid-Coastal Plain	Southeastern Coastal Plain
Pasquotank River- 2007	Neuse River- 2009	Cape Fear River- 2004
Roanoke River- 2006	Tar- Pamlico Rivers- 2004	Lumber River- 2009
Chowan River- 2007	White Oak River- 2007	

Natural Area Inventories: The North Carolina Natural Heritage Program has developed the following natural area inventories. These reports document the most significant natural areas

in the counties, describes their features, and documents all known natural communities and rare species of plants and animals associated with them.

Northeastern Coastal Plain	Mid-Coastal Plain	Southeastern Coastal Plain
Bertie	Beaufort	Bladen
Camden	Carteret	Brunswick
Chowan	Craven	Columbus
Currituck	Edgecombe	Duplin
Dare	Greene	New Hanover
Gates	Jones	Onslow
Hertford	Lenoir	Pender
Hyde	Pamlico	Sampson
Martin	Pitt	
Northhampton	Wayne	
Pasquotank		
Perquimans		
Tyrrell		
Washington		

Regional Green Growth Contacts

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Southern Environmental Law Center	David Farren, Attorney	919-967-1450	dfarren@selcnc.org
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