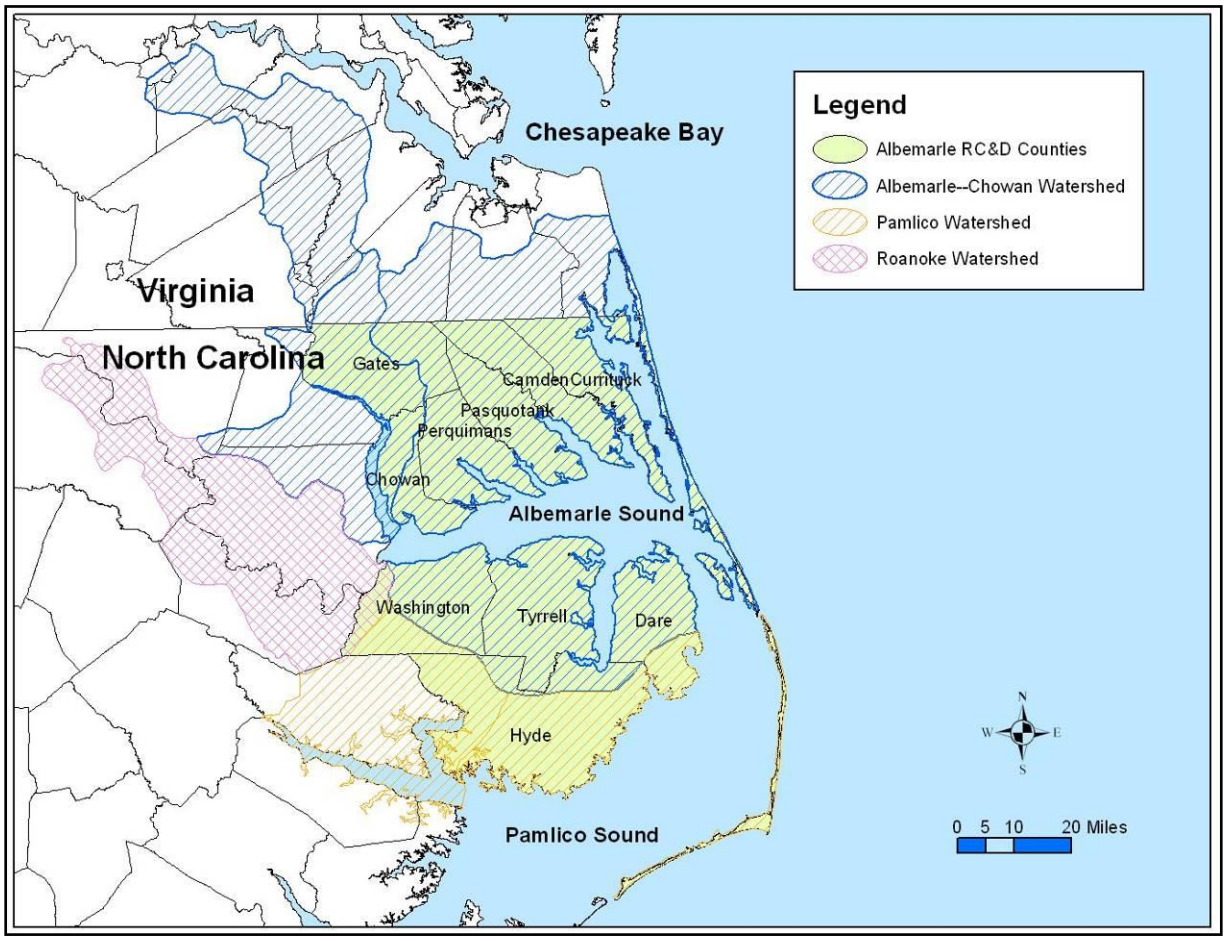
Albemarle Resource Conservation and Development Council

Examples of Projects in Land and Water Conservation

The Albemarle RC&D Council partners with local governments, state and federal agencies, schools and other non-profit groups in 10 counties around the Albemarle and Pamlico Sounds to implement projects that balance resource conservation and economic development. In response to increasing development in the region and its impact on water quality, the RC&D Council and its partners have secured millions of dollars of grant funds to protect land and water resources. Projects have restored eroded shorelines, conserved wetland forests, developed watershed management plans, and constructed about 50 acres of stormwater wetlands on commercial, residential and public properties. The wetlands also serve as outdoor environmental education classrooms for local schools, county and town planners, and the general public. This document describes some of the land and water conservation projects that the council and its partners have implemented over the last 35 years.



The Albemarle RC&D area includes three major watersheds that drain into the Albemarle and Pamlico Sounds. The Albemarle-Chowan Watershed and Roanoke Watershed extend north into Virginia.

Constructed Wetland Projects

River Road Middle School Wetland and Outdoor Environmental Education Classroom

A drainage ditch between the RRMS and recreational soccer fields was converted into a living wetland.

Close to a major U.S. Coast Guard Base and Elizabeth City State University, River Road Middle School is located in one of the fastest growing areas of Elizabeth City. Farm land on all sides of the school is being converted to residential housing. Non-point stormwater runoff from the school and new residential areas is a major concern for water quality because the area drains directly to the Pasquotank River. The stormwater runoff from this area carries N and P fertilizers from recreational fields and lawns. Stormwater is also known to be a major carrier of fecal coliform bacteria, which contaminates the river and negatively affects shellfish harvesting.

The Albemarle RC&D Council partnered with River Road Middle School, Pasquotank Soil and Water Conservation District and Natural Resources Conservation Service to construct a stormwater wetland at the school. The wetland filters stormwater from the school property, about 10 acres of baseball fields and about 15 acres of new soccer fields.

The wetland has a handicap accessible observation deck and two platforms for taking water samples.

Science teachers at the Middle School use the wetland as an outdoor classroom for biology and environmental education. Project results are being assessed through water quality samples, pre & post education surveys and wetland monitoring.

The River Road Middle School wetland project was funded by the North Carolina Section 319(h) Nonpoint Source Grant Program, US Fish and Wildlife Partners for Fish and Wildlife Program and NC Community Conservation Assistance Program.

Total Project Value: $77,840

Stormwater Wetlands in Edenton and Kill Devil Hills

The Town of Edenton, Town of Kill Devil Hills Albemarle RC&D Council, Natural Resources Conservation Service, and NC State Cooperative Extension partnered in 1996 to design, install, demonstrate and evaluate wetland systems in Edenton and Kill Devil Hills. Storm events were monitored extensively to establish water quality variation in the wetlands and to evaluate growth of wetland vegetation. The wetlands have removed about 85% of total suspended solids, about 50% total N, and about 35% Total P. The project was funded by an EPA 319 grant.

The wetland in Edenton filters stormwater from a 600 acre watershed that includes commercial and residential areas.

The wetland in Kill Devil Hills filters stormwater from residential neighborhoods.

Total Project Value: $126,500

Perquimans County High School Stormwater Wetland

With two grants from the Albemarle-Pamlico National Estuary Program (APNEP), the Albemarle RC&D Council, Perquimans County High School, Perquimans Soil and Water Conservation District and Natural Resources Conservation Service constructed a wetland on school property and, in the process, created a permanent outdoor education laboratory, complete with pedestrian bridge and improved pathways that serve youth, adults and the larger community.

Total Project Value: $30,000

Perquimans Commerce Center Stormwater Wetlands

Perquimans County constructed wetlands along three key drainage outlets at the Commerce Center to filter stormwater from existing and future development. A wetland next to the Perquimans Community Center helps filter stormwater from a paved parking lot and recreational ball fields before it drains into the Perquimans River. Wetlands constructed at two main drainage outlets on the Commerce Center property will help filter stormwater from future business development.

The stormwater wetlands project was funded by the NC Clean Water Management Trust Fund with matching funds from Perquimans County. The Albemarle RC&D Council, Natural Resources Conservation Service, and Perquimans Soil and Water provided technical assistance.

Total Project Value: $50,000

Winfall Water Quality Demonstration Project

A drainage ditch next to Winfall Elementary School was converted to a wetland and outdoor environmental education classroom. The wetland filters stormwater from the school property and removes salt and iron from the adjacent Town of Winfall water treatment plant. Teachers and students at the elementary school use the wetland for science and environmental education. The project was funded by grants from the Pasquotank River Basin Council and NC Adopt-A-Trail Program. The Albemarle RC&D Council, Natural Resources Conservation Service and Perquimans Soil and Water Conservation District provided technical assistance.

Total Project Value: $31,000

Albemarle Resource Conservation and Development Council

Town of Gatesville Stormwater Management Project

The Town of Gatesville, Albemarle RC&D Council, Natural Resources Conservation Service, North Carolina Department of Transportation, and Gates Soil and Water Conservation District worked together to restore about 4,100 feet of drainage system and construct a one acre wetland to reduce flooding and trap pollutants before they enter Bennett's Creek and the Chowan River. The project was funded with a grant from the Albemarle-Pamlico National Estuary Program.

Total Project Value: $80,500

Chowan County Water Quality Improvement Project

Millions of dollars have been spent over the past 30+ years to improve the water quality in the Albemarle and Pamlico Sounds by controlling the chemicals that flow into and accumulate in these bodies of water. The multi-faceted approach to water quality improvement has included a focus on the practices of commercial enterprises and private landowners who routinely apply nitrogen, phosphorous and other chemicals to the land. Stormwater run-off from these properties carry high concentrations of chemicals into the Sounds, and contribute to the algal blooms, putrid water smells and fish kills in the area.

About 15 acres of wetlands were constructed during the first and second phases of the project.

The Albemarle-Pamlico Estuarine Study, completed in the 1980s, identified golf courses as one of many commercial contributors to water pollution since golf courses traditionally apply significant amounts of chemicals and fertilizers to maintain fairways and greens. The golf course in Edenton was no exception. Created on land that was originally part of a military complex that occupied several miles of waterfront, natural water storage and filtration systems had been destroyed by earlier development efforts, and direct run-off to the Sound intensified ongoing water quality problems in the Albemarle area.

In the second phase of the project, portions of three deep ponds were converted to wetlands.

Funded by a $414,000 grant from the *NC Clean Water Management Trust Fund*, the drainage system at

Chowan Golf and Country Club (CGCC) has been redesigned to create a series of wetlands and buffers which can store more than three inches of rainfall and absorb nitrogen, phosphorous and sediment before the "filtered" water flows into the Sound. Permanent easements were created next to all areas converted to wetlands and over 18,000 wetland plants and trees have been added to create riparian buffers. In addition, a nutrient management plan and a chemical handling facility have been established to ensure appropriate application and storage of all chemicals used by CGCC. The overall result of this project, initiated in 2003, will be the significant reduction of stormwater pollution entering the Sound from chemicals and fertilizers used to maintain the golf course.

This project was endorsed by the Chowan County Commissioners and Manager. Project collaborators included Albemarle RC&D Council, Chowan Soil & Water Conservation District, USDA-Natural Resources Conservation Service, NCSU– Department of Bio-Agriculture Engineering, NC Dept of Agriculture, Chowan County Extension Service, and CGCC members, board of directors and professional staff.

Total Project Value: $827,000

Northeastern Regional Airport and Edenton Industrial Park Wetlands

The Chowan River Basin was the first water body designated as nutrient-sensitive in the state in 1979. With drainage flowing directly to the Albemarle Sound, Northeastern Regional Airport and Edenton Industrial Park were identified as significant sources of non-point pollution. The Town of Edenton and Chowan County collaborated on a project to establish 132 acres of riparian buffer between the airport and industrial park and the Albemarle Sound. A 20-acre system of wetlands was constructed to receive and filter all runoff, including floodwaters, from the 200-acre watershed before it enters the Albemarle Sound.

The project was funded by the NC Clean Water Management Trust Fund with matching funds from the Town of Edenton and Chowan County. The Albemarle RC&D Council, Natural Resources Conservation Service and Chowan Soil and Water Conservation District provide technical assistance.

Total Project Value: $880,000

Guinea Mill In-Stream Wetland

Rapid residential development in northern Currituck County is negatively impacting water quality of the Currituck Sound. Currituck County, Currituck Soil and Water Conservation District, Albemarle RC&D Council and Natural Resources Conservation Service collaborated on a project to construct 8.5 acres of in-stream wetlands on a key section of drainage canal. The project also established 49 acres of riparian buffers. Old spoil piles were leveled and seeded to enhance wildlife habitat. The project is helping protect water quality by reducing the nutrient load in the receiving waters of Tulls Creek and Tulls Bay by 30%-50%.

The project was funded by a grant from the NC Clean Water Management Trust Fund with matching funds from Currituck County.

Total Project Value: $454,000

Manteo High School Constructed Wetland and Outdoor Environmental Education Classroom

A constructed wetland at Manteo High School in Dare County is improving the water quality in Dough's Creek and Shallowbag Bay, and serves as an outdoor learning facility for students and faculty of the High School, and the general public.

The constructed wetland receives stormwater from approximately 16 acres of recreational fields and parking lots. A 400 foot boardwalk and observation deck allows access to the wetland and Dough's Creek. A platform on Dough's Creek allows teachers and students to launch canoes and kayaks for close study of coastal ecosystems.

The project was made possible through grants from the Albemarle-Pamlico National Estuary Program and US Fish and Wildlife Service—Partners for Fish and Wildlife Program. Other project partners included The Town of Manteo, Dare County Schools, UNC Coastal Studies Institute, Dare Soil and Water Conservation District, NC Coastal Federation and Natural Resources Conservation Service. The Albemarle RC&D Council assisted with the grant applications and provided project design and management support.

Total Project Value: $82,800

Elizabeth City Middle School Constructed Wetland and Outdoor Environmental Education Classroom

The Elizabeth City Middle School campus is built adjacent to the Pasquotank River with a buffer of forested wetlands between the school and the river. Where a soccer field ends – a significant cypress swamp forest begins. Stormwater from the school buildings and parking lots is conveyed to open ditches and swales that come together at a single point before exiting the upland portion of the property into the swamp forest of the Pasquotank River.

This APNEP-funded project constructed a wetland on the upland portion of the school property at the point where the ditch and swale systems come together – to intercept the school's stormwater before it enters the Pasquotank River. The constructed wetland assists with sediment reduction, reduces water velocity and reduces nutrients and other toxicants from the stormwater before it enters the natural wetland. This project also provides a learning environment for students and faculty of Elizabeth City Middle School as well as for the adjacent elementary and high school populations. Parents and visitors to the campus have access to the wetland learning environment as well. Future plans include projects to construct a boardwalk into the natural wetland and more extensive educational signage.

The Albemarle RC&D Council supervised wetland construction and planting activities. The UNC Coastal Studies Institute worked closely with middle school science teachers and students to develop and implement a wetland education and water quality monitoring curriculum. The Natural Resources Conservation Service provided technical assistance to construct and plant the wetland. Elizabeth City State University partnered with the school to engage students in lessons relating GIS tools and how they can be used to promote better stewardship through community education of environmental systems.

Total Project Value: $45,000

First Flight Wetlands and Outdoor Environmental Education Classroom

A project at First Flight Elementary, Middle School, and High School enhanced an existing stormwater management pond and constructed a covered pavilion for environmental education. Students and faculty planted over 1000 native plant to increase vegetative diversity and create a functional wetland. Two platforms were also constructed to help with detailed observation, sampling, and studies involving water quality improvements, native wetland flora, fauna, and natural processes.

The project was funded through grants from the North Carolina Section 319(h) Nonpoint Source Grant Program, and US Fish and Wildlife Partners for Fish and Wildlife Program.

Total Project Value: $28,000

Shoreline Stabilization Projects

Perquimans Commerce Centre Shoreline Stabilization and Stormwater Wetlands Project

Storm surge and heavy rain from Hurricane Isabel removed about 30 feet of shoreline bluff in front of the multi-million dollar Community Center in Perquimans County. The county, with technical assistance from Perquimans Soil and Water, Natural Resources Conservation Service and Albemarle RC&D Council stabilized about 400 ft of shoreline bluff in front of the Community Center building, and installed about 1000 ft of rock sill in shallow water along the Commerce Centre shoreline (photo at left).

Native trees, shrubs and grasses were planted along the bluff and shoreline to help stabilize this important piece of public property. The project was funded through a grant from the NC Clean Water Management Trust Fund and matching funds from Perquimans County.

Total Project Value: $862,000

Newbold-White House Shoreline Stabilization Demonstration Project

The Albemarle RC&D Council worked with the Perquimans County Restoration Association, Newbold-White House and NCRS on a project to demonstrate shoreline restoration, protection and conservation on the Perquimans River. The project:

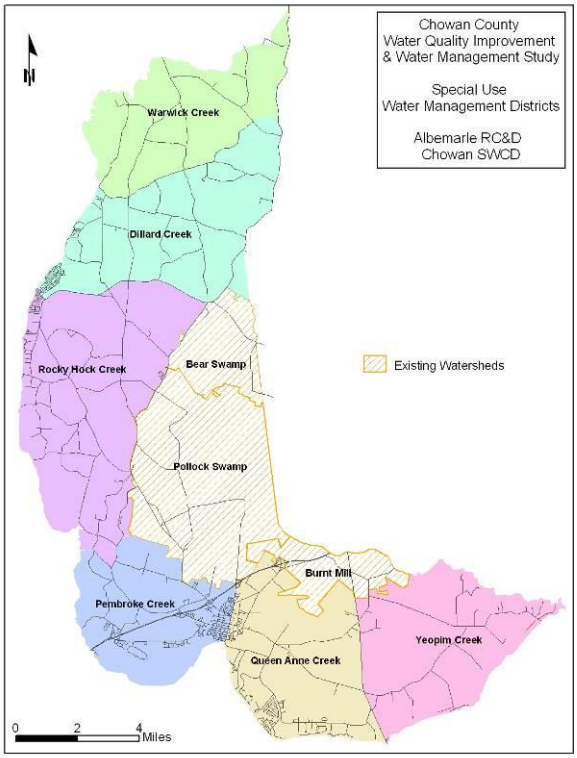
- Constructed 150 feet of stone sills or breakwater and 200 feet of timber sill or breakwater to protect the toe of the slope on the Perquimans River shoreline
- Restored the shoreline with native vegetation including 200 feet of "biolog" along the toe of the slope
- Constructed a nature trail and boardwalk access to the shoreline demonstration
- Purchased 20 acres of shoreline for a conservation easement.

The project was funded through a grant from the NC Clean Water Management Trust Fund.

Total Project Value: $403,500

Water Management Studies

Chowan County Water Quality Improvement and Water Management Study

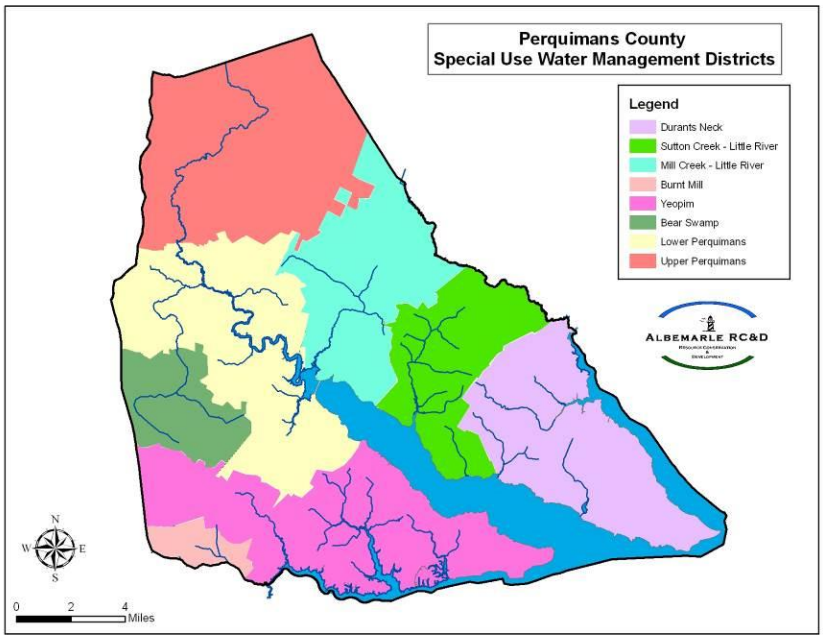


Chowan County contracted the Albemarle RC&D Council to conduct a county-wide water quality improvement and water management study. The Albemarle RC&D worked closely with the Chowan Soil and Water Conservation District (SWCD) and the Natural Resources Conservation Service to conduct the study. Accomplishments included:

- Assisted the County with identifying and obtaining GIS data
- Developed an inventory of drainage sub-basins and surface drainage features using GPS and GIS
- Identified stormwater drainage points, locations where cross-sections are likely, system components needing maintenance, and other factors that would contribute adversely to water quality
- Developed a list of areas to be analyzed in the future for possible use of stormwater Best Management Practices (BMPs)
- Provided draft language for establishing Special Use Water Management Districts
- Provided language for a new county ordinance that protects drainage and manages stormwater and helped the county pass the new ordinance
- Developed a report documenting data-collection methods, data areas to be analyzed for BMPs and recommended improvements to the Town's stormwater system.
- Installed a Filterra filtration system in a parking lot at the high school in Edenton to demonstrate a stormwater retrofit for coastal communities.

Total Project Value: $113,000

Perquimans County Water Management Study



The Albemarle RC&D Council worked with Perquimans County, Perquimans Soil and Water Conservation District, NRCS and an engineering firm to conduct a county-wide water management study. The project:

- Developed an inventory of drainage sub-basins and surface drainage
- Assisted the county with identifying and obtaining GIS data
- Identified stormwater drainage points, locations where cross-sections are likely, system components needing maintenance, and other factors that would contribute adversely to water quality
- Identified areas to be analyzed in the future for possible use of stormwater Best Management Practices (BMPs)
- Identified Special-Use Water Management Districts.

The project was funded through a grant from the North Carolina Department of Environment and Natural Resources, Water Resources Section and matching funds from Perquimans County.

Total Project Value: $30,000

Conservation of Riparian Forests

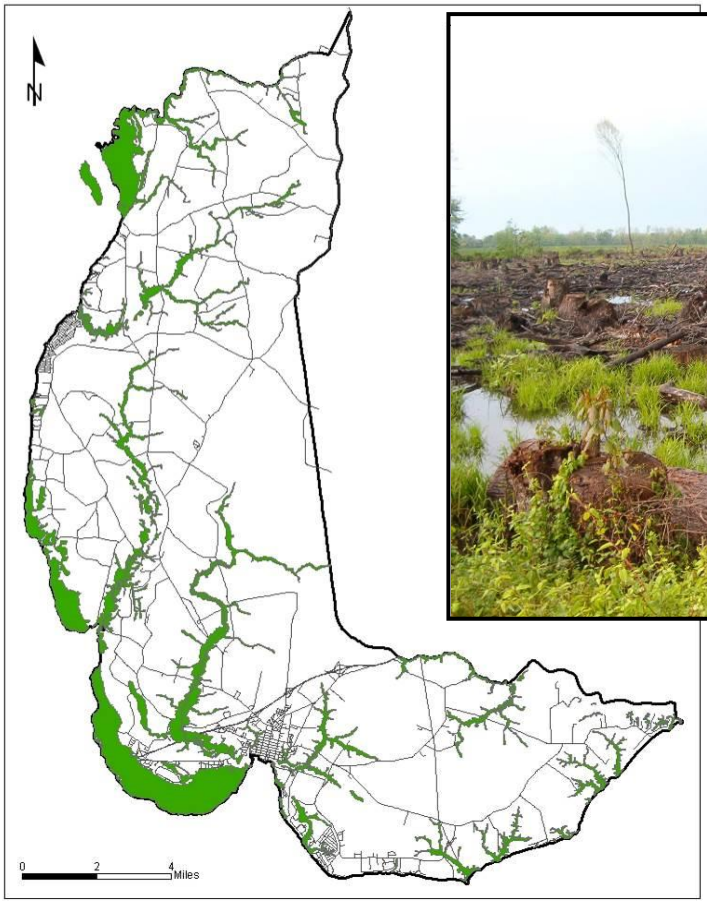
Chowan County Riparian Forest Conservation

Chowan County has approximately 11,800 acres of wetland forests along rivers, streams and creeks. These riparian forests are critical for managing water and improving water quality. They help filter sediments and pollutants from stormwater, and protect floodplains that move water from storm events. These biologically diverse and scenic forests also provide critical habitat for wildlife, and are a key asset for the rapidly expanding nature tourism industry.

The wetland forests in Chowan County represent one of the county's greatest assets for managing water and improving water quality. The Albemarle RC&D Council is working with the county to establish partnerships with state and federal agencies, land trusts, conservation non-profit groups, and private landowners to conserve these critical forests through working easements and other mechanisms.

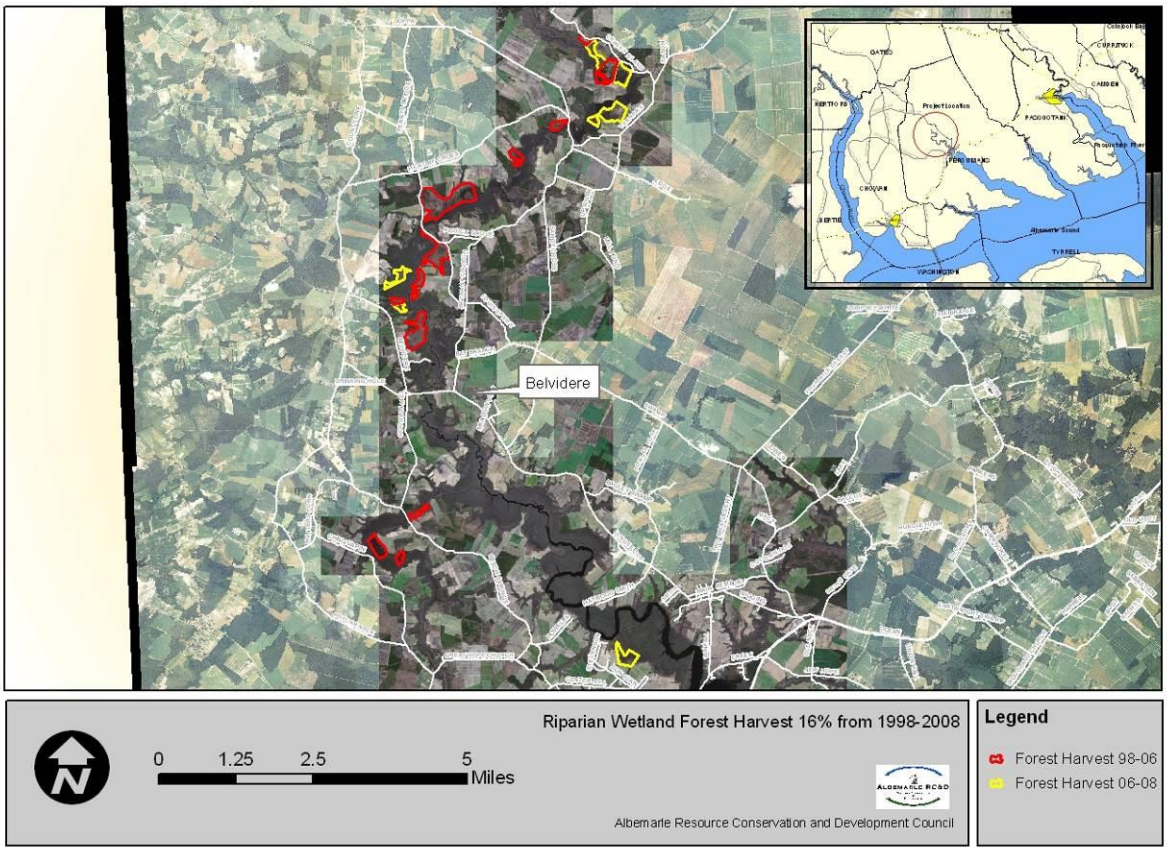
Estimated Project Cost: $1,000,000

Wetland Forests in Chowan County



Wetland forests of cypress and gum along rivers, streams and creeks should be conserved to help mitigate floods, protect water quality, provide critical habitat for wildlife and opportunities for recreation.

Perquimans River Riparian Forest Conservation



The Perquimans River in Northeastern North Carolina is recognized at the local, state and national levels as a unique natural asset that must be conserved for water quality benefits, flood mitigation, critical fish and wildlife habitat and job creation from nature tourism. From its headwaters in the Great Dismal Swamp to its mouth at the Albemarle Sound, the River is bordered by approximately 4,400 acres of "exceptional" mature cypress-gum swamp forests as defined by the N.C. Division of Coastal Management. The extent of these exceptional wetlands makes the Perquimans River truly unique in eastern N.C. However, 16% of these wetland forests were clearcut in a ten-year period from 1998 to 2008. At this rate of harvest, the wetland riparian forests will disappear in about 60 years.

The Albemarle RC&D Council is working with federal and state agencies, local organizations and landowners to conserve these critical forests through working easements and other mechanisms.

Estimated Project Cost: $2,000,000

Storm Clean-up of Rivers, Streams and Canals

The Albemarle RC&D Council has worked with county and local governments to secure almost $3,000,000 in state and federal funds to clean hundreds of miles of rivers, creeks and canals from damage caused by hurricanes and tropical storms. These projects have helped protect water quality, drainage and navigation in the council's 10-county area.