

Section C

Current and Future Water Quality Initiatives

Chapter 1 - Current Water Quality Initiatives

1.1 Workshop Summaries

Two workshops were held in the Pasquotank River basin in March 2001. The Albemarle-Pamlico National Estuary Program's Pasquotank Regional Council and the NC Cooperative Extension Service cosponsored the workshops. There were 55 people in attendance representing a wide variety of interests (Figure C-1).

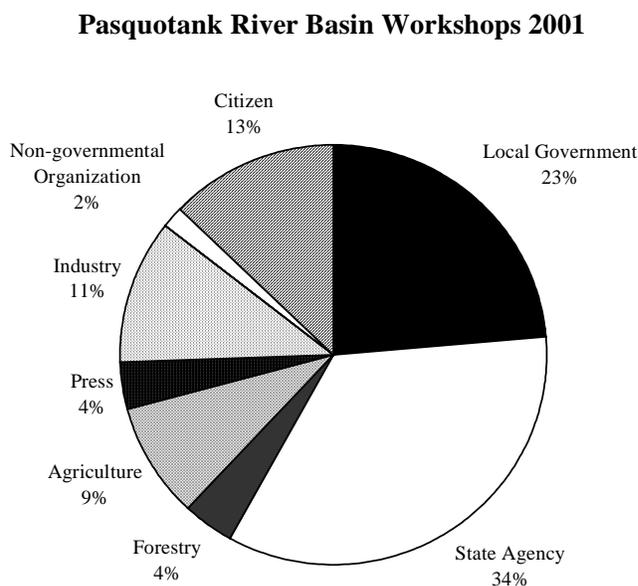


Figure C-1 Pasquotank River Basin Water Quality Workshop Participants

DWQ staff gave presentations about basinwide planning and an overview of recommendations in the 1997 plan and what has been accomplished since. Representatives from several local initiatives spoke, including the Wetlands Restoration Program, Virginia's Southern Watershed Assessment Program, the Albemarle-Pamlico Citizen's Water Quality Monitoring Program, and the Albemarle-Pamlico National Estuary Program's Pasquotank Regional Council. In addition to the spoken presentations, several local initiatives shared information about their programs through written materials. Workshop attendees were asked to discuss the following questions in small groups:

- 1) *What are the main threats to water quality in the basin?*
- 2) *Where are the problem areas or waters? And what recommendations do you have for addressing these problem areas/waters?*
- 3) *Who should address the problems? (i.e., local agencies, organizations, etc.)*

The discussion on these questions was very productive. Comments and responses were recorded. A general summary providing common ideas and viewpoints expressed by more than one group is presented below. DWQ considered these comments while drafting the revised Pasquotank River Basinwide Water Quality Plan and will continue to use these comments to guide water quality activities in the Pasquotank River basin. Detailed workshop notes are included as Appendix V.

Important Issues Basinwide

The most frequently cited concerns about water quality as identified by workshop participants are presented in Table C-1.

Table C-1 Basinwide Concerns Commented by Workshop Participants

Issue	Recommendation	Responsible Parties
◆ Septic system management	<ul style="list-style-type: none"> ◆ Promote decentralized wastewater management ◆ Educate about effective treatment ◆ Improve water quality testing ◆ Mandate particular systems on a case-by-case basis 	<ul style="list-style-type: none"> ◆ Nags Head Model ◆ Roper facility ◆ North Carolina Coop. Extension Service (CES)
◆ Submerged aquatic vegetation loss	<ul style="list-style-type: none"> ◆ Increase automated monitoring through the Knotts Island Ferry ◆ Extend UNC/Duke’s study to the northeast ◆ Analyze data taking into account wind, flow, salinity ◆ Monitor more ◆ Conduct an assessment of where we need to go in terms of future science needs ◆ Ensure regulations have enforcement teeth 	<ul style="list-style-type: none"> ◆ Ferry system ◆ State ◆ Trained citizens ◆ Public ◆ DWQ
◆ Growth and development	<ul style="list-style-type: none"> ◆ Integrate DWQ basin planning into CAMA (i.e., water/land use plan) ◆ Manage effectively ◆ Mandate smart growth approach which prevents environmental degradation ◆ Ensure funding for mandates ◆ Identify and protect critical areas ◆ Restrict uses in critical areas ◆ Promote acquisition ◆ Institute build-out restriction (i.e., short-term and long-term) 	<ul style="list-style-type: none"> ◆ DMF Coastal Habitat Protection Plans ◆ Nature Conservancy ◆ CAMA ◆ Local governments ◆ Federal government
◆ Erosion	<ul style="list-style-type: none"> ◆ Implement buffers 	◆
◆ Agriculture/Urban nonpoint surface runoff	<ul style="list-style-type: none"> ◆ Monitor ◆ Acquire background information ◆ Educate the public 	◆ DWQ
◆ Research	<ul style="list-style-type: none"> ◆ Conduct more education and research 	<ul style="list-style-type: none"> ◆ DWQ ◆ CES ◆ Universities

◆ BMPs (agriculture) (i.e., water control structures, sediment control and denitrification)	◆ Use the systems the right way ◆ Educate ◆ Build in flexibility	◆ NRCS ◆ CES
◆ Boating waste (i.e., petroleum concentration)	◆ Enforce rules and regulations ◆ Advertise pumpout/disposal facilities available ◆ Increase education	◆ Coast Guard ◆ Fish and Wildlife Services ◆ Marinas
◆ Salt wedge stratification and associated problems	◆	◆
◆ Public Outreach	◆ Publish information on a periodic basis ◆ Use Nags Head's program as example	◆ Local, state and county government
◆ Wetland Loss	◆ Preserve wetlands	◆ US Army Corps of Engineers ◆ Division of Coastal Management ◆ NC DWQ
◆ Enforcement	◆ Adequately staff the state employees ◆ Evaluate existing regulations and get ineffective ones out before making new ones ◆ Ensure better coordination of activities	◆ NCDENR ◆ US Army Corp of Engineers ◆ Federal agencies ◆ General Assembly ◆ Governor

Please refer to Section A, Chapter 4 for discussion of some of these issues. All groups commented that development and wastewater treatment concerns were major threats to water quality in the Pasquotank River basin.

1.2 Federal Initiatives

1.2.1 Clean Water Act – Section 319 Program

Section 319 of the Clean Water Act provides grant money for nonpoint source demonstration projects. Approximately \$1 million is available annually for demonstration and education projects across the state. Project proposals are reviewed and selected by the North Carolina Nonpoint Source Workgroup, made up of state and federal agencies involved in regulation or research associated with nonpoint source pollution.

Pasquotank Nonpoint Source Team

A water quality project was funded through the Section 319(h) grant in 1998. The Pasquotank Nonpoint Source (NPS) Team led the project. The objectives of the project include evaluating homeowners' attitudes about nonpoint source (NPS) pollution issues regarding on-site wastewater and management of on-site wastewater systems in order to develop recommendations for improving on-site wastewater system maintenance, understanding and performance; and demonstrating the effectiveness of an advanced on-site wastewater treatment systems for coliform and nutrient reduction. The team hopes to improve educational opportunities regarding operation and maintenance of on-site wastewater systems.

Information on the Section 319 program, including application deadlines and requests for proposals, are available by calling the DWQ Planning Branch Nonpoint Source Planning Unit at (919) 733-5083 or visit the program's website at <http://h2o.enr.state.nc.us/nps/bigpic.htm>.

1.2.2 US Army Corps of Engineers Projects

The US Army Corps of Engineers is active in the Pasquotank River basin with multiple projects ranging from dredging to environmental assessments.

Currituck Sound Environmental Study

The US Army Corps of Engineers, Wilmington District, is beginning a reconnaissance study to identify the environmental needs for Currituck Sound. This study will consider both nonstructural and structural measures to address environmental quality improvements. For more information, contact Ms. Lias Hetherman, Project Manager, at (910) 251-4831.

Wanchese Marsh Creation and Protection

The proposed plan involves the construction of estuarine creek and marsh habitat using dredged material from maintenance of the Manteo-Oregon Inlet Channel and Side Channel to Wanchese, a portion of the Manteo (Shallowbag) Bay project and enhancing the area by the application of oyster shells to serve as habitat for other oysters. This project will restore or enhance about eight acres of estuarine creek and marsh habitat and protect two acres of adjacent marsh currently threatened by erosion providing a total of ten acres of valuable estuarine marsh habitat that will be enhanced, restored or protected by this project. For more information, contact Mr. Chuck Wilson, US Army Engineer District at (910) 251-4746.

Roanoke Island Festival Park Marsh Restoration

The Roanoke Island Festival Park is located on Ice Plant Island adjacent to Manteo. The Roanoke Island Festival Park is connected to Manteo via a bridge, which crosses Dough's Creek. Dough's Creek is located on Shallowbag Bay, off Roanoke Sound. The proposed project will protect about two acres of existing coastal marsh and wooded wetlands, restore about one acre of shallow water area by restoration of marsh, sea grass and oyster habitat, and enhance about one acre of estuarine habitat by development of oyster reef. For more information, contact Chuck Wilson, US Army Engineer District at (910) 251-4746.

Oregon Inlet Study

In order to improve navigation in the Oregon Inlet for commercial fishing interests, the USACE is undertaking the Oregon Inlet Study. As part of the study, the USACE is preparing the Final Supplement III to the Federal Environmental Impact Statement. To date, no accomplishments have been achieved, but the USACE is working towards placing jetties at the Oregon Inlet. For more information, contact William Adams, US Army Engineer District at (910) 251-4748.

Walter Slough Study

Walter Slough is an existing channel located just north of Oregon Inlet in Dare County. Walter Slough is the only access to the sound and ocean from the Oregon Inlet Fishing Center (OIFC). Walter Slough runs 1.5 miles in an east-west direction and connects to Oregon Inlet Channel. Walter Slough has been maintained periodically using combinations of local, state and United States Coast Guard (USCG) funds. The USACE initiated this study in response to a resolution adopted by the Dare County Board of Commissioners requesting a study to determine if a federal navigation channel can be economically justified, constructed and maintained. Contact Bob Finch, US Army Engineer District at (910) 251-4776 for more information.

PAST PROJECTS 1995-2000

Joyce Creek

This project was authorized in March 1967 and provides for excavated channel improvements beginning at the mouth of Joyce Creek in Camden County, and extending upstream along Joyce Creek and Mill Run to County Road 1232, and along Cypress Run to County Road 1233, a total distance of 9.5 miles, with bottom widths ranging from 10 feet to 40 feet.

Manteo (Shallowbag) Bay, North Carolina

The authorized project provides for a channel 14 feet deep and 400 feet wide from the Atlantic Ocean through Oregon Inlet with connecting 12-foot channels, 100 feet wide, to Pamlico Sound, Manteo and Wanchese; and a channel 6 feet deep and 100 feet wide connecting the Manteo-Oregon Inlet Channel with Albemarle Sound. A newly authorized modification provides for stabilization of Oregon Inlet with a dual rubble-mound jetty system, including means for sand transfer to the down drift beach; a channel through the ocean bar at Oregon Inlet; a channel from the gorge in Oregon Inlet to and through Roanoke Sound to and including a 15-acre basin of the same depth at Wanchese; and a channel from the 12-foot-deep channel in Manteo (Shallowbag) Bay through Roanoke and Albemarle Sounds to deep water near the northern end of Croatan Sound. Manteo (Shallowbag) Bay was most recently dredged in 2001 and is dredged every one to two years. For more information, contact Dan Small, US Army Engineer District at (910) 251-4730.

Avon Harbor

The authorized project provides for a direct channel 6 feet deep, 100 feet wide and 3.5 miles long from the depth in Pamlico Sound southeast to a basin of the same depth, 100 feet wide and 300 feet long at Avon. For more information, contact Marie Hefferon, US Army Engineer District at (910) 251-4730.

Channel From Pamlico Sound To Rodanthe

The channel maintenance will involve the waterway from Pamlico Sound to a basin at Rodanthe. Anticipated construction costs will be \$42,029. The channel was last dredged in 2000 and is

scheduled to be dredged every 30 years. For more information, contact Marie Hefferon, US Army Engineer District at (910) 251-4730.

Rollinson Channel

The Rollinson Channel, located about 3.5 miles northeast of Hatteras Inlet, was last dredged in 2000 and is scheduled to be dredged every two years. The authorized project provides for a channel about 5.1 miles long from deep water in Pamlico Sound to and including a basin of the same depth at Hatteras; a rubble-mound breakwater on each side of the channel at the entrance to the basin; and a channel from that depth in Hatteras Inlet gorge to Rollinson Channel, in the vicinity of the basin at Hatteras. For more information, contact Marie Hefferon, US Army Engineer District at (910) 251-4730.

Dare County Beaches (Bodie Island Portion); Dare County

The US Army Corps of Engineers, Wilmington District, has investigated opportunities to increase storm protection and control beach erosion in the study area. Alternatives include a nonstructural plan, dunes and/or berms of various dimensions, and no-action. The potential impacts associated with beach nourishment within the study area are primarily from the excavation of fill material and the placement of this material on the beach. Impacts will be reduced by use of beach compatible sandy material and avoidance of borrow sites that contain hardbottom or significant cultural resources. Disposal operations will begin as soon as practical after the previous sea turtle nesting season (ending November 15) and continue until construction of a given segment is complete (about 8-12 months). There is no time of year when dredging and beach disposal would avoid all significant resources in the project area. While the initial construction schedule does not avoid all significant resources, the proposed phased construction and efforts to start a given phase as soon as practical after November 15 will cause much of the work to occur during colder, less biologically productive, months. Periodic nourishment (maintenance) will occur between November 16 and April 30 to the degree practical. As agreed in previous protocol developed with USFWS, a sea turtle nest-monitoring program will be implemented by the Corps during initial construction or periodic nourishment if dredging and disposal occur during sea turtle nesting season. Construction of this plan is considered to be economically and environmentally feasible. For more information, contact Chuck Wilson, US Army Engineer District at (910) 251-4746.

1.2.3 US Fish and Wildlife Service

Based on a 1997 mandate by Congress under the National Wildlife Program Improvement Act, the US Fish and Wildlife Service is actively developing Comprehensive Conservation Plans for each of its National Wildlife Refuges (NWR) by 2012. This effort will affect several refuges in the Pasquotank River basin: Alligator River NWR, Currituck NWR, Mackay Island NWR, Pea Island NWR and Pocosin Lakes NWR. The planning process involves a public input component in an effort to:

- Provide a clear statement of direction for management of the refuge.
- Provide refuge neighbors, visitors, the public and government officials with an understanding of service refuge management actions on and around the refuge.

- Ensure that the US Fish and Wildlife Service management actions are consistent with the mandates of the National Wildlife Refuge System.
- Ensure that the management of the refuge considers federal, state and county plans.
- Provide long-term guidance and continuity in refuge management.
- Provide the basis for developing budget requests.

The Pasquotank River basin is incorporated into the Roanoke-Tar-Neuse-Cape Fear Ecosystem management unit that contains a 40,000-square mile area in southeastern Virginia and eastern North Carolina, extending from the piedmont to the Atlantic Coast. The management unit contains 59 federally listed endangered and threatened species and over a half million overwintering ducks, swans and geese; totally almost 400 species of birds. In addition, the unit contains the highest black bear population along the mid-Atlantic coast. Some common environmental challenges in the area include habitat loss, fragmentation, cowbird nest predation, construction, clearing for agriculture and industrial activity. In an effort to address these concerns, the USFWS began in the 1990s to delineate land protection needs; consider ecosystem management factors; and expand its refuge boundaries through partnerships, easements and donations.

For more information, contact Bob Glennon or D.A. Brown at (252) 482-2364 or by email d_a_brown@fws.gov or view the program at rtncf-rci.ral.r4.fws.gov.

1.3 State Initiatives

1.3.1 NC Agriculture Cost Share Program

The North Carolina Agriculture Cost Share Program was established in 1984 to help reduce the sources of agricultural nonpoint source pollution to the state's waters. The program helps owners and renters of established agricultural operations improve their on-farm management by using Best Management Practices (BMPs). These BMPs include vegetative, structural or management systems that can improve the efficiency of farming operations while reducing the potential for surface water and groundwater pollution. The Agriculture Cost Share Program is a voluntary program that reimburses farmers up to 75 percent of the cost of installing an approved BMP. The cost share funds are paid to the farmer once the planned control measures and technical specifications are completed. The annual statewide budget for BMP cost sharing is approximately 6.9 million.

Figure B-2 provides a summary of cost share dollars spent in the Pasquotank River basin between 1995 and 2000. Some of the county lines cross multiple river basins; therefore, some of the expenditures in Gates, Chowan, Washington and Dare may be due to projects in the Chowan, Roanoke or Tar-Pamlico River basins.

For more information about the NC Agriculture Cost Share Program, contact the Division of Soil and Water Conservation at (919) 733-2302.

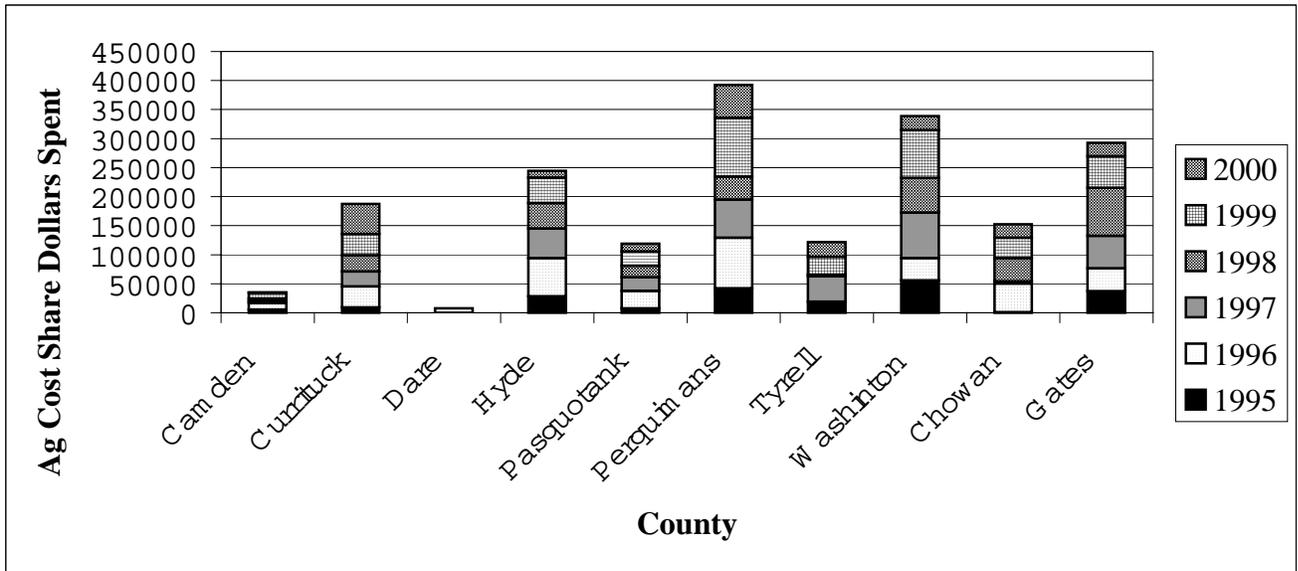


Figure C-2 Agriculture Cost Share Program Dollars Expended (1995-2000) in Counties in the Pasquotank River Basin (Source: NC Division of Soil and Water Conservation, 2001)

1.3.2 Emily and Richardson Preyer-Buckridge Coastal Reserve

The NC Division of Coastal Management acquired the 18,648-acre Preyer-Buckridge Coastal Reserve in June 1999 with funding from the NC Clean Water Management Trust Fund, the NC Natural Heritage Trust Fund, and the US Fish and Wildlife Service's Coastal Wetlands Conservation Grant Program. Additional funding was allocated for restoration of the site's hydrology and the natural communities that have been altered by historical logging activities. The reserve lies along the western shore of the Alligator River in the Pasquotank River basin (HUC 03010205 subbasin 03-01-51). Specific objectives for the Preyer-Buckridge Coastal Reserve are to:

- 1) Restore the natural hydrology and rare vegetative communities, including peatland Atlantic white cedar, pond pine woodland, nonriverine swamp forest and tidal cypress-gum swamp.
- 2) Protect the outstanding water quality of the Alligator River and its tributaries.
- 3) Improve water quality in the coastal area by preserving and restoring functioning wetlands.
- 4) Ensure the protection of aquatic and terrestrial habitat at a watershed level.
- 5) Foster environmental education partnerships with other agencies and organizations.

The Division has completed an environmental assessment for the proposed restoration work and is currently preparing a natural resource management and restoration plan for the reserve. An advisory group consisting of federal and state agency representatives, university researchers and private consultants has been formed to guide the restoration planning process. A natural resource inventory and assessment is underway. In addition, the NC Geodetic Survey has installed a network of elevation benchmarks. Also, dependent on funding, the US Geological Survey will undertake a two-year study to assess the site's hydrology and derive a hydrological model and water budget for the reserve. The USGS will also perform water quality testing in the reserve's

canals. Based on the results of hydrological data collection and analysis, a variety of restoration techniques may be employed with an emphasis on hydrological restoration.

For additional information, visit the DCM website at http://www.ncnerr.org/pubsiteinfo/siteinfo/buckridge/buck_ridge.htm.

1.3.3 NC Division of Water Quality and NC Division of Coastal Management Collaboration

North Carolina's Division of Coastal Management (DCM) and the Division of Water Quality (DWQ) share similar goals regarding water quality, and each program recognizes the value of enhanced coordination in accomplishing program missions. In an effort to enhance coordination, the two programs have agreed to work towards many improved collaborative efforts. Collaboration is intended to increase collaboration through periodic updates, increased review of each other's work products, and joint efforts to provide guidance and technical support between local land use planning programs and basinwide water quality planning.

Some of agreements include the following:

- DCM will provide written annual updates to DWQ on all types of permit activities occurring in the coastal region when the CAMA Permitted Activities Database is operational. Until that time, DCM will provide file access to any DWQ staff to compile the data themselves. This information will inform DWQ of potential impending cumulative effects of permits issued through CAMA.
- DWQ will periodically contact DCM district offices to relay information and gain feedback about the development or implementation of basinwide water quality plans.
- DWQ will discuss the draft basinwide water quality plan with DCM during the public review phase before soliciting the EMC's endorsement.
- DWQ will provide water quality use support methodology updates to DCM staff.
- DCM and DWQ to discuss the information provided to local land use planners (i.e., data packet, water quality designation information, etc.) on an annual basis.
- DCM to update DWQ periodically on local land use plan certifications.
- DCM to update DWQ on incremental reviews of local land use plan implementation pending recent regulation amendments.
- DCM and the CRC should encourage local governments to participate in the Basinwide Planning Program throughout its planning cycle. DCM will share local governments' contact information with DWQ and distribute DWQ programmatic information. DCM staff will also attend basinwide planning workshops and public meetings to the extent they can.
- DCM will provide a list to DWQ of each local government updating its land use plan at least annually. DWQ will provide each local government updating its plan a summary of the applicable water quality and basinwide plan information contained within that local government's jurisdiction. DWQ will provide the information based on the DWQ basinwide planning scale.
- DWQ will incorporate or at least acknowledge applicable local policies contained in certified local land use plans in the development of the respective basinwide plans. In Section C of the basinwide plans, DWQ will identify those local governments that have developed or implemented programs directed toward water quality restoration or protection.

- DWQ will review all draft local land use plans, provide comments to DCM within 30 days identifying potential problem areas, make suggestions for improvements, and identify violations or potential violations of water quality regulations.
- DCM will update DWQ periodically on the status of permitting analysis/cumulative and secondary impacts assessment. DCM and DWQ will work cooperatively to determine the Permitted Activities database query needs. Once the permit tracking system is operational, DCM will provide access for DWQ to conduct queries.
- DCM and DWQ will discuss the information provided in the *Reviewer's Guide for the Consideration of Cumulative and Secondary Impacts of Proposed Development in NEPA/SEPA Documents* specifically related to coastal water quality.
- DCM and DWQ to discuss DCM's guidelines for assessing and mitigating cumulative and secondary impacts during the CAMA permitting process.

For more information, contact the DWQ Planning Branch at (919) 733-5083.

1.3.4 NC Wetlands Restoration Program

The North Carolina Wetlands Restoration Program (NCWRP) is a nonregulatory program responsible for implementing wetland, stream and riparian buffer restoration projects throughout the state. The focus of the program is to improve water quality, flood prevention, fisheries and wildlife habitat, and recreational opportunities. The NCWRP is not a grant program. Instead, the program funds wetland, stream and riparian area projects directly through the Wetlands Restoration Fund.

Restoration projects are targeted through the use and development of the Watershed Restoration Plans for each of the state's 17 major river basins. These plans were developed, in part, using information compiled in DWQ's Basinwide Water Quality Plans. The Watershed Restoration Plans, previously known as the Basinwide Wetlands and Riparian Restoration Plans, are updated every five years on the same schedule as DWQ's Basinwide Water Quality Plans. This year marks the first update cycle of Watershed Restoration Plan for the Pasquotank River basin.

The NCWRP can perform restoration projects cooperatively with other state or federal programs or environmental groups. For example, the NCWRP's efforts can complement projects funded through the Section 319 Program. Integrating wetlands, stream or riparian area restoration components with 319 funded or proposed projects will often improve the overall water quality benefits of the project. The NCWRP actively seeks landowners within the Pasquotank River basin that have restorable wetland, riparian and stream sites.

Table C-2 lists the NCWRP's targeted Local Watersheds [stream names and 14-digit HU codes] in the Pasquotank River basin. This table indicates the pertinent factors that led to the selection of each Targeted Local Watershed. The Targeted Local Watersheds are selected on the basis of available data indicating the need and opportunity for local stream and wetlands restoration projects. Factors such as water quality problems, degraded aquatic habitat, cleared riparian buffers, significant natural areas or species, and increasing development pressures in the watershed are weighted heavily in determining these priority watersheds. Also, the presence of existing or planned water quality or habitat restoration projects in the same local watershed can be a significant factor in the choice of these watersheds. In some cases, NCWRP has used the

water quality information alone (e.g., use impairment, potential increases in nonpoint source pollution) to support the selection of a specific Targeted Local Watershed.

Table C-2 Wetlands Restoration Program Targeted Local Watersheds (2000)

Subbasin	Targeted Local Watershed Name(s)	14 Digit Hydrologic Unit
03-01-50	Folly Swamp	03010205010010
03-01-50	Pasquotank River	03010205010020
03-01-50	Sawyer’s Creek	03010205040010
03-01-50	Knobs/Areneuse	03010205050010
03-01-51	Alligator River	03010205190010
03-01-52	Little River	03010205070010
03-01-54	Tull Creek/Buckskin Creek	03010205020010

* The numbers listed are the last five digits of the 14-digit Hydrologic Unit (HU) for each Local Watershed.

The NCWRP is also working to develop comprehensive Local Watershed Restoration Plans for Folly Swamp, Pasquotank River, Sawyer’s Creek, and Knobs/Areneuse Creek from the Targeted Local Watersheds in subbasin 03-01-50. These more locally-based plans will identify wetland areas, contiguous reaches of stream, and contiguous strips of buffer vegetation that, once restored, will provide significant water quality and other environmental benefits to watersheds. The NCWRP will coordinate with local community groups, local governments and others to develop and implement these plans. Further details about these watersheds are provided in the appropriate subbasin chapter in Section B.

For more information about participating in the NCWRP, please visit the website at <http://h2o.enr.state.nc.us/>, then click on Wetlands Restoration Program or call (919) 733-5208.

1.3.5 Clean Water Management Trust Fund

The Clean Water Management Trust Fund offers approximately \$40 million annually in grants for projects within the broadly focused areas of restoring and protecting state surface waters and establishing a network of riparian buffers and greenways. In the Pasquotank River basin, 11 projects have been funded since 1997 for a total of \$8,326,638. The largest amount of funding (\$3,858,500) was for acquisition purpose, conducted by the NC Division of Coastal Management. Table C-3 outlines the projects.

Table C-3 Projects in the Pasquotank River Basin Funded by the Clean Water Management Trust Fund (as of April 2001)

Project	Project Lead	Amount Funded
Restoration	Currituck County	\$354,610
Buffer Acquisition	Dare County	\$623,000
	NC Division of Coastal Management	\$3,858,500
	NC Wildlife Resources Commission-Harrison Tract	\$534,360
	NC Wildlife Resources Commission-Hassell	\$169,000
	NC Wildlife Resources Commission-Midgett March	\$620,000
	NC Wildlife Resources Commission-Tice	\$250,000
Restoration	Pasquotank County	\$413,600
Greenway Acquisition	Roanoke Island	\$1,200,000
Wastewater	Roanoke Villas Clean Water Foundation	\$245,568
Restoration	Roper	\$60,000

For more information on the CWMTF or these grants, call (252) 830-3222 or www.cwmf.net.

1.3.6 Virginia's Southern Watershed Area Management Program

The Southern Watershed Area Management Program (SWAMP) is a joint venture involving the cities of Chesapeake and Virginia Beach, Virginia; the Hampton Roads Planning District Commission (HRPDC); and the Virginia Coastal Program. SWAMP is intended to protect the natural resources, sensitive lands and water supplies in the Southern Watershed Area (SWA) through management of competing uses and collaboration of local, state and federal agencies working in the SWA.

The SWA is bounded by the Atlantic Ocean to the east, the Great Dismal Swamp to the west, and the State of North Carolina to the south. The SWA covers approximately 325 square miles and contains the sub-watersheds of the Northwest River, the North Landing River and Back Bay.

SWAMP has progressed through several phases. Phase I was largely concerned with the creation of a shared Mission Statement, Goals and Objectives for the SWA, and the development of a Memorandum of Agreement (MOA) between the two cities. The MOA acknowledges the goals and objectives and establishes a policy of attempting to coordinate planning initiatives between the two cities. Research activities accomplished under Phase I include collection of water quality data and initiation of a survey of agencies and organizations working in the SWA. Phase II involved the completion of the agency survey and analysis of the water quality monitoring network in the SWA.

Phase III marked a major transformation in the project. Funding was obtained from the National Oceanic and Atmospheric Administration, through the Virginia Coastal Program, to implement a

Special Area Management Plan (SAMP). A SAMP is intended to foster improved coordination between local, state and federal governmental agencies and other stakeholders that impact a designated coastal area.

Several major planning and technical studies of the SWA are nearing completion. The studies include a Strategic Plan for Agriculture, a Conservation Plan, a Rural Area Preservation Plan and a Mitigation Strategy. This information will be synthesized into a set of policy options for the cities of Chesapeake and Virginia Beach. In addition, MOAs on wetland mitigation, waterway use conflict management and conservation issues will be developed. The MOAs are intended to better integrate management efforts by local, state and federal agencies. The first of the MOAs, dealing with water use conflicts on the North Landing River, will be signed on April 30, 2001.

For additional information regarding SWAMP, contact the Hampton Roads Planning District Commission by calling (757) 420-8300.

1.3.7 Coastal Nonpoint Pollution Control Program

The goal of the CNPCP is to strengthen the links between federal and state coastal zone management and water quality management programs and to enhance state and local efforts to manage land use activities that degrade coastal waters and habitats. As required by the federal mandate, the CNPCP must implement, where necessary, the management measures identified by the federal agencies that address various sources of nonpoint source pollution.

Detailed descriptions of the management measures, where they are intended to be applied, their effectiveness, and their costs can be found in EPA's *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters* at the following website at <http://www.epa.gov/owow/nps/MMGI/>.

The CNPCP will develop a 15-year strategy to ensure implementation of the applicable management measures to protect and restore water quality. The immediate and primary focuses of the program will be on improving and protecting the quality of shellfishing waters; increasing the awareness of coastal nonpoint source related issues in the state; and providing resources that enable the improvement of the water quality component of DCM's Local Land Use Plans.

For additional information on the program, contact the DWQ Planning Branch NPS Planning Unit at (919) 733-5083.

1.3.8 Coastal Habitat Protection Plans

The North Carolina Fisheries Reform Act of 1997 requires the North Carolina Department of Environment and Natural Resources to prepare Coastal Habitat Protection Plans (CHPPs) for the

Overview

The North Carolina Coastal Nonpoint Pollution Control Program (CNPCP) is a federally mandated program that is administered jointly by the NC Department of Environment and Natural Resources' Division of Water Quality and Division of Coastal Management. The National Oceanic and Atmospheric Administration (NOAA) and the Environmental Protection Agency (EPA) administer the Program jointly at the federal level. North Carolina is currently seeking final approval of its program from NOAA and EPA.

"long-term enhancement of coastal fisheries associated with each coastal habitat...." The plans describe the fisheries, fishery habitats and water quality affecting coastal fisheries stocks in the eight river basins that drain to the coast of North Carolina. Although staff of the Division of Marine Fisheries (DMF) is responsible for actually writing the plans, DWQ and the Wildlife Resources Commission, as well as the Divisions of Coastal Management (DCM) and Environmental Health (DEH), are heavily involved in the program. The Environmental Management, Coastal Resources and Marine Fisheries Commissions review and approve the plans, and those commissions are responsible for any new rules necessary for implementation of the plans.

The plans are organized by geographic area, with 11 management units, including the Roanoke River basin, that generally correspond with the DWQ Basinwide Planning Program units. A general Source Document includes regional and summary information. The management unit plans are specific to their areas, including detailed information and specific recommendations addressing conservation; habitat protection and enhancement; water quality improvement; research and monitoring; and administrative actions. A complete plan includes both the Source Document and the management unit plan. The first two area plans are underway in 2001. CHPPs that would affect the DWQ Pasquotank River basin management unit would include the Albemarle CHPP, Coastal Ocean CHPP and the Pamlico CHPP. All CHPPs are scheduled to be finalized by July 2003, then reviewed and updated every five years.

For additional information about CHPPs, call 1-800-682-2632 (in NC) or visit the program's website at <http://www.ncfisheries.net/habitat/chpp1.htm>.

1.3.9 North Carolina Sea Grant College Program

North Carolina Sea Grant's program priorities focus on three main areas: Economic Leadership; Coastal Ecosystem Health and Public Safety; and Education and Human Resources. Coastal Ecosystem Health and Public Safety reflects the transfer of research and technology to protect and enhance coastal habitats and provide safety for inhabitants. As many coastal counties see record growth, the following issues have moved to the forefront: water quality, sustainable development, coastal hazards, and habitat protection and restoration.

Some of the priority research and outreach goals include:

- Developing the capability to predict where and when phytoplankton blooms and hypoxic/anoxic conditions will occur, which is important for determining ecosystem response to these events.
- Determining ecosystem responses to various levels of nutrient controls.
- Quantifying the interrelationships between land-use activities, hydrologic processes and the ecological response of receiving waters in coastal and upland zones.
- Developing techniques to identify, characterize and understand nonpoint sources of nutrients, toxins and other contaminants.

Sea Grant has worked with local shoreline owners to develop and demonstrate erosion control techniques that combine planted or existing marsh grasses with small structures call sills or breakwaters in areas where neither method would be successful if used alone. Some of these

areas include sites in Currituck Sound, Duke, Aydlette and Camden Point on Albemarle Sound. By establishing a new marsh or preventing erosion of an existing marsh, the small structures create or maintain fringing marshes along areas that would otherwise be eroding upland areas. The method reduces sediment and nutrient erosion inputs that would otherwise be added to the rivers and sounds. The method enlarges or stabilizes the width of existing vegetative buffers and their water quality benefits while creating or maintaining an enhanced biological habitat of the marsh compared to less productive eroding beaches.

For additional information about NC Sea Grant or help with shoreline erosion options, contact Spencer Rogers (919) 962-2491 or by email rogerssp@uncwil.edu. If you need help with water quality issues, contact Barbara Doll, Water Quality Specialist, at (919) 515-5287 or by email barbara_doll@ncsu.edu.

1.3.10 Albemarle-Pamlico National Estuary Program

The Albemarle-Pamlico National Estuary Program (APNEP), formerly known as the Albemarle-Pamlico Estuarine Study (APES), was among the first National Estuary Programs established by the EPA in 1987. The mission of the APNEP is to identify, restore and protect the significant resources of the Albemarle-Pamlico estuarine ecosystem. Unlike traditional regulatory approaches to environmental protection, the APNEP is a cooperative effort jointly sponsored by NCDENR and the EPA that targets a broad range of issues and engages local communities in the process.

The program focuses not just on improving water quality in the region's estuaries, but on maintaining the integrity of the whole system - its chemical, physical and biological properties, as well as its economic, recreational and aesthetic values. Important components of the APNEP are the consideration of water quality, fisheries resources, land and water habitats, and the interaction of humans with the natural resources of the estuarine system. The APNEP is designed to encourage local communities to take responsibility for managing the resources in their respective jurisdictions.

Comprehensive Conservation and Management Plan

Since 1987, research generated by the APNEP has been instrumental to the development of a Comprehensive Conservation and Management Plan (CCMP). This plan is composed of recommendations for management strategies that address concerns in the Albemarle-Pamlico Sounds region and to protect the system's estuarine resources.

During the development of the CCMP, the APNEP was guided by a 95-member Management Conference that represented diverse interests. Four committees were responsible for identifying problems in the estuarine system, generating research where gaps in knowledge existed, increasing public awareness of environmental issues, and finding solutions to address those issues. As a result of these efforts, more is known about the Albemarle-Pamlico estuarine system than ever before.

One of the recommendations of the CCMP was to develop regional councils in each of the five major river basins of the Albemarle-Pamlico watershed for the purpose of fostering public input into the APNEP program. In 1995, an Executive Order was issued by the Governor of North Carolina calling for the creation of these regional councils. The Pasquotank River Basin Regional Council is highlighted below.

Currently, the APNEP is administered and staffed by DWQ; however, staff works closely with the EPA's Office of Water to implement the many objectives and key management actions contained in the APNEP's CCMP.

**CCMP Development Involved
Diverse Interests Including:**

- Federal and state government
- University researchers
- Environmental groups
- Agriculture representatives
- Forestry interests
- Industry representatives
- Developers
- Fishers
- Local elected officials

Pasquotank River Basin Regional Council

Each regional council is comprised of elected and appointed county and municipal officials, representatives from agriculture, silviculture, commercial and recreational fishing, conservation, environmental science, business/industry and tourism groups. Each council is charged with identifying and implementing a project that utilizes innovative or unique management strategies to address a priority watershed problem. Regional councils provide a form for public, special interest and local government involvement in the APNEP.

The Pasquotank River Basin Regional Council (PRBRC) has been active, meeting approximately four times per year. Highlights of accomplishments thus far include:

- Securing congressional funding (\$100,000) for the Army Corps of Engineers to conduct a comprehensive study of Currituck Sound.
- Touring the Tidewater On-Site Wastewater Demonstration Center at the Vernon James Research Center in Plymouth to view current research/demonstration of alternative septic systems.
- Conducting a demonstration project with the Albemarle RC&D regarding constructed wetlands.
- Hosting discussions regarding sustainable development in response to ever-increasing population pressures being applied to communities along the Outer Banks.
- Learning about the USFWS's development of comprehensive conservation and management plans for each of the wildlife refuges in North Carolina and Virginia.
- Co-sponsoring public workshops conducted by DWQ regarding development of the 2002 Pasquotank River Basinwide Water Quality Plan.
- Linking with Noah Hill (APNEP/VADCR liaison) regarding Virginia's Watershed Roundtables, SWAMP (Southern Watersheds Area Management Plan), draft MOA between NC DENR and VADCR, Virginia's Adopt-A-Stream Program and Riverkeeper efforts in the Blackwater and Nottoway Rivers.

Interstate Collaboration Efforts

North Carolina and Virginia have jointly funded a Watershed Field Coordinator position to facilitate discussions regarding the Albemarle, Chowan and Coastal Watersheds. The term position aims to accomplish:

- Facilitate and foster coordination and communication between Virginia's Watershed Roundtables and NC's River Basin Regional Councils.
- Compile information from local jurisdictions that will aid in the Albemarle-Pamlico National Estuary Program's Comprehensive Conservation and Management Plan's work plans, targeting and monitoring of progress.
- Assist in preparing regionally targeted fact sheets, news releases and other articles for publishing purposes.
- Assist with event planning and facilitation.

For more information on the Watershed Field Coordinator's activities, call (757) 925-2468.

For more information on the Albemarle-Pamlico National Estuary Program, call (919) 733-5083, ext. 585 or visit the program's website at <http://h2o.enr.state.nc.us/nep/>.

1.4 Local Initiatives

1.4.1 NC Cooperative Extension Service

In an effort to improve the information flow in the Pasquotank River basin, the NC Cooperative Extension Service's local area specialized agent in water quality acquired Section 319 funding. The funding is used to develop and circulate a periodic newsletter entitled *River and Sound Advice: News about the Chowan and Pasquotank River Basins*. For more information, contact Marjorie Rayburn at (252) 357-1400 or by email Marjorie_Rayburn@ncsu.edu.

1.4.2 Town of Nags Head Septic Health Initiative

In the fall of 2000, the Town of Nags Head began a Septic Health Initiative Program designed to develop strategies and programs to improve the performance of septic systems in the town. Failing or poorly maintained septic systems can adversely impact water quality in the sounds and ocean surrounding the town. The programs developed were the result of several years of work from the Town of Nags Head Septic Health Committee.

The Septic Health Committee, established in 1997, is composed of a cross-section of town citizens sharing a deep concern for the protection of water quality within and around the town. The Septic Health Committee developed, and the Board of Commissioners approved, a series of programs designed to improve the performance of septic systems while gathering information about septic systems in the town.

Guiding the development of the Septic Health Initiative were the goals of the Septic Health Committee and a companion goal in the town's Land and Water Use Plan. The Goal of the

Septic Health Initiative is to reduce the need for central sewage and improve the quality of the town's surface water and groundwater by improving the performance of individual septic systems used to dispose of wastewater throughout the town.

The Town of Nags Head is to provide an economic and environmentally sensitive means of sewage treatment and disposal which maintains or improves the quality of the town's surface waters and groundwater and maintain low density development. The Septic Health Initiative has four separate but interrelated programs: Septic Tank Pumping Program; Water Quality Monitoring Program; an Education Program; and a Decentralized Wastewater Master Plan.

Septic Tank Pumping and Inspection Program

This program is designed to encourage homeowners through incentives and educational resources to have their septic systems inspected and pumped on a regular basis. The inspection data collected during the pumping process will be used to develop a Decentralized Wastewater Management Plan.

Water Quality Monitoring Program

In order to measure the effectiveness of the town's septic health initiative, the town is monitoring 31 groundwater and surface water sites throughout the town to identify any problems associated with septic systems.

Education Program

Aimed at homeowners, guests and school children, the education program is designed to increase awareness about water quality and the importance of proper operation and maintenance of septic systems.

Decentralized Wastewater Management Plan

The long-term goal of the Septic Health Initiative is to develop a plan that will allow the continued use of on-site systems in the town without impacts on water quality. The information currently being collected in the Septic Tank Pumping and Inspection Program and the Water Quality Monitoring Program will be used to develop this plan. The Decentralized Wastewater Management Plan will provide a long-term strategy for the protection of water quality while at the same time allowing the continued use of on-site systems.

Program objectives include the following:

- Providing incentives for the pumping and inspections for non-state regulated systems. The department goal is to have 500 tanks pumped this year.
- Testing and analyzing groundwater and surface waters from 31 sites.
- Developing a "protocol" for the release of water quality data.
- Developing educational materials directed towards elementary school children.
- Analyzing water quality and inspection data and develop strategies to address any problems that may be found.

- Developing the necessary databases (inspection reports, existing permits, land and water use data, etc.) needed for the development of an effective management program.
- Distributing to homeowners and rental agencies educational material (vinyl decals, bathroom door hangers and brochures). Revise and "refresh" the program and materials as well as develop new ideas for promoting the program.
- Beginning the development of a Decentralized Wastewater Management Plan to assure optimum operation and maintenance of on-site septic systems.
- Promoting the program by: continued press releases, interviews, participation at conferences and seminars, town newsletter articles, participation at civic groups, government informational channel, etc.
- Applying for state and federal grants as the opportunity arises.
- Promote and inform citizens about the Septic Health Initiative loan program for the repair of failed or failing septic systems.

As of April 2001, this initiative has assisted 200 property owners in Nags Head with the inspection and pumping program. Our water quality data results are available for public viewing on the town website, and our educational material is being distributed to many groups, associations and individuals. The Town of Nags Head intends for this initiative to run approximately 4-5 years.

For additional information on any part of Septic Health Initiative, please call The Town of Nags Head Septic Health Coordinator at (252) 441-5508 or visit the website at <http://www.townofnagshead.net>.

1.4.3 Dare County Surface Water Quality Monitoring Program

The Dare County Health Department works with NC Shellfish Sanitation in coordinating the surface water quality program in Dare County. At this time, there are 49 sites sampled within the county. The samples are analyzed one time per month for total phosphates, nitrates and nitrites. Fecal coliform and E. coli are tested one time per week from Memorial Day to Labor Day, and less frequently during the 'off' season.

The county works with DEH Shellfish Sanitation in the posting of advisories for high bacterial content at these sites. When an advisory must be posted, the Dare County Health Department handles the notification of county and town officials, any business that may be affected, and the public through the internet and radio. DEH Shellfish Sanitation posts the sign.

To view bacterial data on-line, go to www.co.dare.nc.us/Health, click on water monitoring, along with current advisories and information about how the program works. For more information on the program, call the Dare County Health Department at (252) 475-1096 or visit the program on the web at <http://www.co.dare.nc.us/health/WaterMon/index.htm>.

1.4.4 Keep Pasquotank Beautiful/Recycling; Pasquotank County

One of the projects that Pasquotank County's Keep Pasquotank Beautiful campaign has considered involves storm drain marking. This effort has historically been done in the local area; however, the recycling program hopes to gain additional exposure. For example, several of the

program's affiliate municipalities have found that a reflective plate with the "do not dump" message and a visual reminder that storm drains flow directly into the Pasquotank River is much more effective. The program is conducting cost research with the NC Department of Corrections and local municipalities to determine cost and number of signs needed. In addition, the program is actively seeking funding for the initiative. For further information, contact the coordinator at (252) 335-4105.

1.4.5 North Carolina Coastal Federation

The North Carolina Coastal Federation (NCCF) is the state's largest nonprofit organization working to restore and protect the coast. Formed in 1982, the NCCF has grown to serve more than 5,000 members and 200 member groups. The NCCF focuses on three main areas of work including habitat restoration and protection, environmental education, and the encouragement of sound environmental programs and their enforcement.

ShoreKeeper Projects

The NCCF ShoreKeeper projects are examples of ways citizens can restore and protect water quality and coastal resources. Naturally green shorelines act as "buffers" and can consist of native trees, shrubs, grasses, wetland plants or any combination. NCCF has performed several ShoreKeeper erosion control consultations in the Dare County area and offers expertise and guidance to citizens interested in this method of shoreline stabilization.

Ice Plant Island Shoreline Restoration

The Corps of Engineers, working cooperatively with the NCCF, staff from the Roanoke Island Festival Park, and various state and federal agencies, has developed draft design plans for a shoreline restoration project. In recent years, about 1,500 feet of Ice Plant Island's southern and eastern shorelines have experienced severe erosion, primarily due to increased boat wakes in the area. An estimated 100 feet of shoreline was lost in the last ten years. The conceptual approach for this site involves the construction of a low profile stone sill channelward of the eroding marsh and the reestablishment of a coastal marsh fringe landward of the sill. In addition to restoration of the coastal marsh, the proposed design includes enhancement of both oyster habitat and seagrass beds. The proposed sill and resource/habitat enhancement areas will be implemented along approximately 900 feet of shoreline; the remaining eroding shoreline (east facing) will be stabilized with a standard stone revetment adjacent to the existing marsh and upland. The project, as designed, will restore coastal marsh, oyster habitat and seagrass beds, in addition to halting erosion and preventing further loss of the remaining marsh fringe. The stone sill will remain open at regularly spaced drop down areas to ensure fish passage to the protected marsh, and the stone itself provides habitat for fauna utilizing the nearshore zone. Restoration and protection of the marsh fringe along Ice Plant Island is essential to maintaining the fish habitats of this area, and Dough's Creek is designated by the Department of Environment and Natural Resources as a Primary Nursery Area, and the area also serves as an important habitat for shellfish. The Corps of Engineers has proposed project construction during the winter 2001/2002, with completion of the seagrass and marsh plantings scheduled for April/May 2002.

CoastKeepers

NCCF was approved by the Water Keeper Alliance in November 2000 to license three CoastKeepers. The federation is the only organization to be licensed to cover the state's entire coast. The first of the three CoastKeepers, Cape Fear CoastKeeper, was hired to cover the coastal areas from Camp Lejeune to Calabash. NCCF's next goal is to establish CoastKeepers at the ocean headquarters and then along the Outer Banks. NCCF aims to have the Cape Lookout CoastKeeper by the end of 2001 and the Cape Hatteras CoastKeeper in 2002.

Educational Programs

NCCF's Education Program's mission is to provide educational experiences and resources that will produce an understanding and appreciation of coastal areas, motivating participants to make informed decisions and become active stewards. The Education's Program includes field trips, teacher workshops, classroom curriculum, action projects and much more. All students and teachers will find a hands-on way to connect to North Carolina's coast. Field trip sites in the Pasquotank River basin include Currituck Sound, Dare County and Hyde County (Alligator River). Each month NCCF offers a day-long coastal canoe trip to a different location. NCCF also offers a Coastal Canoe trip at the Alligator River National Refuge once or twice a year.

For more information, call NCCF at (252) 393-8185 or visit the website at <http://www.nccf>.

1.4.6 Citizens' Water Quality Monitoring Program

The Albemarle-Pamlico National Estuary Program's (APNEP) Citizens' Water Quality Monitoring Program (CWQMP) is a network of private citizens who monitor ambient, surface water quality in the Albemarle-Pamlico Estuary and its tributaries. This program began as an initiative by the Pamlico-Tar River Foundation, to protect, preserve and promote the quality of the Tar-Pamlico River and its watershed. In 1991, the CWQMP was expanded under the Albemarle-Pamlico National Estuary Program to include all waters located within the Albemarle-Pamlico Watershed basin.

The CWQMP focuses upon three areas of activity: 1) baseline monitoring; 2) targeted monitoring and surveys; and 3) water quality education. Program participants receive support in many forms: water quality education and training, equipment and supplies, data management and analysis, and network opportunities.

Participants in the CWQMP primarily monitor "vital signs" of the estuary. Specifically, volunteers monitor dissolved oxygen, pH, salinity, air and water temperatures, and turbidity to gauge the general health or quality of water in the estuary. Using basic, but accurate water quality test kits, citizen volunteers analyze water samples, observe qualitative factors such as weather conditions and other visual indicators, and record their results. All data collected are forwarded to the program office where staff compiles the information and enters the data into report form for citizen and government agency use. Often, these monitoring efforts serve as useful supplements to existing governmental activities.

For additional information, please contact the CWQMP by calling (252) 328-1747 or by visiting the APNEP website at <http://h2o.enr.state.nc.us/nep/>.

1.4.7 North Carolina Coastal Land Trust

The North Carolina Coastal Land Trust and its contractors are currently developing a conservation planning document, *Riparian Corridor Conservation*. The document is designed for the Pasquotank River riparian zone. The document will be completed and submitted to the Conservation Trust of North Carolina and the Clean Water Management Trust Fund by December 2001. The area of concern for this document is the nontidal, riparian zone of the Pasquotank River and its major tributaries between the southern boundary of the Great Dismal Swamp National Wildlife Refuge and Elizabeth City, a distance of approximately 20 miles.

The document will contain three main sections. The first section will be a summary of available water quality and quantity information and features of the watershed that may affect water quality and quantity. This will include summaries of stream classifications, state and federal water quality monitoring efforts, state Natural Heritage areas and other protected lands, demographic information, land uses and potential threats to water quality. The second section will be a compilation and summary of conservation strategies available to landowners and land managers that target water quality and quantity protection. Specifically, this section will include a summary of state and federal programs that promote the protection of riparian buffers along the main stem of the Pasquotank River and its tributaries. The third section will be an action plan specifying ways to implement water quality and quantity protection strategies on parcels that received high priority rankings as well as outreach and education strategies in the watershed in general. An integral part of this section will be a "Prioritization Strategy" which will identify key parcels of land that, if protected, would serve to maintain or enhance water quality for the river basin.

Funding for this document has been provided by a grant from the North Carolina Clean Water Management Trust Fund through the Conservation Trust of North Carolina.

The Land Trust acquired four acres overlooking the Pasquotank River in Pasquotank County. The property is located north of Elizabeth City, including a cypress-gum swamp along the river. In addition, the NC Coastal Land Trust acquired funding to work on other projects in the region (Coast Lines, 2001).

1.4.8 The Town of Winfall

The Winfall Water Quality Demonstration Project is intended to demonstrate the effectiveness of a constructed wetland in treating backwash water from a municipal water treatment plant and stormwater runoff.

The site is located within the Town of Winfall adjacent to the Winfall Town Offices and an elementary school. Begun in July 2001, the constructed wetland portion of the project is completed. In addition to approval from the Town of Winfall, this project also required approval from the US Army Corps of Engineers and the NC Division of Water Quality. Wetland construction combined bioengineering methodology with the planting of specific aquatic plants.

Development of an educational brochure, as well as the construction of a boardwalk leading to an outdoor classroom platform in the middle of the wetland, are almost complete.

The project is a cooperative effort between the Albemarle Resource Conservation and Development Council, the Albemarle Pamlico National Estuary Program Pasquotank River Basin Regional Council, the Town of Winfall, the Perquimans Soil and Water Conservation District, the National Resource Conservation Service, Wooten Engineering, Royster Clark, Inc., and the USEPA.