MANAGING THE ALBEMARLE-PAMLICO SOUNDS

"It's Everyone's Responsibility"

NOVEMBER 19 AND 20, 1998
Sheraton Grand Hotel
New Bern, North Carolina

A Forum to Examine Implementation of the Comprehensive Conservation and Management Plan (CCMP) and the Public's Role in Protecting the Natural Resources of the Albemarle-Pamlico Sounds Region

Sponsored by:
NC Department of Environment and Natural Resources

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MANAGING THE ALBEMARLE-PAMLICO SOUNDS

"It's Everyone's Responsibility"

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REGIONAL COUNCILS, the COORDINATING COUNCIL and the BASINWIDE PLANNING APPROACH to WATER QUALITY MANAGEMENT

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There are five major river basins in the Albemarle-Pamlico sounds region: the Chowan, Tar-Pamlico, Roanoke, Pasquotank and Neuse. Each is represented by a Regional Council of citizens and local government officials whose purpose is to advise and consult with state and federal governments, as well as the general public and various interest-groups, on the implementation of environmental management programs is their respective basins. They also advise the public and local governments of actions and information relevant to environmental management in their basins. Their formation was mandated through Governor Hunt's Executive Order #75, issued in March 1995, which was based upon recommendations contained in the Albemarle-Pamlico Estuarine Study's Comprehensive Conservation and Management Plan (CCMP).

Three members from each Regional Council are included in the membership of the Coordinating Council. The Coordinating Council was also mandated through Executive Order #75 and, as the name implies, has as its primary role, the evaluation and support of the CCMP implementation process. The Coordinating Council is necessary to ensure the highest level of cooperation and coordination among agencies, local governments, the public and private interest groups, representatives of which, make up its membership. The Coordinating Council is pursuing a Memorandum of Agreement with the State of Virginia to enlist that state's continued cooperation in implementing the CCMP within those basins whose interest we hold in common.

This basinwide approach to water quality management is a major objective in the Water Quality section of the CCMP. Effective management of water resources is ultimately seen as relying on the consideration of system-wide processes, and the cumulative impacts of activities in a river basin. Basinwide planning is reliant on existing regulations and programs and is designed to restore and protect the quality of North Carolina's surface waters. Basinwide plans have been prepared for all 17 major river basins across North Carolina and, while they are developed by the NC Division of Water Quality, their implementation relies on the coordinated efforts of many agencies, local governments and citizenry.

There are many benefits to this approach, not the least of which, is public involvement and outreach. Public involvement opportunities, principally, come through attendance and participation at workshops and public meetings where citizens are encouraged to make their thoughts and opinions heard and to become involved in the planning process. Without this input the plans would lack a important component - the understanding and support of North Carolina's citizens.

Implementation of the Comprehensive Conservation and Management Plan Albemarle-Pamlico National Estuary Program 1998 Progress Report

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Much progress has been made in implementing the objectives and key management actions of the Comprehensive Conservation and Management Plan (CCMP). The following is a brief evaluation of CCMP implementation -- highlighting those actions which are progressing well and those that have not been fully implemented.

STRENGTHS (selected CCMP actions that are progressing well):

Water Quality Plan:
- basinwide water quality management plans have been developed for all 17 river basins in NC
- improvement of scientific modeling capabilities to better understand the estuarine system
- enhanced monitoring efforts for water quality in the rivers and estuaries
- establishment of basinwide nonpoint source teams and implementation of Section 319 NPS projects
- increased annual funding to the NC Agriculture Cost Share Program
- continued research on alternative septic systems and BMPs to control NPS pollution
- enhanced efforts/coordination to help reduce/improve inputs and operating costs from PS dischargers
- enhanced efforts to track and evaluate algal blooms and fish kills

Vital Habitats Plan:
- regional planning efforts underway to protect and restore natural habitats in A/P region
- continued development of accurate maps and records of wetlands and fisheries habitats
- efforts to identify wetlands and to evaluate and rank wetland function
- the protection of high priority natural areas through public ownership and/or management
- interim Basinwide Wetlands and Riparian Restoration Plans completed for all five A/P river basins
- the establishment of a wetlands compensatory mitigation program
- increased coordination to strengthen regulatory programs to protect vital fisheries habitats

Fisheries Plan:
- Fisheries Reform Act of 1997 accelerates development of Fishery Management Plans
- bycatch reduction gear & practices are being developed and used by the fisheries community
- Fisheries Reform Act revised the existing coastal fishing license system to better manage the resource
- Fisheries Resource Grant Program provides funding to enhance fisheries resource

Stewardship Plan:

- continued development and maintenance of GIS data layers
- more affordable and accessible GIS information provided to local governments and the public
- the establishment of five education-oriented sites in the A/P region to promote eco-tourism
- multitudinous development & distribution of environmental education material by DENR
- continued involvement of citizens in the APES Citizens Water Quality Monitoring Program

Implementation Plan:

- establishment of five river basin Regional Councils and a Coordinating Council to support environmental management and coordinate CCMP implementation in the A/P region
- development of annual progress reports on CCMP implementation by APNEP staff
- conducted a second public forum to examine the status of the APNEP CCMP and the special role played by the public in implementing it

<u>WEAKNESSES (selected CCMP actions that have not been fully implemented):</u>

- creation of an interagency state policy that addresses marina siting and integrates best management practices through permitting and education
- establishment of a local government planning program that would provide technical assistance and funding to local governments for the development of local economic and environmental plans
- establishment of an interagency committee to ensure a comprehensive, coordinated and proactive approach to managing the state's public trust waters
- creation of a citizen ombudsman position within DENR

The majority of CCMP recommendations are moving forward and we anticipate action on other recommendations to occur in the future. The Coordinating Council will play a major role in effectively coordinating and prioritizing implementation of the CCMP.

Water Quality in the Albemarle-Pamlico Drainage-A NAWQA Perspective and Implications for Managing the Sounds

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Major water-quality issues of concern in the Albemarle-Pamlico Drainage Basin are eutrophication of the sounds, sources of nutrients, and questions about the pervasiveness and concentrations of nutrients and pesticides in surface and shallow ground water. Studies conducted by the U.S. Geological Survey for the National Water-quality Assessment (NAWQA) Program provide some insight into these issues and provide useful information for managing the sounds. Data collected and analyzed as part of this program have raised several issues that may be potentially significant, particularly with respect to concerns about nutrients and eutrophication.

Of the four major subdrainage basins investigated (Chowan, Roanoke, Tar, and Neuse), highest nitrogen and phosphorus yields between 1980-92 occurred in the highly agricultural and urbanized Neuse Basin; lowest yields occurred in streams of the forested (more than 55%) Roanoke and Chowan Basins. Although trends in nitrogen and phosphorus concentrations declined between 1980 and 1995, phosphorus and nitrogen concentrations remain high enough in the Tar and the Neuse Basins to cause nuisance algal blooms. Discharge of high phosphorus concentrations in ground water of the Tar and Neuse Basins may be a major reason why these basins are susceptible to eutrophication. Correlations between algal growths, as measured by chlorophyll a, and summertime concentrations of phosphorus and nitrogen in the Neuse Estuary are similar, suggesting that phosphorus can be as important as nitrogen in controlling algal productivity. Summertime concentrations of nitrogen and phosphorus in the Neuse, Contentnea Creek, and Tar Basins between 1993 and 1995 were above literature-based freshwater guidelines for controlling algal productivity. A 50% reduction in both phosphorus and nitrogen would be required to be within these guidelines in the Neuse Basin; a 30% reduction in concentrations of phosphorus and nitrogen would be required in the Tar Basin. Using data from 1990, although most nitrogen and phosphorus were derived from agricultural non-point sources and were transported to the sounds during the winter and spring, point sources accounted for most of the phosphorus and nitrogen transported during the summer months when nuisance algal blooms typically occur. In addition, concentrations of both nitrogen and phosphorus in the Tar and Neuse are inversely related to discharge, indicating dilution of constant sources of nutrients at high flows. Algal blooms and water-quality problems are likely to be worse than normal during dry, extreme low-flow conditions in the summer when little dilution is possible. Based on results of this study, point-source discharges to rivers during the summer appear to be a potentially major factor in affecting estuarine productivity. A combination of both nonpoint and point source management will likely be key for attaining water-quality goals for the sounds.

Other findings from the study include:

- Pesticide occurrence in surface water was highest in the Tar River Basin; of 47 pesticides analyzed, 45 were detected.
- The herbicides metolachlor, atrazine, prometon, and alachlor were detected in over 60% of stream samples
- Pesticide concentrations in streams are highest during May and June: drinking water standards are most likely to be violated during the Spring months
- Four percent of 49 shallow ground water samples in the Coastal Plain exceeded the 10 mg/L drinking water standard for nitrate; 14 of 47 pesticides were detected in ground water with all concentrations less than 0.1 microgram/liter.
- Nitrate concentrations in shallow ground water are highest in areas of well-drained soils of the inner Coastal Plain; lowest concentrations of nitrate were detected in ground water of the outer Coastal Plain where soils are high in carbon and are poorly drained
- Differences in fish communities in the Albemarle-Pamlico Basin were more strongly related to basin-level characteristics compared with site-specific habitat characteristics.

WETLAND RESTORATION PRIORITIES IN THE ALBEMARLE-PAMLICO REGION

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One of the most important components of the North Carolina Wetlands Restoration Program (NCWRP) is the development of Basinwide Wetland and Riparian Restoration Plans for each of the seventeen river basins in North Carolina. The Albemarle-Pamlico region includes the Neuse, Tar-Pamlico, Chowan, Pasquotank and lower Roanoke River basins. Basinwide Wetland and Riparian Restoration Plans have been developed for each of these basins and will be available through the NCWRP web page found at http://h2o.enr.state.nc.us/wrp/index.htm. These initial plans will be reviewed and updated in accordance with the schedule used for the Basinwide Water Quality Management Plans.

As described in the Basinwide Wetland and Riparian Restoration Plans, numerous GIS data layers, including water quality data, natural heritage information, wildlife and fisheries habitat information, and presence of sensitive watersheds, such as water supply watersheds and Outstanding Resource Waters, were used to select priority subbasins within each river basin. Nineteen priority subbasins were selected within the Albemarle-Pamlico region. Within the priority subbasins, smaller watersheds called 14-digit Hydrologic Units were selected using the same information used to select subbasins but with a stronger focus on the potential to implement wetland and riparian restoration projects. Utilizing the land-use data layer in conjunction with the stream hydrography data layer, 300-foot buffers were placed around all classified surface waters. Areas without forest vegetation were used to indicate a high potential for restoration. A total of 89 Hydrologic Units were targeted as high priority watersheds in the Albemarle-Pamlico region.

The rationale for targeting the smaller 14-digit Hydrologic Units instead of the subbasin or the river basin is to ensure that the limited resources available are used in a manner that will result in quantifiable improvement of water quality within the watershed. As the plans for the smaller watersheds are developed and implemented, the resulting improvement in water quality within each of these smaller watersheds will be noticeable on the subbasin and eventually river basin scale.

The goal of the NCWRP is to work with local governments, state and federal agencies, non-profit organizations, and other interested parties to develop comprehensive watershed restoration plans for the targeted hydrologic units. These plans will attempt to identify all of the problems within the watershed, including water quality, flooding, fish and wildlife habitat, as well as high quality areas that should be protected because of their existing value. The watershed plan will also propose potential solutions and management strategies to address the identified problems and protect the high quality areas. The NCWRP will focus its resources within these watersheds on the restoration of wetlands and riparian areas to address problems associated with non-point sources of pollution. The plans will identify other sources of funding that may be available to address other components of the watershed restoration plan. The formation of partnerships to develop and implement the watershed restoration plans will be essential to successful restoration on a watershed scale.

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STATUS OF THE STOCKS AND IMPLICATIONS OF THE FISHERIES REFORM ACT OF 1997

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The North Carolina Division of Marine Fisheries (DMF) issues an annual report on the status of twenty-nine (29) commercial and recreationally important marine fish and shellfish stocks. Stocks are assessed as being viable, stressed-recovering, stressed-declining, depressed or unknown based on the best available and most current information. Information sources include recreational and commercial landings data, fishery dependent and fishery independent information, and biological sampling.

Recently, the North Carolina Marine Fisheries Commission (MFC) amended its guidelines for the preparation of fishery management plans (FMP) under the Fisheries Reform Act of 1997 to include the status of the stocks report. Specifically, the amended guidelines require that stocks designated stressed-declining or depressed be given priority for the development of a FMP. The first stocks being considered under these new guidelines is red drum.

The purpose of this presentation is to review the 1997 stock status report, discuss the implications of the amended MFC guidelines, and specifically discuss current activities in the planning process for a red drum FMP.

Managing the Albemarle-Pamlico Sounds
November 19-20, 1998

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SUMMARY

Participants in the Tampa Bay National Estuary Program have agreed to adopt nitrogen loading targets for Tampa Bay based on the water quality and related light requirements of turtle grass *Thalassia testudinum* and other native seagrass species. Based on monitoring data, it appears that light levels can be maintained at necessary levels by "holding the line" at existing nitrogen loadings. However, the "hold the line" goal may be difficult to achieve given the 20% increase in the watershed's human population and associated 7% increase in nitrogen loading that are projected to occur over the next 20 years. Through an intergovernmental agreement addressing the issue of nitrogen load allocation, partners in the TBNEP will be committing to develop Action Plans detailing specific projects that will be implemented to ensure that nitrogen management targets are met.

To maintain nitrogen loadings at existing (1992-1994) levels, local government Action Plans will address that portion of the nitrogen target which relates to non-agricultural stormwater runoff and municipal point sources within their jurisdictions, a total of 6 tons of nitrogen per year through the year 2010. A Nitrogen Management Consortium of a local electric utility, industries and agricultural interests, as well as local governments and regulatory agency representatives, has been established to develop a Consortium Action Plan to address the remainder (a total of 11 tons of nitrogen per year each year through the year 2010), which is attributed to atmospheric deposition, industrial and agricultural sources and springs.

The Association of National Estuary Programs: Opportunity for Dialogue with the Nation

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I will share with you today four declarations, and with each of them, an invitation to join your Council efforts with others around the Nation in shaping new coastal policies for the 21st Century.

The Albemarle-Pamlico Estuarine Study was one of six programs which broke new ground in 1987 as a part of a daring experiment in public empowerment. The Regional Councils which form the core of the APES CCMP implementation constitute one of the boldest implementation approaches in the Nation. The Association of National Estuary Programs was formed to provide a national framework which will help link the Councils with other Management Conferences and Citizens Committees around the country. We believe that such linkages will result in new and aggressive changes in public policy, and these new policies will be the key to sustaining our estuaries. The rest of our mission is to:

* Seek support and commitment for development and implementation of CCMPs;
* Share the practical experiences of NEPs with other resource managers;
* Promote the formation and strengthening of government/private partnerships;
* Capitalize on the role that Management Conferences play as a continuing forum;
* Bring consistency, reliability, coordination and greater usefulness to NEP data.

Public involvement is not easy, and it is not cheap. In fact, most agencies had just as soon do without any more than is absolutely necessary. Most government budgets have only enough for a few hearings. That is not the problem in the NEPs, and in fact, the multi-stakeholder, watershed approach pioneered by NEPs is now the accepted norm for water resources planning. But the NEPs are also founded on the principle that CCMPs will be implemented, and that brings us to the four declarations of need.

First, the nation must and can be motivated to win the battle to achieve sustainable estuaries. Second, while the public is generally aware of coastal issues, the consumption behaviors which harm estuaries must change more significantly, and at a faster rate. Third, the nation must recognize and act to curb the economic and community disruption which is occurring in the midst of phenomenal population growth, urban sprawl, and an ever-increasing love affair with the automobile. Finally, ANEP's fourth and perhaps most urgent declaration is the absence of effective collaboration in the federal community and among public groups and industry must end. We invite you to join us in debating and discussing these over the months to come.

The latter declaration is perhaps the most important today. To begin work on it, I invite each Council to designate one or two people to work with ANEP and the other NEP communities in building a NEP Citizens Network. This network will act as a conduit to share information on technology and issues, design public education campaigns, enable more participation in legislative processes, and stimulate debate about what coastal America ought to be.

I have revealed four declarations of national need, and I have issued an invitation to the Councils to join the ANEP efforts. But I also want to close by welcoming each individual here today to join us. Our recent Report to America is being distributed at this Conference. Pick it up, and let us hear from you.

SOIL AND WATER CONSERVATION IN VIRGINIA: PROGRAMS TO ENHANCE THE RESOURCES OF THE ALBEMARLE-PAMLICO SOUNDS

Matthew R. Bley*
and
Ernest N. Brown**

Soil and water conservation in Virginia is a multi-faceted, cooperative effort that relies on a variety of state, local, public, and federal partners. The majority of Virginia's conservation programs are incentive-based, with technical and financial assistance provided to encourage voluntary participation by the various stakeholders. The overall goal is to ensure the health and vitality of the rivers and coastal waters in Virginia, as well as the resources shared with other states, such as the Albemarle-Pamlico Sounds with North Carolina.

Virginia implements several statewide programs to address soil and water conservation, including: nutrient management, erosion and sediment control, stormwater management, floodplain management, shoreline and streambank erosion control, and assistance to local soil and water conservation districts. The focus of all of these programs is to control nonpoint source (NPS) pollution through the implementation of best management practices (BMPs) on the ground. In addition to the statewide programs, Virginia provides grants from several sources, including the Virginia Water Quality Improvement Fund, Virginia Agricultural BMP Cost-share Program, EPA Section 319 grant, and EPA Chesapeake Bay Implementation grant.

Recently Virginia embarked on several new initiatives to dramatically increase the soil and water conservation efforts throughout the state, as well as build on the program successes of the past. Tributary strategies are being developed and implemented for all of the major rivers in the Chesapeake Bay watershed. These strategies, developed at the local level, are designed to significantly reduce nutrient, sediment, and pollutant loadings to the Chesapeake Bay and its tributaries. In 1998 a strong funding commitment by the Governor and General Assembly to the Water Quality Improvement Act and Fund resulted in an unprecedented increase in the implementation of the state's conservation programs and cooperative programs with localities. More recently, Virginia, North Carolina, and West Virginia have begun work on the New River's designation as one of the American Heritage Rivers. In addition, other priorities have recently come to the forefront, including the development of the Clean Water Action Plan and strategies to address Clean Water Act Total Maximum Daily Loads (TMDLs). The work on all of these initiatives will help address water quality improvement in the Albemarle-Pamlico Sounds.

To meet the challenges of this myriad of program and initiatives in a comprehensive and unified fashion, and place a greater emphasis on watershed-based approaches to NPS pollution prevention, Virginia recently appointed watershed managers to each of the major river basins throughout the state. These watershed managers are working with conservation partners, agencies, local governments, and other stakeholders to address regional pollution reduction goals linked to state water quality objectives. Strategies will be developed according to local social and economic conditions in order to increase community adoption of BMPs by industries and private citizens. Efforts to enhance NPS pollution control in the regions that drain to the Albemarle-Pamlico Sounds will be crucial.

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Citizen Involvement Around the Nation

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This presentation has two purposes:

(1) to give an overview of the National Estuary Program and, as one of the first NEPs, the important role the APNEP plays in the national program; and
(2) to demonstrate the U.S. Environmental Protection Agency's commitment to support citizen involvement in environmental decision making.

Examples of innovative and successful public education and outreach efforts from some of the other 27 NEPs will be highlighted to demonstrate the creative solutions being implemented and the importance of transferring information between NEPs and to other coastal watersheds.

"Expand Americans' right to know about their environment," is one of the goals in EPA's Strategic Plan released in September 1997. In addition, the Administration's Clean Water Action Plan includes a key action to "support local organizations and citizens in locally based watershed protection efforts, and to encourage the organization of such groups nationwide by increasing information and technical assistance available to these groups."

To realize these goals and objectives, the Agency supports a number of programs and activities in addition to the 28 NEPs:

- Nine Coastal America Coastal Ecosystem Learning Centers have been established around the country to raise public awareness of critical coastal issues and encourage involvement in activities that benefit coastal ecosystems;
- EPA supports the Center for Marine Conservation's annual beach cleanup efforts and the National Marine Debris Monitoring Program which relies on volunteer monitoring data to document amounts and origins of marine debris along U.S. coasts, including the U.S. Virgin Islands and Puerto Rico;
- EPA sponsors Volunteer Water Quality Monitoring workshops which provide an opportunity for volunteer groups to improve water quality monitoring operations, increase the quality of data collected, and enhance training techniques. The workshops also provide a forum for local/regional networking among monitoring groups;
- EPA supports celebration of our nation's bays, sounds, and lagoons on National Estuaries Day by helping to produce and distribute education and outreach materials. In partnership with NOAA's National Estuarine Research Reserve System (NERR), EPA's National Estuary Program (NEP), join with their local communities to observe the day with educational activities, festivals, exhibits and programs tailored to their coastal areas;
- Surf Your Watershed is an internet service provided by EPA to help you locate, use and share environmental information about your place. Access Surf Your Watershed at http://www.epa.gov/surf/; and
- EPA also supports the Association of National Estuary Programs which is a nonprofit organization dedicated to promoting responsible stewardship and a common vision for the preservation of our nation's bays and estuaries.

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BREAK-OUT SESSION:
1- NEUSE RIVER BASIN

NEUSE RIVER BASIN REGIONAL COUNCIL (NRBRC) REPORT

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The Neuse River Basin Regional Council is composed of representatives from 17 counties which lie in the Neuse River Basin. Each county has at least three representatives on the Council, two of whom are appointed by the county commissioners and a third who is appointed by the Secretary of the NC Department of Environment and Natural Resources (DENR) from among the following special interest groups: agriculture, silviculture, conservation, environmental science, commercial fishing, business/industry, recreational fishing, tourism, Soil and Water Conservation Districts and at-large.

In order to provide insight into the varied perspectives of the many special interest groups, representatives of these groups were invited to make presentations on such topics as best management practices (BMPs), silviculture, wastewater treatment, buffers, storm drains and the pork industry. These presentations provided the necessary background for efforts to follow. Lessons learned benefitted the organization of the state's other Regional Councils.

Over the past three years, the NRBRC has identified issues which members feel have been overlooked or deserve greater attention. In pursuit of discharging its duties as an advisory body, the NRBRC drafted resolutions addressing specific problems or potential problem areas. Resolutions related to the following topics were passed by the NRBRC:

- concerns over the NRBRC's role in protecting and improving water quality in the Neuse River Basin,
- expressed support for improvements in the funding process for studies and services for water quality improvements in the Neuse River Basin,
- identification of the NRBRC's responsibilities,
- requested that the state address its responsibilities for the clean-up of its navigable waterways by contracting with fishermen to pick up large fish kills for disposal in a safe and environmentally sound manner, and
- expressed concern for and a study on the rate of withdrawal of aquifer waters in NC.

Other resolutions are in progress.

Last May, the Council developed a Program of Work. The results of this effort identified nonpoint sources of pollution as a primary concern. Council members are working to develop and implement a demonstration project to benefit the natural resources of the Neuse Basin. Given that project funds are limited (~$25K), the Council decided that pooling resources, time, money and expertise was the most practical approach for identifying, developing and implementing a demonstration project. This effort is now underway.

While our progress has been modest to date, our efforts have not. The Neuse did not get to where it is in a day. It will be a long haul. Thankfully, we are on the way.

Neuse River Basin: NSW Rules to Control Nitrogen

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General Update

The Neuse River basin hit a big milestone this summer when the General Assembly approved eight out of nine of the rules that constitute the Nutrient Sensitive Waters Management Strategy. DWQ staff have begun the process of implementing these rules by convening stakeholder groups and gathering technical information to support rule implementation. All of the rules that were approved must be fully implemented on or before August 1, 2003. The Riparian Area Rule received a great deal of attention in the General Assembly that resulted in House Bill 1402, which is described in more detail below. Other efforts in the Neuse River basin include MODMON and the recent TMDL submittal.

Wastewater Treatment Plants

The association organizers (essentially the Lower Neuse Basin Association) drafted an agreement several months ago, which DWQ staff reviewed and discussed with them. DWQ staff have committed to returning written comments to the association organizers by Thanksgiving.

The following point source facilities have already made notable improvements in implementing nutrient controls: Cary-North, Raleigh, Goldsboro, Weyco, Farmville, Wilson, and Zebulon.

Urban stormwater

The Neuse Stormwater Team has been meeting monthly since May 1998. This team includes representatives of the local governments that are affected by the stormwater rule and representatives from state agencies and the environmental community.

The Neuse Stormwater Team has divided themselves into three workgroups to handle the different aspects of the rule's requirements: New Development, Retrofit/ Illegal Discharges and Education. Each of these workgroups is making good progress toward developing a model plan for its part of the stormwater program.

Agriculture

Implementation of the Neuse Agricultural Rule has been underway since April 1998. The current vehicle for rule implementation is the Neuse Agricultural Interagency Workgroup, which consists of representatives from federal and state agencies, interest groups and the scientific community. The mission of the workgroup is to lay the groundwork for the Basin Oversight Committee (BOC) required by the rule. Since April, the workgroup has met once a month.

Currently, the workgroup is developing draft guidelines on how the Local Advisory Committees will comply with the Neuse Agricultural Rule. Other efforts that are underway include:

- Formation of the Basin Oversight Committee
- Formation of Local Advisory Committees in each county.
- Development of the farmer sign-up process.

Nutrient Management

DWQ staff are working with the Cooperative Extension Service (CES) to develop nutrient management training materials and conduct the applicator sign-up process. A stakeholder group has been formed to assist in developing the nutrient management training program. The stakeholder group includes representatives from federal and state agencies, interest groups and the scientific community.

Riparian Area Protection

House Bill 1402, which was approved on October 28, 1998, allows DWQ to continue implementing the temporary rule for Protection and Maintenance of Riparian Areas for one more year with some modifications in the definitions of streams, forest vegetation and vested rights. The EMC first put the Riparian Area Temporary Rule into effect on July 22, 1997.

In addition to the changes to the temporary rule, House Bill 1402 calls for the formation of a Stakeholder Advisory Committee. This Committee met for the first time on October 21-22 and will meet again on November 12-13 and December 3-4. The Committee is responsible for making recommendations to the EMC by April 1, 1999 on some of the technical issues associated with the Riparian Area Rule. These issues include defining a stream and creating a riparian area mitigation program. Based on the Committee's recommendations, the EMC will submit revised Riparian Area Rule language to the 1999 session of the General Assembly.

The Neuse River Nutrient Sensitive Waters Management Strategy Riparian Area Rule

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On December 11, 1997, the Environmental Management Commission (EMC) approved an historic initiative - The Neuse River Nutrient Sensitive Waters (NSW) Management Strategy. This strategy consists of nine (9) separate rules that together are designed to achieve a 30% reduction in the nitrogen which enters the Neuse River and its tributaries either through point sources or nonpoint sources. Even though nitrogen is an essential nutrient, too much nitrogen in the Neuse river is causing "overfertilization" of plants that are depleting the water of oxygen as a result of respiration and decay. Fish kills result when oxygen levels are too low. The State of North Carolina recognizes the need to reduce the nitrogen levels entering the Neuse River so that the health of the River can be restored. The Neuse River is crucial to the environmental and economic health of our entire state.

The Riparian Area rule deems it illegal to remove existing "forest vegetation" in the first 30 feet of land directly adjacent to a stream or other waterbody (designated as Zone 1) except in certain situations. "Forest vegetation" refers to wooded plant communities and means not only trees, but also shrubs, saplings, vines and herbaceous plants. Forest vegetation does not include intensively maintained public or private lawns.

Zone 2 in the riparian area consists of an additional 20 feet on either side of the stream. Zone 2 is required to have a dense plant cover. For both zones of the riparian area, the landowner or caretaker is required to keep the trees and plants healthy and to promptly repair any eroded channels if possible.

House Bill 1402 was recently approved by the General Assembly. This Bill is an act to disapprove the Neuse River Nutrient Sensitive Waters Management Strategy as a permanent rule until the EMC can make revisions. A Stakeholders Advisory Committee has been established to assist in this process. Until that time the Riparian Area Rule will still be in effect as a temporary rule.

The Division of Water Quality will cooperate with other state agencies and local governments to implement this riparian area rule. Persons who violate this rule may be subject to civil or criminal penalties. Violation of a rule of the Environmental Management Commission is punishable by up to $10,000.00 per incident per day.

Floating Down the Neuse River: A Journalist's Perspective

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In August 1998, photographer Chuck Liddy and I canoed down the Neuse River from Raleigh to the estuary. Our goal was to show the importance beyond the science and the policy. a seven-part series called "The River Chronicles" appeared in the News and Observer and the paper's Internet site, where updates from the banks of the Neuse were posted every evening to enable readers to follow the trip from their screens. The stories blended our experiences and misadventures with historical accounts and interviews with those who live, work and play around the Neuse.

In nearly three weeks, we discovered a river diminished by pollution and pinched by civilization, but still majestic, wild and largely ignored until its waters widen dramatically at New Bern. Despite the Neuse's infamous fish kills, algae blooms and sewage spills, this waterway's problems appeared surprisingly subtle and manageable as we paddled past majestic forests, cooled off in its amber waters and slept on sandbars that seemed distant from civilization.

Popularity doesn't always indicate quality in journalism, but I believe the River Chronicles achieved its purpose. More than 100 readers wrote or called the paper to comment, resulting in our most successful Internet reader forum ever. They appreciated the depiction of a river as more than the sum of its bioassessments, nitrogen concentrations and vegetated buffer strips. Readers were also captivated by the idea of a wilderness adventure in their backyard. The appeal crossed all political and social boundaries, proving to me that rivers possess a power matched by few other environmental issues. The Neuse may lack the grandeur of the Mississippi or the Hudson, but we learned it has a powerful constituency calling on government to do whatever it takes to restore it.

MANAGING
THE
ALBEMARLE-PAMLICO
SOUNDS

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BREAK-OUT SESSION:
2- TAR-PAMLICO RIVER BASIN

The Tar's Roots: Origins of Biological Treasures

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North Carolina provides a great diversity of aquatic habitats within the mountains, piedmont and coastal plain. Differences in elevation, slope, aspect, geologic resources, soils, climate, associated plant communities, and numerous other variables have allowed development of aquatic habitats ranging from roaring, turbulent mountain trout streams to silent, meandering coastal plain blackwater rivers.

As witnessed through geologic time, riverine ecosystems are in a constant state of change. Streams, creeks and rivers cut back through the countryside and, at times, capture tributaries of other riverine ecosystems or have their own tributaries captured by adjacent ecosystems. Also, during periods of glaciation, sea levels fall, thus allowing confluence of some rivers on the Continental Shelf. Through these processes, associated animals (and probably certain plants) are able to move from one river basin to another. These processes help explain wide distributions of species, such as bluehead chub, bowfin, longnose gar, and the dwarf wedgemussel. The aquatic faunas of the Chowan, Roanoke, Tar and Neuse river basins have been significantly influenced by stream capture events among the James, Roanoke, New, and Tennessee river basins. As a result, a unique assemblage of species, including amphibian, fish, snail, mussel, and crayfish taxa, has been established in our Atlantic Slope rivers.

Aquatic species diversity has also been enhanced by the isolation of species within unique habitats, such as our Atlantic Slope river basins. Through time, isolated populations have evolved into endemic North Carolina species. Examples include the Tar River spinymussel, Neuse River waterdog, Carolina madtom, and at least two crayfish species.

Because of isolation and other biogeographic processes, the presence of a great number of different habitats, unique ecological interactions, hundreds of aquatic insect, sponge, mussel, snail, fish, amphibian, and other aquatic species are found in the Tar River and other nearby river basins.

Tar-Pamlico Nutrient Control Rules: Under Construction

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Abstract: In the late 1980's, increases in algal blooms and fish kills in the upper Pamlico estuary were linked to excessive nutrient inputs from the Tar River. In 1989, the state's Environmental Management Commission (EMC) designated the entire Tar-Pamlico River basin as Nutrient Sensitive Waters (NSW). This designation required the state to develop a nutrient management strategy for the basin. The first phase of this strategy, implemented in 1990, targeted wastewater treatment plants and other "point source" discharges to the basin. Phase I set a cap on point source nutrient discharges, and the association of dischargers, the Tar Pamlico Basin Association, has stayed beneath that cap every year since 1990.

Phase II of the NSW strategy covers the period 1995-2004. The major thrust of Phase II is to establish instream reduction goals for nutrients, and to implement a plan to achieve nonpoint source reductions. The Phase II Agreement set interim goals of a 30 percent reduction in total nitrogen loads to the estuary from 1991 conditions, along with no increase in phosphorus loads. Coordinated by DWQ, the state NPS agencies implemented a Plan in 1996 for achieving the 30% nitrogen reduction goal from nonpoint sources. The NPS Plan relies on existing programs to achieve the goal through better targeting, coordination, and increased effort.

After two years of implementation of the NPS Plan, the EMC determined that the rate of progress is inadequate to obtain the 30% goal in a timely manner. In September 1998, the EMC directed DWQ staff to begin a rule-making process that would include mandatory measures to achieve the nonpoint source nutrient goals. DWQ staff are convening stakeholder groups to assist in drafting the rules that will be considered by the EMC and sent out to public hearings in summer 1999. Under this schedule, the rules would be considered by the General Assembly in summer 2000. The NPS agencies will continue to implement the existing, voluntary approach simultaneous with the rule-making process.

A steering committee of stakeholders met in late September and established the following stakeholder teams that will help draft rules:

1. Atmospheric Emissions
2. Agriculture
3. Restoration
4. Buffer Protection
5. Stormwater
6. Onsite Wastewater
7. Erosion and Sedimentation Control - Urban
8. Nutrient Management

The first stakeholder team meetings were held November 17th and 18th. Meetings will continue through January. An email listserv on the rule-making effort has been set up through the UNC Environmental Resources Program (ERP). Meeting notices and minutes for all teams will be posted to this listserv, called CHECCtar pam. To subscribe to CHECCtar pam, visit the ERP web page at http://checc.sph.unc.edu/.

1998 APES conference

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The Neuse River and Tar/Pamlico River Rapid Response Teams are subunits within the Environmental Sciences Branch of the NC Division of Water Quality. The teams were formed in 1997 and 1998 respectively through the initiative of Governor Hunt in response to concerns about water quality in the two rivers. The two teams are actively involved in water quality related issues on the Neuse and Tar/Pamlico river basins. The main focus of the teams is to provide quick response to reports of fish kills, algal blooms, and related water quality problems. Additionally, the teams participate in the routine monitoring of river conditions. These efforts require cooperation with numerous other agencies and researchers. Valuable support and data collection is and has been provided for researchers working on water quality, *Pfiesteria,* fish diseases, and aquatic vegetation. Public participation is critical to the team's efforts to protect the rivers and their tributaries. A 24 hour hotline is maintained for the public to call in any concerns or complaints and the teams are prepared to respond 7 days a week. Information is made available to the public via the World Wide Web. The Neuse team maintains a home page that contains pertinent information about the team and links to sites relating to fish kills and current water quality conditions. The Internet address is: http://www.ehnr.state.nc.us/EHNR/neuse/
The Tar/Pamlico Team can be reached at 252-946-4328 or toll-free at 1-877-337-2383
The Neuse Team can be contacted at 252-514-4748 or toll-free at 1-888-764-7661

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BREAK-OUT SESSION:
3- ROANOKE RIVER BASIN

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Operational Methodology for John H. Kerr Dam and Reservoir Project

John H. Kerr Dam is a Corps of Engineers project located on the Roanoke River twenty miles east of Clarksville, Virginia. The Kerr project became operational in the 1952-53 period for the primary purposes of flood control, hydropower generation, recreation, water supply, fish and wildlife enhancement, and water quality. The majority of John H. Kerr Reservoir is located in the Commonwealth of Virginia with the balance located in the State of North Carolina.

In order for Kerr Reservoir to best serve all the project purposes, it is necessary at times to either hold or release water causing reservoir level changes. The predicted schedule of reservoir levels is referred to as the "guide curve" or "rule curve". The guide curve level will vary from elevation 295.5 to 302 feet, msl during the year. While this guide curve can be followed during most years and does provide conditions ideal for many purposes, there are times when inflows into the reservoir are such that the guide curve cannot be followed. During times of excessive rainfall and resulting high river floods, Kerr Reservoir must rise above the guide curve to prevent damaging flood levels downstream. The controlled flood storage space in Kerr Reservoir is from elevation 300 to 320 feet, msl and will contain floodwaters produced from 3.2 inches of rainfall runoff from the 7800 square mile drainage area upstream of Kerr Dam. During periods of drought, Kerr Reservoir may be drawn down below guide curve in order for the project to meet minimum hydropower commitments and to provide flows downstream for water quality purposes and to provide water to accommodate downstream fish populations. In extreme droughts, Kerr Reservoir could be drawn down to elevation 293 feet, msl. Furthermore, with severe power shortages, Kerr Reservoir could be drawn down below the 293 level.

Whenever possible, the guide curve at Kerr Dam is operated to maintain the water level near the bottom of the flood pool during the summer. This level is ideal for recreational purposes. During October through November of each year, the level is gradually lowered four feet to provide additional reservoir storage space to store extreme floods during December through February. The October through November draw down also produces water releases that supplement the normal low seasonal river flows and improves the water quality in the lower Roanoke River. Kerr Reservoir is refilled 5.5 feet during the month of March to elevation 301 feet, msl. Filling during this normally wet season reduces damaging flows downstream, reduces mosquito problems by preventing vegetative growth along the shoreline and stores water needed to supplement the normally low flows which occur later in the year. The guide curve in Kerr Reservoir peaks at elevation 302 feet, msl during the last half of April and all of May to provide additional water for the striped bass spawn in the lower Roanoke River.

"Promoting Sustainable Development on the Lower Roanoke River"

Jamey Gerlaugh, Executive Director, Roanoke River Partners

The lower Roanoke River valley region has received much attention in the last decade with regard to maintaining its biological treasures. State gamelands, a National Wildlife Refuge and Nature Conservancy conservation lands were designated. Although biologically, historically and culturally rich in resources, the region is one of the most economically distressed in the state. The Roanoke River Partners (RRP) was created in 1996 to provide a vehicle for promoting ideas and facilitating projects that relate to community sustainability in the region. The basis for its creation was that: 1) without bettering the people's lives in the region, any conservation program would be viewed resentfully, prone to failures, and be very unlikely to grow, and be bad PR for biodiversity in general, 2) the traditional economic development being pursued may not be compatible with resource conservation, 3) the presently pursued economic development may not be a probable option, 4) most of the resources present were being vastly ignored as tools of economic development and community health.

RRP has the following basic functions: 1) provides a conduit for bringing in ideas and vision on "community sustainability"; this "sustainability education" can be viewed as the economic and community practical complement to environmental education; 2) serves as a "safe" meeting place for people and organizations of varied backgrounds to brainstorm, identify common goals, and create productive plans; 3) helps facilitate projects that fill gaps in the "infrastructure" of a sustainable community, mostly sparking opportunities for sustainable businesses.

To date, RRP has focused on creating sustainable eco-tourism opportunities, and facilitating downtown revitalization efforts. The current eco-tourism project is the development of 200 miles of canoe/kayak camping trails along the Roanoke and its backwater tributaries. The goals include creating a environmentally-friendly infrastructure that promoted eco-tourism and create opportunities for local businesses (e.g., outfitters, guides, B&B's, etc). Working with many different stakeholders over two years has created an extensive Master Plan and Feasibility study. Ten canoe camping platforms are to be constructed in the swamps with future plans for treehouses and off-season hunting shack use. The management system addresses reservations, fees, maintanence, waste, safety, marketing, liability & environmental impact monitoring.

The Downtown Renaissance program is helping nine small towns to bring life back to their dying downtowns. The major goals include 1) promoting the benefits of downtown health and the problems of sprawl development, 2) tying in the downtowns to eco- and heritage tourism efforts, 3) helping the towns create their own vision and plan, 4) assisting with actual revitalization projects, including historic renovations, greenway devt, festivals, tours, etc.; 5) helping promote new sustainable businesses

As RRP grows, it would like to become more involved with sustainable agriculture, environmental technologies, eco-industrial parks, and sustainable housing.

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POST-FRAN MONITORING OF ROANOKE RIVER WATER QUALITY DURING A RAMPED FLOW RELEASE SCHEDULE

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The lower Roanoke River is bounded by an extensive floodplain which interacts with the mainstem river when flow exceeds bank full conditions. Following large storm events such as Hurricane Fran, release of upstream water is controlled to moderate flooding along the lower river. A ramped flow release schedule was developed in 1995 (Betterment Plan) to provide a gradual transition from management of dam releases to control flooding to normal reservoir operations. The plan was developed in response to a fish kill in summer 1995, following a drop in discharge at Roanoke Rapids from ~18,000 ft^3/s to 4,000 ft^3/s over a single day. This rapid decline in river flow initiated drainage from floodplain wetlands into the river while headwater flow was low. A second important factor in summer 1995 was low headwater dissolved oxygen (DO) levels. The Betterment Plan is intended to extend the step down period of Roanoke Rapids dam releases to at least two weeks to slow the rate of drainage from the Roanoke River swamp lands and to provide adequate upstream river flow to counteract the input of low DO swamp water. Management of flood waters following Hurricane Fran in September-November 1996 provided an opportunity to evaluate the effectiveness of ramped flow releases at maintaining adequate DO levels in the lower Roanoke River to protect aquatic life.

Surveys of water quality along the lower Roanoke River were conducted on seven dates during October-November 1996 during implementation of a modified "Betterment Plan" flow release schedule. Roanoke Rapids dam discharges during the study period were decreased in 2500-5000 ft^3/s steps from approximately 20,000 ft^3/s to <3000 ft^3/s over a five-week period. The timing of surveys coincided with target flow regimes to determine changes in wetland drainage patterns, tributary biochemical oxygen demand (BOD) and DO levels, and variations in BOD and DO along the mainstem of the river. Notably, the flow release schedule proposed in the Betterment plan was modified by extending the "steps" at intermediate flow (8,500-10,000 ft^3/s).

Drainage from floodplain swamps was progressive (upstream to downstream) as Roanoke Rapids dam release was decreased. Transitions from bank over-wash conditions to drainage generally occurred at 15,000 to 5,800 ft^3/s. DO concentrations progressively decreased from Scotland Neck downstream to Albemarle Sound, but upstream DO levels and river flows were adequate to prevent hypoxic (DO levels < 3 mg/l) conditions in the lower Roanoke River. Minimum DO levels in the mainstem were 3 to 4 mg/l during the study. Tributaries often had low DO concentrations (<4 mg/l) with poorest water quality for creeks above Williamston. In fact, tributary DO levels decreased to <1 mg/l for some creeks during drainage of stored waters, particularly in the middle portions of the lower Roanoke (40-90 miles upstream from Albemarle Sound). Tributary DO and BOD values for the study period indicate both poor quality (low DO) and high oxygen demand (high BOD) are important factors in observed DO declines as swamps drain following over bank flooding. The study showed a ramped flow release schedule can moderate swamp water impacts on mainstem DO levels during the transition period from flood control to normal reservoir operations.

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BREAK-OUT SESSION:
4- CHOWAN RIVER BASIN

How a Small Town Survived Wastewater Treatment Problems

Lee Wynns, Mayor
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The Town of Colerain is a small rural town with 240 residents and is located in Bertie County about one mile from the Chowan River. In less than 45 days after I became Mayor, a letter was received from the Division of Water Quality indicating that fines were to be levied because the town had failed to address problems with its aging sewer system. Because of inflow and infiltration, the treatment plant was discharging in excess of 100,000 gallons per day into the Chowan River. The plant was permitted for only 70,000 gallons per day -- and should only have generated about 30,000 gallons per day. It became obvious that solutions were needed to address our wastewater treatment problems.

My presentation talks about the steps we took to remedy our situation and how a small town learned a great deal from the experience. The process of eliminating wastewater discharge directly to the Chowan River in favor of creating a spray irrigation system for land application was very challenging.

Briefly, this is what has been accomplished:

1. The town no longer discharges wastewater into the Chowan River.
2. Wastewater is recycled through an irrigation system and used to produce cotton, corn and soybeans for feed, and a cover crop in winter to reduce erosion.
3. The construction of another collection system eliminating 60 poorly performing septic systems in a neighboring community is nearly complete.
4. A system was designed that will not overly tax the financial or administrative resources of a small community.
5. A farm site was chosen that practices conservation tillage, thus helping prevent unwanted run-off of rain water.

During the first year of operation, it was the wettest winter on record. The lagoon never exceeded being over half-full and using the spray field was not necessary during the wet period. All the wastewater was contained in the lagoon until the water requirements of the crops called for irrigation. The only problem now seems to be a lack of water for optimum irrigation purposes.

Financially, the system has worked well. The monthly cost for a consumer who uses 3000 gallons of water is $11.50.

Virginia DEQ's Water Quality Monitoring Program in the Chowan River Basin

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The Meherrin, Nottoway, and Blackwater Rivers, which are located in Virginia, comprise the headwaters of the Chowan River Basin. Of the 4790 square mile Chowan watershed, 75% (3575 sq. mi.) is within Virginia. The Virginia Department of Environmental Quality (DEQ) is the state agency charged with the assessment and protection of water quality in Virginia's state waters. This mandate is accomplished in the Chowan River Basin by the coordinated monitoring efforts of two of the six DEQ regional offices whose jurisdictions encompass the Chowan watershed within Virginia. DEQ's monitoring program includes data collection in the following categories: stream ambient water quality, lake water quality, benthic biological community integrity, biota tissue monitoring for toxic chemicals accumulation, pollution report response, and special environmental studies. DEQ's monitoring network within the three Chowan headwater watersheds is comprised of more than 200 stations, which are spatially distributed throughout the three major rivers' watersheds. Information collected through the monitoring network provides water quality data for stream physical measurements, nutrient concentrations, chemical constituents, bacterial indicator biomass, toxic chemicals, and benthic biological biomass. DEQ's monitoring program is updated annually and is detailed in the technical bulletin "Virginia Ambient Water Quality Monitoring Report" for the monitoring years since 1996.

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BREAK-OUT SESSION:
5- PASQUOTANK RIVER BASIN

Managing Wildlife Resources and People on the Alligator River National Wildlife Refuge

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Recently, the USFWS has refocused it's vision and rethought it's organizational chart. The new "look" continues to highlight wildlife and its habitat -- and it always will. This is the one point that has always set the Fish and Wildlife Service apart from other land management agencies. However, even the most conservative of managers is acknowledging the important role that people play in wildlife refuge management these days.

The roles people play in refuge management have diverged far from he traditionally accepted roles as managers, biologists, equipment operators, interpreters, and the like. These days, refuge managers find themselves juggling appointments with "partners", eco-tour guides, cooperative farmers, hunters, fishermen, birders, paddlers, and educators, just to name a few.

Americans have found that phrase "for public enjoyment" that was so carefully tucked away in the old mission statement of the National Wildlife Refuge System. They have come to realize that the natural resources so carefully managed are, in fact, maintained "for the benefit of present and future generations". Simply put, there are more "stakeholders" in national wildlife refuges, and they're more educated, more sophisticated, and more willing to challenge the system. They demand to be heard.

The "new Fish and Wildlife Service" is eager to meet with and listen to these stakeholders. Management decisions have always been carefully thought through, but these days, every decision is carefully scrutinized to make certain it can meet the "compatibility test", and a creative, cooperative manager is more likely to be a successful one.

GROWTH MANAGEMENT TOOLS IN CURRITUCK COUNTY

Presented at: *Managing the Albemarle-Pamlico Sounds Conference*
"It's Everyone's Responsibility"
November 19 and 20, 1998
New Bern, North Carolina

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Currituck County has been facing rapid growth continuously since the 1980s. Residents have voiced concerns over the impacts growth is having on their quality of life, including rising taxes and costs of county services, negative impacts on the environment, and loss of rural character. In response to citizens' concerns, Currituck County enacted several measures to control growth and promote development that is sensitive to the environment, including adoption of an adequate public facilities ordinance, adoption of open space subdivision regulations, and overall reduction of density throughout the county.

Jack Simoneau, Director of Planning and Inspections, will discuss the tools used by Currituck County to control growth and Bill Richardson, County Manager, will discuss the political implications of such growth control measures.

SOUTHERN WATERSHED SPECIAL AREA MANAGEMENT PROGRAM

Hampton Roads Planning District Commission
John M. Carlock, Deputy Executive Director for Physical Planning

The Hampton Roads Planning District Commission is facilitating the Southern Watershed Special Area Management Program (SWAMP), a cooperative project involving the Cities of Chesapeake and Virginia Beach. Funded through the Virginia Coastal Resources Management Program, this project addresses common needs and opportunities identified by the two Cities. It is, in part, a result of the HRPDC project, Environmental Management Program for the Southeastern Virginia Portion of the Albemarle-Pamlico Estuarine System, completed with assistance from the APES Program in 1993.

The SWAMP Project is guided by a Memorandum of Agreement for cooperative planning in their Southern Watersheds, executed by the two Cities in 1995. The MOA establishes a common goal and five common objectives to guide planning and development in the Southern Watersheds. The goal of the program is "To protect natural resources, sensitive lands and water supplies in the Southern Watersheds through management of competing uses and collaboration of local, state and federal agencies working in the Southern Watersheds." Five objectives are established:

1. Water quality should be protected and enhanced for water supplies and natural resources conservation.
2. Preserve open lands to help protect and enhance water quality.
3. Ensure compatibility of recreational activities and commerce with natural resource protection.
4. The character of the Southern Watershed should remain rural while providing for rural residential development.
5. Agricultural and forestal activities in the Southern Watershed should be sustained and encouraged.

A multi-year planning project is underway to achieve new and enhanced management programs, termed "enforceable policies" by the funding agency. To support these program enhancements, a number of technical studies in the areas of water quality, land use, natural features, economics and regulatory issues are underway. New planning strategies, enhanced local land use regulations, and Memoranda of Agreement between local, state and federal agencies and the private sector will result. Related programs, being conducted in the areas of water supply protection and stormwater management, are augmenting the SWAMP Program.

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PANEL DISCUSSION:
"PEOPLE MAKING THE DIFFERENCE"

Managing the Albemarle-Pamlico Sounds: It's Everyone's Responsibility
Conference
November 19, 1998

Lisa L. Schell
Public Information Officer, North Carolina Aquariums

Presentation Title: "Making the Connection: Fostering Stewardship Through Entertaining Education"

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Summary:

Overview of educational programming offered at the three North Carolina Aquariums designed to increase awareness of the link between water quality, stewardship and the health of our oceans. Focus on the responsibility and role the aquariums must play in communicating DENR's water quality message.

PARTNERSHIP *for the Sounds*

UPDATE ON ACTIVITIES OF THE PARTNERSHIP FOR THE SOUNDS

The Partnership for the Sounds (PfS) was chartered in 1994 as a private, non-profit organization. Its mission is to build and operate environmental education centers in the Albemarle-Pamlico estuarine region, which in turn will promote ecotourism and sustainable development in several rural and relatively poor counties (specifically Beaufort, Bertie, Hyde, Pamlico and Tyrrell, plus counties adjacent to them).

The Albemarle-Pamlico Estuarine Study's Stewardship Action Plan recommended that the state help fund PfS as a primary vehicle for environmental/estuarine education in the APES area. The Legislature has done so every year since 1994, including in the recently adjourned 1998 short session.

To date the Partnership has accomplished the following goals:

- Opened the North Carolina Estuarium in Washington (January 1998). The Estuarium interprets the sounds and coastal rivers with a unique combination of science and art.
- Opened the Columbia Theater Cultural Resources Center (October 1998). This facility examines human uses of the region's resources, especially as seen in fishing, farming and forestry.
- Funds a full-time staff person and restoration projects at the Mattamuskeet Lodge in Hyde County. The Lodge is an historic structure with a fascinating past. Restoration efforts now allow the Lodge to serve as a coastal research laboratory and to host tourists and meetings.
- Will open the Roanoke/Cashie River Center in Windsor during winter 1998-99. The R/CRC will interpret the Roanoke and Cashie systems and the vital floodplain forests surrounding them.
- Was asked by the Legislature in 1998 to begin working with Pamlico County on the development of an environmental education center in Oriental.
- Conducts environmental education programming and assists with programming by other groups (state parks, etc) throughout the PfS counties.
- Has produced marketing materials that publicize not only PfS centers, but also other existing environmental, cultural, and historic sites in the region that would appeal to the ecotourism traveler.
- Has worked with numerous other groups from North Carolina and other states that are developing ecotourism/sustainable development initiatives.

The Partnership is an innovative effort to bring environmental, economic, and public interests together for the common goal of helping people better understand the estuarine region of North Carolina. As a private non-profit it can operate with limited bureaucracy, but close ties to the state help keep it in the loop with important programs like the state aquariums, estuarine research reserves, and state parks. By working cooperatively, these groups can provide the citizens of North Carolina with a rich variety of environmental education opportunities.

Presenter: Tom Stroud, Special Projects Director, Partnership for the Sounds

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Citizen Involvement in Watershed Education and Outreach in the Neuse Basin

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Because the Neuse Rules affect most segments of the population, several of the members of the Neuse Education Team conducted a survey to gauge the water quality knowledge and perceptions of the diverse constituency groups in the Neuse River Basin. The intent of the survey was to determine the educational needs of constituency groups as related to water quality, and to improve participation, understanding and buy-in to possible solutions to protect river water quality.

The Neuse River basin is the third largest river basin in North Carolina, encompassing 5,590 square miles (approximately 9% of the state) in 23 counties (McMahon and Lloyd, 1995). The river originates in north central North Carolina, northwest of Durham, and flows in a southeasterly direction approximately 200 miles past Raleigh, Smithfield, Goldsboro, Kinston, and New Bern to the tidal waters of the Pamlico Sound. The basin contains 3,293 miles of freshwater streams, 328,700 acres classified as salt waters, and thousands of acres of impoundment's (NC DEHNR, 1993).

According to the U.S. Geological Survey, the Neuse River and one of its major tributaries, Contentnea Creek, have the highest concentrations of total nitrogen and total phosphorus of any of the four major river basins (Chowan, Roanoke, Tar, and Neuse) draining into the Pamlico and Albemarle Sounds (Spruill and Harned, 1997). The Neuse River carries the highest percentage of nitrogen (35% and phosphorus (45%) transported by all four rivers to the sounds, even though the river drains only about 20% of the contributing land area (Spruill and Harned, 1997).

To help implement the rules through and educational program, the general assembly funded seven new positions to the North Carolina Cooperative Extension Service: five county-level environmental area agents and two university-level extension specialist. These agents and specialist, along with three other university-level specialists compose the Neuse Education Team. The goals of this team are to: 1) develop, implement, and evaluate educational programs to improve water quality, 2) build partnerships and 3) improve policy making processes.

The primary educational needs that were derived from the focus groups are science based information about the current water quality conditions in the Neuse River and its estuary must be made available to a wide audience of constituency groups throughout the basin. Except for one group, participants were unanimous in requesting unbiased, reliable sources of information that describe the water quality conditions in the Neuse and their effects on the estuary. They also want the information contain what we know, what we don't know, and a description of the interactive nature of watershed or river basin projects. In order for this information to reach large audiences, it was suggested that the information be available from numerous sources: the media, the Internet, conferences, workgroups, NCCES publications, trade-association magazines and newsletters, and public service announcements. A better explanation of how source contribution is calculated is needed. It

is important that the constituency groups understand how difficult it is to calculate source contributions. Beyond a description of the methodology that was used to calculate source contribution, additional topics should be included: limitations of partitioning nitrogen contributions by different sources. Nitrogen movement into the ground water and then into streams. The relationship between nitrogen loading and stream size the relationship between land use area and nitrogen contributions (include the percentage of different land uses in the basin) a description of the hydrologic cycle and the relationship between nitrogen movement and hydrology estimate of nitrogen used in the basin for agricultural crops estimate of nitrogen used in the basin for turfgrass continued efforts to increase the average citizen's awareness of their ecological address are still needed. Data on the effectiveness of BMP's must be made more available. Many groups were doubtful about the nitrogen-reducing effectiveness of the BMP's that have been prescribed for implementation in the Neuse River Basin. Policy makers need more information about the models that are being used in the basin. They also need explanations of the model. They need to understand what biological processes the models can and cannot explain. Current plans to hold meetings to discuss water quality modeling in the Neuse River Basin should help with this request. Information on appropriate fertilization practices should accompany every bag of fertilizer sold to non-agricultural purchasers. Participants in several groups suggested that urban homeowners need more information to help them practice nutrient management more responsibly.

Threats & Remedies: The Value of Citizen Action

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A number of citizen-based activities have been organized to monitor water quality in the Tar-Pamlico River, to educate citizenry about the effects of pollution and to advocate for state and federal policies to restore the water quality. Some of the efforts of the Pamlico-Tar River Foundation, such as the formation of the APES Citizens Water Quality Monitoring Program and the development of the North Carolina Estuarium will be addressed by other speakers on the panel.

Citizen involvement is central to the efforts of the Pamlico-Tar River Foundation to protect and improve the environmental quality of the Pamlico-Tar River, its estuaries and watersheds. Current citizen involvement activities center around the development of voluntary conservation easements along riparian sections of Swift Creek, Fishing Creek and Upper Tar River. These important ecosystems provide habitat to 12 species of rare or endangered freshwater mollusks, 2 species of rare amphibians and 3 species of rare fish. Protecting riparian land on a voluntary basis necessarily involves community support and citizen involvement.

The Clean Water Management Trust Fund has provided a valuable opportunity to mobilize communities around important water quality projects. The Pamlico-Tar River Foundation is organizing efforts in the City of Washington to turn the site of a former wood planing mill site into a stormwater wetland and park. Citizens are asking that riparian land be used for conservation uses, rather than private development, which could lead to less impervious surface and greater filtration of the first inch of stormwater in the downtown area.

The Pamlico-Tar River Foundation is involved in a number of other citizen-action projects, including stenciling storm drains in Greenville and assisting community groups concerned with the potential environmental impacts of new industries in the watershed of the Albemarle-Pamlico Estuary.

TRINITY CENTER

OF THE

EPISCOPAL DIOCESE OF EAST CAROLINA

THE RT. REV. CLIFTON DANIEL, 3rd
BISHOP

F. MICHAEL MORGAN
EXECUTIVE DIRECTOR

Name of the author: F. Michael Morgan, Executive Director
Affiliation: Trinity Center
A program of the
Episcopal Diocese of East Carolina

Presentation Title: Methods to Increase Student Involvement in Water Quality Issues

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A short history of Trinity Center's "Sound to Sea" environmental education program to include:

- Start up and funding
- Response by public and private institutions
- Teaching methods
- Costs
- Availability of open dates
- Attendance percentages by geographical area

Using Estuary-Net and GLOBE as methods to report, store, compare, observe and retrieve data on water quality monitoring.

A – Estuary-Net

- A national program sponsored by NOAA
- Local affiliation
- "Hello"
- Metadata
- Data

B – GLOBE

- A global international partnership
- Scope
- Program design and development
- Student-scientist partnership
- Science and education

Question and Answer period

Patrick Stanforth
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Albemarle-Pamlico Citizens' Water Quality Monitoring Program

Background

The Citizens' Water Quality Monitoring Program (CWQMP) is a network of private citizens who keep track of ambient, surface water quality in the Albemarle-Pamlico Estuary and its tributaries. The program began as an initiative by the Pamlico-Tar River Foundation and was expanded under the Albemarle-Pamlico Estuarine Study to gather essential data and focus additional public attention on the quality of the fragile water resources of the estuary.

The CWQMP focuses upon three main areas of activity: baseline monitoring, targeted monitoring and surveys, and 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 the "vital signs" of the estuary. Specifically, volunteers monitor dissolved oxygen, pH, salinity, air and water temperature, and turbidity to gauge the general health or quality of the waters in the estuary. Using basic, but quite 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. Occasionally, program volunteers gather water samples for specific pollutants such as bacteria and nutrients. All data collected are forwarded to the program office where staff organize the information and put the data into report form for citizen and government agency use. Often, these monitoring efforts serve as useful supplements to existing governmental activities.

What is Water Quality Monitoring and Why is it Needed?

Water quality monitoring is the repetitive measurement or observation of a waterbody over time. We measure water quality repetitively to detect changes and trends in water conditions that occur due to natural events or pollution. Often, one or two years of data will not show trends in water quality and will not pinpoint sources of pollution. Therefore, monitoring is a long-term effort. Carefully obtained, objective monitoring is very valuable to develop information about a waterbody's baseline conditions. Trained analysts use this data to identify trends and changes in the system's water quality. By not relying on subjective information, monitoring can provide more objective, quantified measures of the past.

What is the Albemarle-Pamlico Estuary and Why Should We Monitor It?

The Albemarle-Pamlico Estuary is one of North Carolina's most important natural resources. Seven sounds make up an estuary that is home to a wide diversity of unique habitats and wildlife. Historically, the estuary has supported many important northeastern North Carolina industries such

as commercial fishing, seafood, recreation and tourism. Not only do we extract resources from the estuary, but we also depend on its aesthetic and cultural viability to attract interest and investment in the region.

Why Should Private Citizens Participate in Water Quality Monitoring?

Help is needed to monitor this vast estuarine system. The estuary is a large and diverse region and is too big to adequately monitor with government agency resources. The estuary has a 30,000 square mile watershed with more than 9,299 miles of freshwater rivers and streams and 1.8 million acres of brackish estuarine waters. The watershed contains five major river basins and seven sounds. With the exception of the Chesapeake Bay, it is the largest estuary in the Unites States. Because the estuary is so large and the impacts upon it are so diverse, the assistance of citizens is needed to monitor the estuary. The wide expanse of waters that makes up the estuary is often more accessible to local citizens who live nearby. Citizens' help allows us to "fill in the gaps" left open by limited government resources.

Citizens of North Carolina need to know what it happening in their estuary and need to be involved in managing this resource. Water quality monitoring allows citizens to observe water conditions firsthand, and to learn more about the interactions of water measures and the changes that occur due to natural events and pollution. The knowledge volunteers gain through water quality monitoring helps them to be an informed citizen and to act as an advocate for a clean and healthy environment.

MANAGING THE ALBEMARLE-PAMLICO SOUNDS

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POSTER SESSION

The Center for Geographic Information and Analysis

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The Center for Geographic Information and Analysis (CGIA) played a significant role in creating data inventory for the Albemarle-Pamlico Estuarine Study. Since 1994, CGIA has continued its support role in advancing the goals of the CCMP. In addition to the approximately 60 digital data sets available as part of the NC Corporate Geographic Database, CGIA has been developing additional coverages related to environmental protection. A few examples are discussed below.

A land cover map of the state has been developed that will aid in protecting wetlands and identifying riparian buffers.

Digital Orthophotography Quarter Quadrangles for APES and CAMA counties based on 1993 aerial photography is available from CGIA.

Public water and sewer system information has been received for more than six APES counties.

Coverages of fish community and benthic monitoring results have been created based on data received in April 1998.

CGIA is in the process of updating the geographic coverage of close shellfish waters and is developing a separate coverage of conditionally closed waters.

CGIA serves as the lead agency for geographic information system (GIS) coordination in the state and played a key role in the APES study. CGIA has future plans to expand the environmental data layers, conduct spatial analyses of data and develop custom GIS applications to meet environmental protection needs.

MANAGING THE ALBEMARLE-PAMLICO SOUNDS: "It's Everyone's Responsibility"

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Summary:

The land area surrounding the Albemarle and Pamlico Sounds contain extensive acreage of soils that are either provisionally suitable or unsuitable for conventional on-site wastewater systems. Despite poor soils, this area is experiencing continued growth. This growth often forces the use of alternative, innovative, and experimental wastewater technologies that are inherently more complicated than a conventional on-site system. Therefore, there is a need for advanced training of environmental health specialists, installers, operators, and CES agents in the installation and maintenance of these systems as well as the existing conventional systems. The On-Site Demonstration Facility located at the Tidewater Research Station/Vernon James Center (TRS/VJC) was established for this purpose. The center provides a major training area for agents, specialists, installers, and operators thus promoting the use of the most appropriate technologies for a given site. The training often involves people with diverse backgrounds thus fostering a sense of cooperation. The Facility has the potential to be a resource for interested public officials as well as individuals to in order to explain various options and illustrate the need for proper and timely maintenance and overall landuse planning.

Research is ongoing in this region on alternative septic systems that provide greater treatment of wastewater prior to subsurface disposal. One such system utilizes, fibrous peat as a treatment media. This system was installed as a repair of a failing system on poor soil. Biological and chemical analysis of the system indicates that it has been performing well.

Along with education and research we are looking at overall system management as a means to ensure public and environmental health. Four northeastern counties in the lower coastal plain (PPCC Health District) created a district wide public management entity in the early 19990's. A survey of septic system performance before and after the implementation of management indicates how management can benefit the environment. Only through the combination of education, research, and management of septic systems can we secure our futures.

1. Harvey J. Walsh, Larry R. Settle, and David S. Peters
2. National Marine Fisheries Service, Beaufort Laboratory
3. Poster Title: DISTRIBUTION AND ABUNDANCE OF ANADROMOUS CLUPEID LARVAE IN THE LOWER ROANOKE RIVER SYSTEM
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Utilization of backwater habitats by larval anadromous clupeids was studied during spring 1996 and 1997. Sampling was conducted near Hamilton, NC in tributary systems connecting the Roanoke River to Broadneck and Company Swamps. Ichthyoplankton stations sampled included man-made canals, creeks, a river oxbow, adjacent flooded swamp, main river channel, and river edge. Clupeid larvae comprised 59% of the total number of larvae collected in 1996 and 25% in 1997. Three species were identified; blueback herring (*Alosa aestivalis*), alewife (*Alosa pseudoharengus*), and hickory shad (*Alosa mediocris*). Based on presence of eggs and early stage larvae, it appears all three species spawn in backwaters and swamps. Therefore, fluctuations in river height which affect the amount of flooded backswamp habitat available for spawning and nursery of early-stage larvae have an impact on all three species in several ways. Drops in river height can make spawning habitat unavailable or undesirable. Rapid decreases in river height may result in mortality for eggs and larvae through stranding. Moderate to high discharge rates make backwater habitat available and beneficial to all three species of anadromous clupeids as long as the backswamp is flooded for a sufficient amount of time to allow eggs to hatch and larval be exported to the river.

1. Carl R. Crozier, G.M. Chescheir, R.O. Evans, J.W. Gilliam, and R.W. Skaggs.
2. North Carolina State University Soil Science and Biological and Agricultural Engineering Departments.
3. Effects of Water Table and N Management on Grain Production: Research and Extension Activities.
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Water table and nutrient management have been shown to reduce N runoff in the North Carolina Tidewater region, and are key components of the strategy to reduce N runoff by 30% in the Neuse River basin. Ongoing research and extension efforts attempt to document and promote management practices which permit profitable grain production while minimizing offsite impacts.

The effects of both water table and N management on corn, wheat, and soybean yields have been studied for several years in two field experiments at the Tidewater Research Station. One experiment has 8 main water control plots with replicated treatments: free drainage, controlled drainage, subsurface irrigation. The other has a 5 main water control plots in a stepwise gradient: water levels at 15, 30, 45, 60, and 75 cm. Both experiments have N rate subplots.

Corn and soybean responses to water management generally varied in relation to rainfall. Subsurface irrigation is likely to enhance yields in drier years, but may reduce yields in wetter years. Wheat yields were consistently lower with very shallow water management levels (15 and 30 cm). As long as producers retain the flexibility to lower water levels in case of wet conditions, then they should benefit from water table management. Maintaining at least some water in field ditches, i.e. 2 feet below soil surface rather than 3-4 feet, should provide both agronomic and N runoff benefits. If supplemental water is available, then subsurface irrigation can reduce the risk of crop losses during the frequent short-duration dry periods in this region. If supplemental water is not available, then controlled drainage can at least delay the onset of drought stress when compared to the free-drainage condition.

Corn and wheat responded to increasing N levels in 23 of 26 comparisons. An N response plateau was detected in every cropping season. Optimal fertilizer rates for wheat were approximately 2 lbs N/bushel of grain, consistent with recommendations based on the Realistic Yield Expectation (RYE) concept. Nitrogen use efficiency of corn has improved during the last three cropping seasons, with maximum yields increasing as the optimum N rate per acre remained relatively constant. Using the RYE concept, efficiency has improved from 1.96 lbs N/bushel in 1993, to 1.52 in 1995, to 1.24 in 1997. We suspect that this increase in efficiency is related to soil changes following drainage and clearing this land during the 1980s. This suggests that yield-enhancing BMPs which do not involve more fertilizer can result in greater N removal, and thus reduce residual N.

These results are being presented to producers (Blacklands Farm Managers Tour, winter meetings), N.C. Cooperative Extension Service training sessions, and other professionals (Soil Science Society of North Carolina, American Society of Agronomy).

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The Neuse and Tar/Pamlico River Rapid Response Teams, work units of the NC Division of Water Quality, are available to respond to fish kills, algal blooms, and other water quality problems on the Neuse and Tar/Pamlico rivers. The teams were created by Governor Hunt in response to the growing concern of water quality issues in the area. Based in New Bern and Washington, the teams provide quick response to ecological problems in the lower Neuse River and Tar/Pamlico basins.

Ongoing monitoring of water quality conditions is also a priority. The teams work in cooperation with other DWQ personnel and agencies such as UNC's Institute of Marine Sciences and East Carolina University in providing weekly monitoring of the rivers. The data collected is used in monitoring and modeling of riverine trends and conditions.

The Neuse team has a world wide web page, maintained by the NC Department of Environment and natural Resources, where water quality findings are summarized in weekly updates. The internet address is: http:// www.ehnr.state.nc.us/EHNR/neuse/. A web page is also planned for the Tar/Pamlico team.

Public participation is a key to the team's effort to protect the Neuse and Tar/Pamlico rivers and their tributaries. The teams seek to build and maintain a cooperative relationship with the public, interest groups, and researchers in this area. The presence of the teams strengthens ties with the community through participation in environmental awareness events and providing the media and public with a better understanding of water quality conditions and influences.

The teams operate seven days a week and the public is urged to report water quality problems at any time. The Neuse team can be reached at 252-514-4748 or toll free 1-888-764-7661. The Tar/Pamlico team can be contacted at 252-946-4328 or toll free 1-877-337-2383.

Water Quality in the Albemarle-Pamlico Drainage Basin, North Carolina and Virginia, 1992-95

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Knowledge of the water quality of the Nations streams and aquifers is important because of the implications to human and aquatic health and because of the significant costs associated with decisions involving land and water management, conservation, and regulation. The National Water Quality Assessment (NAWQA) Program is assessing the water-quality conditions of more than 50 of the Nation?s largest river basins and aquifers, known as Study Units. Comprehensive assessments of about one-third of the Study Units are ongoing at a time. Each Study Unit is scheduled to be revisited every decade to evaluate changes in water-quality conditions. This poster summarizes selected findings that emerged between 1992 and 1995 from the water-quality assessment of the Albemarle-Pamlico Drainage Study Unit and relates these findings to water-quality issues of regional and national concern.

MANAGING
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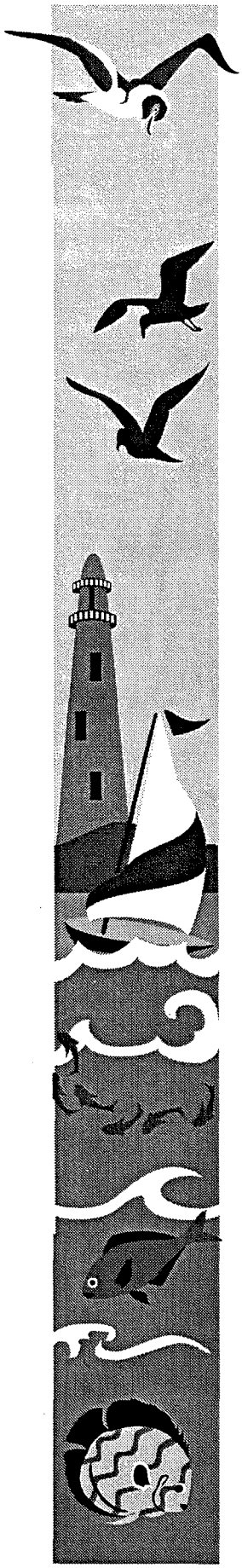
1998 DRAFT SUMMARY REPORT
IMPLEMENTATION of the COMPREHENSIVE CONSERVATION and MANAGEMENT PLAN



IMPLEMENTATION

OF THE

COMPREHENSIVE CONSERVATION & MANAGEMENT PLAN

ALBEMARLE-PAMLICO NATIONAL ESTUARY PROGRAM

1998 DRAFT SUMMARY REPORT

Prepared for the Albemarle-Pamlico Sounds NEP CCMP Conference
November 19 and 20, 1998
New Bern, North Carolina

This document has been prepared based on communication with state and federal agencies, and other groups having involvement with CCMP management actions. We are currently seeking public input prior to finalizing this edition. Please send any comments you may have to Guy Stefanski, NC Division of Water Quality, Water Quality Section, Planning Branch, PO Box 29535, Raleigh, NC 27626-0535

FORWARD

The Albemarle-Pamlico National Estuary Program (AP NEP), a part of the US Environmental Protection Agency's National Estuary Program, culminated in the preparation of a Comprehensive Conservation and Management Plan (CCMP). The CCMP, intended as a practical, cost-effective and equitable approach to restoring, enhancing and protecting the valuable resources of the Albemarle-Pamlico watershed, was ratified by the Governor of North Carolina and the US EPA in November, 1994. Implementation of the CCMP is being administered through the Division of Water Quality (DWQ) within the NC Department of Environment and Natural Resources (DENR).

Much progress has been made in implementing the objectives of the CCMP, and this report provides an overview of the many accomplishments and achievements that have been made over the past year for each of the CCMP's 49 management actions. This draft document (revised from the August 1997 edition) provides the most recent information available regarding CCMP implementation. For information regarding CCMP implementation progress prior to this report, please refer to the 1996 & 1997 summary reports.

The information contained in this report was derived from a variety of sources including staff's most current knowledge of ongoing CCMP activities and feedback from key individuals within and outside of DENR. The following agencies/organizations have provided significant contributions to this document:

- NC Division of Water Quality
- NC Division of Coastal Management
- NC Division of Soil & Water Conservation
- NC Division of Marine Fisheries
- NC Division of Parks & Recreation
- NC Division of Water Resources
- NC Division of Land Resources
- NC Division of Forest Resources
- NC Office of Waste Reduction
- NC Office of Environmental Education
- NC Center for Geographic Information & Analysis
- The Partnership for the Sounds, Inc.

The goals, objectives, management actions and explanations contained in this summary are taken directly from the A/P NEP CCMP. Periodic updates to this document will occur as further progress is made in implementing the CCMP's management actions.

MAJOR RIVER BASINS OF THE ALBEMARLE-PAMLICO WATERSHED

1: Chowan River Basin
2: Roanoke River Basin
3: Currituck Sound & Pasquotank River/Albemarle Sound Drainage Basin
4: Tar-Pamlico River & Pamlico Sound Drainage Basin
5: Neuse River Basin and Core Sound/Bogue Sound Drainage Basin

Implementation
of the
Comprehensive Conservation and Management Plan
Albemarle-Pamlico National Estuary Program

Draft Summary Report - 1998 Edition

Table of Contents

WATER QUALITY PLAN

GOAL: Restore, maintain or enhance water quality in the Albemarle-Pamlico region so that it is fit for fish, wildlife and recreation.

OBJECTIVE A:
IMPLEMENT A COMPREHENSIVE BASINWIDE APPROACH TO WATER QUALITY MANAGEMENT

Management Action 1
Water Quality Plan - Objective A

Develop and begin implementing basinwide plans to protect and restore water quality in each basin according to the schedule established by the Division of Environmental Management's Water Quality Section. The plans would include provisions for basinwide wetland protection and restoration.

Explanation:

Basinwide plans are comprehensive, targeted strategies for managing water quality. They assess the cumulative impact of individual projects on water quality within a basin. They can identify and manage pollutants in a way that protects water quality while accommodating economic growth. Basinwide protection and restoration also can help assess and preserve wetlands functions.

1997-98 CCMP Implementation Achievements:

- The Division of Water Quality (DWQ) continues to develop basinwide water quality management plans according to schedule. Basinwide plans have been completed for all of the seventeen river basins in North Carolina, including the Neuse, Tar-Pamlico, Roanoke, White Oak, Chowan and Pasquotank rivers in the Albemarle-Pamlico (A/P) region. A draft plan for the 5-year update of the Neuse Basin plan has been circulated for public review. Five public meeting workshops on this plan were held in March 1997. Two public meetings were held in September 1998 to solicit comment on the draft plan. The final plan is scheduled to be presented to the EMC in December, 1998 for final approval. A draft of the 5-year update for the Tar-Pamlico River basin is currently being developed.

- DWQ is currently pursuing wetland protection initiatives and targeting sites for wetland restoration, through the Wetlands Restoration Program. Basinwide Wetlands and Riparian Restoration Plans are being developed in concert with the Basinwide Water Quality Management Plan schedule. These plans include the following information:
  - A statement of the restoration goals for each river basin
  - A map of each priority subbasin showing water quality information and watershed boundaries
  - A map of each priority subbasin showing water quality information, watershed boundaries and land cover by type (agricultural, forested or developed)
  - A narrative overview of the river basin, including general information on existing water quality-related problems
  - Summary information on natural resources
  - Descriptions of each priority subbasin
  - Data on wetland impacts

  Interim plans have been completed for all five river basins in the Albemarle-Pamlico Sounds region.

Management Action 2
Water Quality Plan - Objective A

Establish total maximum daily loads (TMDLs) and associated control strategies for all impaired streams in the Albemarle-Pamlico region by 1999.

Explanation:

Total maximum daily loads estimate the amount of pollution that can safely enter a body of water. To determine limits to these daily loads, current and projected levels of pollution must be considered in

relation to what the system can absorb. Proper use of TMDLs will allow development of management strategies to ensure long-term sustainable growth that does not harm the state's water resources.

1997-98 CCMP Implementation Achievements:

- EPA's definition of an acceptable TMDL has changed. Previously, EPA had indicated that management strategies designed to restore water quality constituted TMDLs. As a result of lawsuits that have been filed across the nation, EPA has indicated that TMDLs must be numeric goals.

- A TMDL for total nitrogen in the Neuse River Estuary was submitted to EPA on October 30, 1998. This TMDL will become final upon EPA approval which has thirty days to approve or disapprove the TMDL.

- TMDLs for the following waterbodies in the A/P region have been completed:
  - Total Nitrogen (TN) and Total Phosphorus (TP) in the Tar River Estuary
  - BOD5 targets in many stream reaches including the Neuse and Roanoke Rivers along with several smaller tributaries in the Neuse River Basin
  - A TMDL for BOD on the Tar mainstem. Since the water was not on North Carolina's 303(d) list, EPA was not required to take action on this TMDL
  - Dioxin TMDL for Welch Creek and Roanoke River

- Outstanding Resource Waters (ORW), High Quality Waters (HQW) and reservoirs with water supply protection have general management strategies developed for them that are designed to protect the existing uses and prevent the need for TMDLs.

- The basinwide water quality management plans developed by the Division of Water Quality contain information on TMDLs and management strategies.

Management Action 3
Water Quality Plan - Objective A

Renew all discharge permits in a river basin simultaneously by 1999.

Explanation:

Renewing permits simultaneously allows the Division of Water Quality (DWQ) to consider the total impact from all dischargers when determining how much pollution each may release into the basin.

1997-98 CCMP Implementation Achievements:

- DWQ's scheduled basinwide plans allow for synchronous renewal of discharge permits within respective river basins of the state. Under this approach, all NPDES permit renewals in the Albemarle-Pamlico region were handled in this manner by March 1998. The second round of NPDES basinwide permitting has begun in the Neuse River. The second round will be completed by March 2003.

Management Action 4
Water Quality Plan - Objective A

Consider the potential for long-term growth and its impacts when determining how a basin's assimilative capacity will be used.

Explanation:

Assimilative capacity is the ability of a river basin to safely absorb pollutants. Basinwide planning should ensure that this capacity is used in a way that sustains long-term growth. However, planning for long-term growth also must consider how secondary impacts such as runoff from new roads will affect water quality.

Supporting information:

Integrating point and nonpoint source pollution controls and determining the amount and location of the remaining assimilative capacity in a basin are key long-term objectives of basinwide management. The information can be used for a number of purposes including determining if and where new or expanded municipal or industrial wastewater treatment facilities can be allowed;

setting the recommended treatment level at these facilities; and identifying where point and nonpoint source pollution controls must be implemented to restore capacity and maintain water quality standards.

Wasteload allocations (WLAs) are performed by DWQ using models of varying scope and complexity, depending on the type of waste of interest and the characteristics of the receiving waters. DWQ uses models to determine the fate and transport of pollutants, reduction goals for point and nonpoint sources of environmental contaminants, and to derive effluent limits for NPDES permits. For new dischargers or for expanding dischargers, DWQ utilizes models to determine the existing assimilative capacity for that waterbody.

1997-98 CCMP Implementation Achievements:

- DWQ has begun to take steps to limit the impacts of long-term growth on its rivers. On the Neuse River, and several other major rivers, DWQ has placed limits on the amount of certain pollutants that can be discharged. For example, in the case of oxygen-demanding substances, dischargers on some streams have been prohibited from expanding their plants while others have been required to reduce loading.

- On other creeks, some proposed dischargers have been prevented from discharging any oxygen-consuming wastes. For nutrients (phosphorus and nitrogen), a cap has been established in the Neuse and Tar-Pamlico River Basins. In the Tar-Pamlico River basin, a nutrient trading program exists which requires that increases at one facility must be offset by a decrease at another facility or by a substantially larger decrease from a nonpoint source activity. In both the Neuse and Tar-Pamlico River basins, as well as in the Chowan Basin, regulatory measures to address both point and nonpoint sources of pollution have been established or are being pursued to reduce nutrient inputs into surface waters. While much remains to be done, the impacts of growth are clearly being considered in these areas.

Management Action 5
Water Quality Plan - Objective A

Improve the scientific models for understanding the estuarine system, the effects of human activities on the system and the viability of alternative management strategies.

Explanation:

Scientists use models to understand how systems work. Models for the Albemarle-Pamlico's river basins have been developed, but further refinement and calibration are needed to determine how much pollution can be safely released into the estuary (i.e., total maximum daily loads). This would allow regulators to focus on the most critical sources of pollution, thereby reducing the cost of regulation, monitoring and enforcement. Increased knowledge gained from models will help planners manage water resources to allow for future growth.

1997-98 CCMP Implementation Achievements:

- Three hundred thousand dollars ($300,000) has been allocated to the Upper Neuse River Basin Association, Inc., by the 1998 NC General Assembly to develop a cooperative, comprehensive, and integrated State-local watershed management plan for the Upper Neuse River Basin. This plan will serve as a model watershed management approach for river basins and subbasins in North Carolina.

- DWQ and other researchers are enhancing scientific modeling capabilities in the Neuse River Basin. Emphasis is to develop and apply the estuary model and the watershed model (including fate and transport) for nonpoint source load estimation. Work is also underway to better estimate atmospheric and groundwater nitrogen loads. Other modeling efforts currently underway in the Neuse River Basin include:

MODMON

Using money allocated by the 1996 North Carolina General Assembly, DWQ contracted work with a team of university researchers to collect monitoring data in the estuary and develop a two dimensional estuarine response model (MODMON). The initial version of the model is being calibrated using one year of data that was collected beginning in June 1997. The model will be delivered to DWQ in early 1999. This model will enable DWQ to determine if the 30% reduction target for total nitrogen needs to be modified.

The General Assembly just approved a budget that includes an item to extend the MODMON work. The General Assembly's budget package includes developing a model of the Neuse watershed that includes examining instream fate and transport issues and linking it to the estuarine response model. The additional work is projected to be completed in October 2000.

MIMS

The U.S. Environmental Protection Agency is developing a multi-media integrated modeling system (MIMS) that will be an object-oriented modeling approach to holistically review environmental problems. The MIMS project will be using the Neuse River (and potentially the Tar-Pamlico) as a prototype and will include nitrogen in the surface waters, atmosphere, groundwater and watershed. They are planning on being able to use the project for TMDL issues, but at recent meetings of the MIMS team, we were informed that the modeling system will not be available until 2006. Presentations at the National Estuary Program Atmospheric Deposition Workshop in Annapolis on October 20 and 21, 1998 indicated that the project deadline has already been extended to 2008. Efforts are underway to coordinate this project such that it builds on the MODMON work and hopefully reduces the time frame for completion.

RIMDESS

DENR obtained funds from the Environmental Protection Agency (EPA) to develop a shell that will facilitate developing a modeling system that links the estuary model to a watershed model, groundwater model and atmospheric model. DENR contracted with the Research Triangle Institute (RTI) to develop this tool which is called the River Management Decision Support System (RIMDESS). RIMDESS is intended to provide DENR with the ability to review various nitrogen management options in the basin, and assess the cost-effectiveness of these options. The framework to do this has been established, but the RIMDESS frame needs to be filled with the different model components, such as the estuarine model, and updated information.

Other EPA Initiatives

EPA's Research Triangle Park office has much ongoing research in the Neuse River. In September 1998, staff from EPA and DWQ met to discuss the MIMS project. There is one part of this effort directly related to the Neuse nitrogen TMDL. EPA is developing a land use database that will be used to develop nonpoint source nutrient models of the basin.

Management Action 6

Water Quality Plan - Objective A

Continue long-term, comprehensive monitoring of water quality in the APES system, collecting data to assess general system health and target regional problems.

Explanation:

On a system-wide basis, water quality monitoring allows managers to assess the effectiveness of management strategies. In addition, monitoring data may be used to develop scientific models or other methods of evaluating water quality on a smaller scale. Continued monitoring also would assess long-term trends.

1997-98 CCMP Implementation Achievements:

- During the summer of 1997, state public health officials began testing coastal recreation waters for fecal coliform, salinity, Enterococcus and temperature to make sure they are safe for swimming. Coastal recreational water monitoring efforts now include more than 1,300 sites.

- The Shellfish Sanitation Section tests 275 sites once a week during the tourist season, less often the rest of the year. These tests will give researchers and the public a gauge of water quality along our coast over the short and long-term.

- DWQ has also benefited from data collected by the US Geological Survey under that agency's National Water Quality Assessment Program (NAWQA) water quality sampling program.

OBJECTIVE B:

REDUCE SEDIMENTS, NUTRIENTS AND TOXICANTS FROM NONPOINT SOURCES.

Management Action 1
Water Quality Plan - Objective B

For each river basin, develop and implement a plan to control nonpoint source pollution as part of the basinwide management plans.

Explanation:

Plans would address all nonpoint sources of pollution in each basin, targeting the most critical areas for controls. These plans would identify the nonpoint source pollution problems specific to each basin. Implementation would vary according to each basin's needs. Plans also would include strategies to control nonpoint source pollution in accordance with the total maximum daily loads (TMDLs) established for each basin. Possible measures include targeted funds for implementation of BMPs, buffer strips along waterways, and continued use of BMPs for highway construction.

1997-98 CCMP Implementation Achievements:

- On August 1, 1998, most of the Neuse River Basin Nutrient Sensitive Waters Management Strategy went into effect under permanent rules. The major permanent rules that went into effect include:
  - Nutrient Reduction Goal: Sets a nitrogen reduction goal of 30% below 1991-1995 average annual load to the Neuse River Estuary
  - Wastewater Discharge Requirements: Requires wastewater treatment plants in the Neuse River basin to achieve the nitrogen reduction goal by working either individually or collectively.
  - Basinwide Stormwater Requirements: Requires the 15 largest local jurisdictions in the Neuse River basin to develop and implement a local stormwater management program to reduce nitrogen from new and existing developments
  - Agricultural Nitrogen Loading Reduction: Requires the agricultural community in the Neuse River basin to collectively achieve and maintain a 30% reduction from 1991-1995 nitrogen loads contributed by agricultural operations.
  - Agricultural Nitrogen Reduction Strategy: Requires agricultural operations to achieve their nitrogen reduction goal either by participating in a collective nitrogen reduction plan or individually implementing BMPs on their property.
  - Nutrient Management: Requires persons who apply nutrients to 50 or more acres each year to either attend nutrient management training or develop nutrient management plans.
  - Offset Payments: Sets up a system whereby treatment plants and developers may partially offset their loads by funding practices to reduce nitrogen through the state Wetlands Restoration Program.

DWQ staff and cooperating agencies have begun the implementation process for these rules which must be fully implemented by, or before, August 2003.

- The Neuse Riparian Area Rule (part of the Neuse River Basin Nutrient Sensitive Waters Management Strategy) has been in place as a temporary rule since July 1997. This rule protects "buffers" along all perennial and intermittent streams, lakes, rivers, ponds and estuaries in the Neuse River basin that have existing forest vegetation. House Bill 1402, approved at the end of October, allows DWQ to continue implementing the Neuse Riparian Area Rule as a temporary rule (with a few modifications) until an alternative permanent rule is approved by the 1999 session of the General Assembly.

  DWQ staff is currently working with interest group representatives to reach agreement on several technical issues associated with implementing the Riparian Area Rule. The recommendations of the interest group representatives will be presented to the Environmental Management Commission (EMC) in Spring 1999. Based on this presentation, the EMC will formulate recommendations to be sent to the General Assembly for consideration.

- Nonpoint Source Teams have been created for the following river basins in the A/P region:

  1) Upper, Middle and Lower Neuse River,
  2) Chowan River,
  3) Pasquotank River, and
  4) White Oak River.

  These teams include representatives of local governments, federal and state agencies, interest groups and interested citizens. These groups have all obtained funding from the federal Section 319 grant program to pursue nonpoint source projects in their basins. The teams are currently underway in implementing their projects.

- In September 1998, the EMC directed DWQ staff to begin the rule-making process for a nutrient reduction strategy for the Tar-Pamlico River basin. DWQ staff is in the process of convening stakeholder groups to assist in drafting the rules that will be considered by the EMC and sent out to public notice in Summer 1999. Under the current rule-making schedule, the EMC plans for the Tar-Pamlico NSW Strategy to be considered by the General Assembly in Summer 2000.

- The EMC approved the revised concept for the Use Restoration Waters (URW) program in July 1998. The URW program concept involves a "carrot and stick" approach in which "carrots" would be incentives that DWQ staff would develop, such as technical and financial assistance, recognition, and educational materials that would entice local groups to initiate and implement plans to restore impaired watersheds. The "sticks" would be regulatory requirements that would affect landowners, local governments, industries, farmers, commercial operations, etc. in watersheds where local groups do not initiate and implement watershed restoration plans.

Management Action 2
Water Quality Plan - Objective B

Expand funding to implement nonpoint source pollution controls, particularly agricultural best management practices through the N.C. Agriculture Cost Share Program, and also to develop a broader Water Quality Cost Share Program. Expand the cost share programs to include wetlands restoration. Increase cost share funds to problem areas.

Explanation:

Economic incentives and technical assistance have been effective in promoting nonpoint source pollution controls in agriculture. Under this initiative, the Agriculture Cost Share Program would expand and a new Water Quality Cost Share Program, modeled after the one for agriculture, would be created. Cost-sharing would give farmers, marina owners, forestry operations and individual land owners greater incentive to reduce nonpoint source pollution.

1997-98 CCMP Implementation Achievements:

- The Clean Water Management Trust Fund (CWMTF) received $47 million from the 1998 NC General Assembly. In 1997, the CWMTF supported several projects in the Albemarle-Pamlico region. They are listed below:

Watershed	Application Name	Applicant Type	Purpose	Amount Funded
Chowan				
	Town of Edenton/County of Chowan	Local Government - Municipal	Acquisition-Buffers	$880,000
	Seaboard	Local Government - Municipal	Wastewater	$1,037,000
			Subtotal	**$1,917,000**
Neuse				
	NCSU Cooperative Extension Service	State Agency	Restoration	$329,520
	UNC Institute of Marine Sciences	State Agency	Restoration	$1,064,000
	City of Wilson	Local Government - Municipal	Wastewater	$803,350
	Goldsboro	Local Government - Municipal	Wastewater	$1,600,000
	Goldsboro	Local Government - Municipal	Wastewater	$800,000
	Triangle J COG	Local Government	Planning	$59,000
	Hillsborough	Local Government - Municipal	Acquisition-Buffers	$254,000
	NC Global TransPark Dev. Comm.	Local Government	Planning	$50,000
	Coastal Land Trust	Non-profit	Acquisition-Buffers	$378,200
	Craven County	Local Government - County	Wastewater	$160,000
	Pamlico County	Local Government - County	Wastewater	$1,650,000
			Subtotal	**$7,148,070**
Pasquotank				
	NC Division of Coastal Management	State Agency	Acquisition-Buffers	$3,858,500
			Subtotal	**$3,858,500**
Roanoke				
	Town of Stovall	Local Government - Municipal	Wastewater	$800,000
	Wildlife Resources Comm.	State Agency	Acquisition-Buffers	$1,056,000
			Subtotal	**$1,856,000**
Tar-Pamlico				
	Pamlico-Tar River Foundation	Non-profit	Acquisition-Buffers	$793,000
	City of Greenville	Local Government - Municipal	Acquisition-Buffers	$270,000
	Grimesland	Local Government - Municipal	Wastewater	$425,000
	City of Rocky Mount	Local Government - Municipal	Greenways	$200,000
			Subtotal	**$1,688,000**
White Oak				
	Town of Swansboro	Local Government - Municipal	Wastewater	$1,663,760
	NC Sea Grant	State Agency	Stormwater	$200,000
	NC Coastal Federation	Non-profit	Acquisition-Buffers	$2,520,000
			Subtotal	**$4,383,760**
Multiple				
	NC Dept. of Commerce/DCA	State Agency	Planning	$63,374
	NC-CGIA	State Agency	Planning	$250,000
	NC Div. of Soil/Water Conservation	State Agency	Easements	$285,450
	NC Div. of Water Resources	State Agency	Restoration	$250,000
	NC Coastal Federation	Non-profit	Planning	$90,000
	Conservation Trust For NC	Non-profit	Planning	$470,000
			Subtotal	**$1,408,824**

- In 1997, the NC General Assembly (NCGA) increased the funding available for farmers under the NCACSP for best management practices (BMPs) by $2.5 million. The NCACSP is administered by the Division of Soil and Water Conservation (DSWC).

- DSWC and Soil and Water Conservation Districts (SWCD) targeted funding and technical assistance to priority waters for the installation of BMPs aimed at reducing sediment and nutrients. DSWC and SWCDs will continue to target priority areas

identified through basinwide nonpoint source control plans.

- In the Tar-Pamlico Basin for 1997, $2 million of NCACSP funds were directed at the implementation of BMPs on agricultural lands. Additional funding was supplied by an Environmental Protection Agency grant ($85,540) and by the Tar-Pamlico Basin Association ($7,200). By the end of 1997, 31% of the cropland acres in the Tar-Pamlico Basin were treated with BMPs and 83% of the 173 registered animal operations were certified as complying with .0200 animal waste management regulations.

- Technical assistance is being provided within the Neuse Basin to assist in accomplishing the nitrogen reduction goals set by the Environmental Management Commission rule 15A NCAC 2B .0238. The Division of Soil and Water Conservation Neuse Basin Coordinator position will coordinate state and local agency efforts to assure that agriculture achieves the nitrogen reduction goals. Funding provided by USDA and the NCGA has expanded technical assistance by creating 12 new technical positions located within SWCDs throughout the Basin to enhance existing efforts of targeting, planning, installing and tracking nutrient reduction BMPs implemented in the Basin.

- The Conservation Reserve Enhancement Program (CREP) is a federal, state, and local initiative that will be implemented in the Chowan, Neuse, and Tar-Pamlico Basins as well as the Jordan Lake Watershed area to address agricultural nonpoint source pollution. Eligible landowners can enroll environmentally sensitive areas next to streams, rivers, drainage ditches, wetlands, and Jordan Lake in conservation agreements which will take land out of production for 10-years, 15-years, 30-years, or permanently. Funding will be provided by the USDA, Clean Water Management Trust Fund, NC Agriculture Cost Share Program, and NC Wetlands Restoration Program.

Accomplishments & Initiatives in the Neuse Basin

- A Basin Coordinator position was created and filled in the Division Soil & Water Conservation to coordinate state and local level agency efforts to assure that agriculture achieves nitrogen reduction goals in the basin, and to attain landowner compliance, under the Environmental Management Commission (EMC) rule 15A NCAC 2B .0238. The position will target technical and financial assistance for installation of best management practices on cropland.

- Funding from USDA and the NC State Legislature has expanded technical assistance by creating 12 new positions. These positions are located in Soil and Water Conservation Districts throughout the Neuse Basin, with administrative supervision provided by the Basin Coordinator. These positions will enhance existing efforts in the targeting, planning, installing and tracking of nutrient reduction BMPs implemented in the basin.

- EMC rules to implement nitrogen reduction strategies in the basin went into effect August 1, 1998. Since May, 1998, the Neuse Agriculture Interagency Workgroup has been working on the tasks that face the Basin Oversight Committee (BOC), created under rule .0238. The BOC must develop a draft accounting and tracking method for the EMC by February, 1999. The BOC must also allocate reduction goals to the Local Advisory Committees (LAC) for development of their reduction strategies. Local stakeholder agencies have already begun meeting to begin farmer sign-up for participation in the local options under rule .0238.

- While continuing to fund best management practices (BMPs) for water quality

protection, the Agriculture Cost-Share Program (ACSP) has removed the 100 acre cap on nutrient management incentive payments, due partly to the NSW status of the Neuse River. Payments are allowed on unlimited acreage of $6 per acre, and are not allowed on land receiving animal waste.

- The NC Legislature approved, for FY 96-97, non-recurring ACSP funding of $1.75 million in the basin above the regular allocations to be used only for assisting existing (those established prior to May, 1992) animal operations in compliance with .0200 non-discharge rules.

- The USDA Natural Resources Conservation Service Environmental Quality Incentives Program (EQIP) has allocated approximately $1.4 million in the Neuse Basin for FY 1998 & 1999 to implement BMPs for environmental protection.

- The 1998 NC General Assembly appropriated two hundred fifty thousand dollars ($250,000) to support the North Carolina Farmland Preservation Trust Fund which will purchase agricultural conservation easements pursuant to The Farmland Preservation Enabling Act, Article 61 of Chapter 106 of the General Statutes.

Management Action 3
Water Quality Plan - Objective B

Continue to research and develop alternative septic systems and new best management practices to reduce nonpoint source pollution.

Explanation:

Alternative septic systems will help protect the environment and support long-term growth by providing effective waste treatment for eastern North Carolina. BMPs improve septic system performance and reduce costly repairs. Developing and demonstrating additional BMPs for other sources of pollution, such as runoff from agricultural lands, urban lands, and highways, would provide proactive, cost-effective means to reduce nonpoint source pollution.

1997-98 CCMP Implementation Achievements:

- While operation and maintenance using certified operators is now in place for all but the simplest septic tank systems, efforts (law and rules) are in the implementation process to enhance improved management practices for conventional septic tank systems through the use of filtered effluent and access risers. (See House Bill 1462) - Ratified in the 1998 "short" session. Temporary rules to implement the law will become effective January 1, 1999.

- Rules have been adopted by the Commission for Health Services to allow aerobic treatment units [15A NCAC 18A. 1957(c)] and approval of innovative and experimental systems [15A NCAC 18A.1969]. Recent innovative approvals include "peat filters" and "sand filters" for pretreatment prior to subsurface disposal.

- The On-Site Wastewater Section has recently employed an on-site wastewater/NPS coordinator for the development, review and education of on-site technologies related to best management practices (BMPs). This full time position was provided to the Division of Environmental Health through Section 319 funding. This position addresses on-site wastewater issues and promotes the development of demonstration projects in the Tar-Pamlico River Basin.

- A project entitled "Nutrient loading from septic tanks" has been approved for funding at $145,000 ($98,000 federal funds) through Section 319 for FY 98. The contract to start this project is in process. This project will involve an inventory of a Neuse River watershed and a demonstration of advanced on-site wastewater technologies.

- DWQ funded an aerial infra-red survey of on-site wastewater disposal systems in the Craven County section of the Neuse River. Also, a ground survey of several hundred septic systems was conducted. These surveys have helped to identify areas where program resources should be targeted to help correct these potential sources of nutrients.

- The On-Site Wastewater Section has implemented a Wastewater Discharge Elimination Program (WaDE) to eliminate straight pipe sewage discharges into surface waters.

Management Action 4
Water Quality Plan - Objective B

Strengthen current enforcement to detect and correct ground and surface water quality violations from nonpoint sources.

Explanation:

Although current enforcement authority exists, nonpoint sources of water quality violations are difficult to identify because they are varied and often widespread. The Division of Water Quality's (DWQ's) Water Quality and Groundwater Sections would strengthen enforcement to ensure that these violations are identified and corrected.

1997-98 CCMP Implementation Achievements:

- The NC General Assembly (summer 1998) approved four additional inspectors to check construction sites for erosion and sedimentation problems.

- The State Sedimentation Control Commission has adopted a plan to reduce amounts of sediment reaching the state's rivers and streams. The plan, which addresses erosion from construction projects, calls for expanding and enhancing erosion control requirements, toughening enforcement practices available to the state and locally delegated programs, and increasing technical training and education.

- State and federal officials have reached an agreement to require new permits in North Carolina for intensive livestock and poultry operations that violate their waste management plans and allow waste to discharge into surface waters. Once in place, every farm that has violated its waste management plan along with having a discharge to surface waters will have to apply for a new individual permit.

Management Action 5
Water Quality Plan - Objective B

Strengthen implementation of forestry best management practices through training, education, technical assistance and enforcement.

Explanation:

Proper use of forestry best management practices is critical for water quality protection in the APES region. Additional professional foresters would provide needed outreach and technical assistance to forestry operators and landowners regarding implementation of BMPs. Enhanced enforcement would ensure proper use of forestry BMPs and help to eliminate improper forestry practices. Participation by loggers and landowners in education programs, such as the Professional Loggers Program, is vital to the expanding goals of the forest products industry. Forestry workshops create an opportunity for landowners to learn about forestry management and the use of acceptable forestry BMPs.

1997-98 CCMP Implementation Achievements:

- The Division of Forest Resources (DFR) has received funding from the 1998 General Assembly for 7 specially trained foresters that will advise loggers on how to protect rivers when felling trees.

Management Action 6
Water Quality Plan - Objective B

Enhance stormwater runoff control by strengthening existing regulations and developing new ones, if needed, by 1995. Improve enforcement to ensure that

stormwater management systems are properly installed and regularly maintained.

Explanation:

At present, the North Carolina Stormwater Management Program targets priority areas and high risk pollutant sources. Additional benefits from this program may be realized by evaluating expansion of the areas of coverage to target more -- or potentially all -- waters. Under this initiative, various regulating agencies would coordinate their efforts to protect all state waters. The Division of Water Quality (DWQ) would dedicate more staff time to monitoring the installation, operation and maintenance of stormwater systems. A critical part of enforcement would be providing education and technical assistance to private land owners, industries, municipalities and others required to comply with these regulations.

1997-98 CCMP Implementation Achievements:

- On August 7, 1997, the Secretary of DENR directed the state's water quality programs to take stronger enforcement actions against polluters of North Carolina's waterways. The new enforcement policy includes the following:
  - increased penalties for water quality violations;
  - a plan for improved "bad actor" enforcement, including consideration of Department-level investigation capability for environmental crimes, streamlined permit revocation processes, increases in the statutory caps on penalties, and any other changes, that are crucial to having top-notch "bad actor" enforcement capability in water quality protection programs; and
  - a review of how divisions currently perform water quality enforcement and otherwise encourage compliance and recommendations on steps that should be taken to strengthen compliance and enforcement policy for water quality.

- Neuse stormwater rules apply to the largest and fastest-growing local governments in the Neuse River basin. The rule establishes a broad set of objectives for reducing nitrogen runoff from urban areas. The rule also sets up a process for DWQ to work with the following affected local governments to develop a model stormwater plan for meeting the objectives:

  - Cary
  - Durham
  - Garner
  - Goldsboro
  - Havelock
  - Kinston
  - New Bern
  - Raleigh
  - Smithfield
  - Wilson
  - Durham County
  - Johnston County
  - Orange County
  - Wake County
  - Wayne County

- The model plan will include four elements for reducing nitrogen:

  1. Reviewing and approving stormwater management plans for new development.
  2. Educating the public.
  3. Identifying and removing illegal discharges.
  4. Identifying sites where water quality management projects can be inserted into existing development ("retrofits").

  If the rule is approved by the General Assembly, then it will become effective on August 1, 1998. After the rule becomes effective, the local governments and DWQ will have one year to develop the model plan. Local governments will then have an additional 18 months to get their stormwater plan approved by the EMC and begin implementing the plan. If a local government doesn't implement a stormwater plan, then it may be subject to federal NPDES stormwater permitting. Local governments will make annual progress reports to the EMC which will include nitrogen loading reduction estimates.

Management Action 7
Water Quality Plan - Objective B

Implement an inter-agency state policy that addresses marina siting and integrates best management practices through permitting and better public education.

Explanation:

There is no consensus on the cumulative impact of marinas on the estuary or on how to manage marina development. A state marinas policy would coordinate agencies concerned with regulating and planning for marinas. It would address such issues as public trust rights and siting, and would integrate new best management practices. New BMPs include designing marinas to contain oil spills and pollution, minimizing the impact of turbulence from boating outside marinas, and controlling pollution from fish wastes and boat cleansers. A marinas policy, along with the appropriate regulations, would be a guide for local government planning. Public education, particularly boater education, plays an integral role in encouraging best management practices.

1997-98 CCMP Implementation Achievements:

- To strengthen marina BMPs, DCM provides funding through the NC Pump-out Program to marina operators to install pump-out stations at their facilities. The Program has awarded $199,398 in financial assistance to 34 marinas, three local government docking facilities (Columbia, Carolina Beach and Edenton) and the Wanchese Seafood Industrial Park. Five new facilities are being installed in counties which previously had no pump out or dump stations services, and an educational poster and brochure have been produced. The Federal Clean Vessel Act has been re-authorized and DCM will continue to participate through 1998.

OBJECTIVE C:

REDUCE POLLUTION FROM POINT SOURCES, SUCH AS WASTEWATER TREATMENT FACILITIES AND INDUSTRY.

Management Action 1
Water Quality Plan - Objective C

Promote pollution prevention planning and alternatives to discharge, where feasible, for all point sources to reduce the volume and toxicity of discharges.

Explanation:

Environmental problems surface when inadequately controlled or treated wastewater is discharged into the system. Pollution prevention programs are a proactive measure aimed at reducing waste at its source. These programs make treatment more efficient, reduce pollutants in the waste stream, and lower cleanup costs for industry and government. When appropriate, alternatives to discharge should be encouraged.

1997-98 CCMP Implementation Achievements:

- There is increased coordination between the Division of Pollution Prevention and Environmental Assistance (DPPEA) and DWQ's Pretreatment Program to help reduce/improve inputs and operating costs from point source dischargers. DPPEA provides nonregulatory multi-media pollution prevention technical assistance to industries and municipalities; while the Pretreatment Program works to protect municipal or publicly owned wastewater treatment works (POTW) and their receiving waters from potential impacts of industrial users. DWQ regional inspectors commonly refer facilities with compliance problems to DPPEA for technical assistance.

- Pollution prevention is a major component of DWQ's Stormwater Permitting Program. All applicants for stormwater NPDES permits must develop and maintain a Stormwater Pollution Prevention Plan to minimize pollutants introduced to stormwater.

- DPPEA and DWQ are coordinating efforts to identify other opportunities to integrate pollution prevention into permitting, inspections, compliance and enforcement activities. This includes development of standard language to be included in notices of violations (NOVs) that encourage facilities to use pollution prevention strategies to address the non-compliance and identifying opportunities to include

Supplemental Environmental Projects for pollution prevention as part of enforcement settlements.

Management Action 2
Water Quality Plan - Objective C

Expand and strengthen enforcement of National Pollutant Discharge Elimination System (NPDES) permits. Increase site inspections and review of self-monitoring data to improve facility compliance by 1995.

Explanation:

Increasing the staff of the Division of Water Quality's (DWQ) Compliance Group would allow for more frequent site inspections and would enhance enforcement. More frequent inspections would improve communication between the Division and dischargers, and would help prevent some violations before they occur. Stronger enforcement would dampen incentives for dischargers to violate their permits.

1997-98 CCMP Implementation Achievements:

- Regional Supervisors within DWQ have been delegated authority to assess civil penalties that include effluent limitations and monitoring frequencies for NPDES permits.

- The "Monthly Managers' Report" has been modified to show all dischargers which experience at least one (1) monthly average limit violation. Previous assessments were generated based upon 3 - 5 monthly average violations. The old process resulted in a review of the previous year's Daily Monitoring Reports (DMR's). One violation of any limited parameter (monthly average) will trigger in-depth review of the DMR for subject month. Example - BOD5 monthly average violation would prompt review for compliance with all limited parameters plus review of compliance with all monitoring frequencies for limited and non-limited parameters.

- Assessments will occur on a monthly basis as opposed to previous method which generally utilized an annual review period.

- Assessment thresholds will be established for an interim period. From July 1, 1998 through June 30, 1999 (DMR's from May '98 to April '99), the threshold for conventional pollutants will be 40%. Conventional pollutants include parameters such as BOD5, total suspended solids, nutrients, detergents and oils, minerals (calcium, chloride, fluoride, etc...) and four metals (aluminum, cobalt, iron and vanadium). A threshold of 20% will be utilized for all other metals, organic and inorganic limitations. Discharges that exceed these thresholds will be assessed civil penalties. Flow and toxicity will not be given any level of discretion - all violations of flow limits or toxicity testing requirements will be assessed.

- Beginning July 1, 1999 (May '99 DMR), the threshold for all parameters will be 20%.

- All other enforcement actions, whether civil or criminal, non-discharge permits (animal waste systems, spray irrigation systems, etc...) or NPDES permits (failure to report, stream standard violations, etc...), will be coordinated and acted upon by the central office.

- A new policy that eliminates Collection Systems Overflows was developed to promote reduction and elimination of sanitary sewer overflows (SSO's) from sewer collection systems. The policy will increase enforcement actions for non-compliance while recognizing and rewarding systems that demonstrate exceptional levels of compliance and environmental stewardship. The key to reducing SSO's and minimizing water quality impacts is founded in the successful implementation of operation and maintenance programs and ensuring

adequate local response to spills and overflows from collection systems. The initial phase of implementation (July 1, 1998) is to focus on achieving adequate response to spills from the collection system.

OBJECTIVE D:
REDUCE THE RISK OF TOXIC CONTAMINATION TO AQUATIC LIFE AND HUMAN HEALTH.

Management Action 1
Water Quality Plan - Objective D

Increase efforts to assess and monitor the extent of estuarine sediment contamination, fish and shellfish tissue contamination, water quality violations, and to identify the causes and sources of these problems.

Explanation:

Several areas within the Albemarle-Pamlico region have been identified as exceeding levels of concern for toxicity in water, sediment and fish tissue. Any additional contaminated sites should be identified. Existing contaminated sites would be evaluated to determine the extent of the problem and its impact on aquatic life, wildlife and human health. Management actions should focus on reducing or eliminating further contamination in areas of concern.

1997-98 CCMP Implementation Achievements:

- DWQ's Environmental Sciences Branch Ecosystems Unit's Ambient Monitoring System (AMS) is a network of stream, lake, and estuarine stations strategically located for the collection of physical and chemical water quality data. At approximately 380 locations around the state, ambient chemical monitoring data is collected to allow a comprehensive assessment of water quality criteria. This information, along with biological data, is used in development of Basinwide Water Quality Management Plans to assess the quality of water bodies across the state and highlight areas needing management actions.

- DWQ's Intensive Survey Unit continues to monitor for water quality at those sites identified as being most contaminated.

- DWQ's Biological Assessment Unit continues to monitor and analyze for chemical contaminants in fish tissues, or review data collected by NPDES dischargers. Much of the analyses of fish tissues focuses on metals and dioxins. When necessary, special studies are conducted in problem areas that have been identified as having elevated toxicity concentrations in the sediments.

Management Action 2
Water Quality Plan - Objective D

Continue to issue fish advisories as necessary to protect public health. Improve communication and education about the risks associated with eating contaminated fish and shellfish.

Explanation:

Regional fish advisories alert the public to the potential health hazards of eating contaminated fish. The Environmental Epidemiology Section (EES) would continue to review fish tissue analyses and issue advisories as necessary. Public outreach and education should stress the risks associated with eating contaminated seafood to the general population and sensitive populations (e.g., women of child-bearing age and children).

1997-98 CCMP Implementation Achievements:

- Communication and education of the risks from exposure to contaminated fish in a particular area are completed in various ways. The Department of Health and Human Services has public meetings in the area in which a fish consumption advisory is issued. Public notices of the public meetings are released to the local papers. The Epidemiology section also uses press releases and sign postings, and maintains a list of the advisories that are placed in a North Carolina fishing manual.

- As a result of declining levels of dioxin in fish collected from the Chowan River, the existing fish consumption advisory for the Chowan was revised in March 1998. Under the revision all fish species except carp and catfish were dropped from the advisory.

- Widespread mercury contamination of bowfin has resulted in the posting of a statewide fish consumption advisory for the species in June 1997.

- DMF and the Shellfish Sanitation Section of the Division on Environmental Health have updated and consolidated closure descriptions for all waters permanently closed to shellfish harvest in North Carolina for the past ten years. As a result of this update, 1,225 acres of water have been opened and 1,173 acres of water have been closed, for a net opening of 52 acres.

Management Action 3
Water Quality Plan - Objective D

Remediate toxic contamination where necessary and feasible.

Explanation:

Considerable efforts should be made to remedy contamination that is an immediate threat to human health and aquatic life. The Division of Water Quality (DWQ) would proceed with sediment cleanup only where necessary and where remediation activities would not cause further damage to ecological communities.

1997-98 CCMP Implementation Achievements:

- Currently, no remedial action has occurred involving the removal of contaminated sediment. Known contaminated sediment sites are being monitored.

OBJECTIVE E:
EVALUATE INDICATORS OF ENVIRONMENTAL STRESS IN THE ESTUARY AND DEVELOP NEW TECHNIQUES TO BETTER ASSESS WATER QUALITY DEGRADATION.

Management Action 1
Water Quality Plan - Objective E

Continue to track and evaluate indicators of environmental stress, including algal blooms, fish kills, and fish and shellfish diseases.

Explanation:

Biological assessments are useful in evaluating the integrity of the estuarine system. Traditional biological indicators such as algal blooms and fish kills can signify water quality problems that chemical and toxicological monitoring may have missed or underestimated.

1997-98 CCMP Implementation Achievements:

- In 1998, a "rapid-response team" capable of traveling to the scene of most fish kills within minutes to check for the presence of Pfiesteria was formed for the Tar-Pamlico River. The team operates out of the DWQ Washington Regional Office.

- Monitoring, research and fish-kill investigation, including rapid response teams for the Neuse and Tar-Pamlico rivers received $6.1 million from the 1998 NC General Assembly

- In January 1998, DENR established a team to develop a comprehensive response to the pfiesteria complex of toxic dinoflagellates through:
  - Collaboration and partnerships between DENR, experts in water quality, fish kills, fish disease, Pfiesteria research, and other states;
  - The establishment of processes and protocols for sharing data and communicating information, and

- Making recommendations on additional research and funding needs that will further our knowledge of pfiesteria.

- The condition of a fishery is one of the most meaningful indicators of ecological integrity. Fish occupy the upper levels of the aquatic food web and are both directly and indirectly affected by chemical and physical changes in the environment. DWQ's Biological Assessment Group employs a method for assessing streams' biological integrity by examining the structure and health of fish communities. This assessment incorporates information about species richness and composition, trophic composition, fish abundance and fish condition. At each sample site, a 200 meter section of stream is selected. The fish within the delineated stretch of stream are collected with the aid of backpack electrofishing units.

  Since fish spend their entire lives in the aquatic environment, they incorporate chemicals from this environment into their body tissues. Therefore, by analyzing fish tissue, determinations of what bioaccumulative chemicals are in the water can be made. Contamination of aquatic resources, including freshwater, estuarine, and marine fish and shellfish species have been documented for heavy metals, pesticides, and other complex organic compounds. Results from fish tissue monitoring can thus serve as an important indicator of contamination of sediments and surface water.

Management Action 2
Water Quality Plan - Objective E

Improve the techniques for evaluating the overall environmental health of estuarine waters.

Explanation:

The sensitivity and diversity of organisms inhabiting an area can be an indication of the system's overall environmental health. Further research is needed to target these "indicator species" in the estuary. Once found, these organisms could be used to monitor the general state of the system and indicate areas that warrant further attention.

1997-98 CCMP Implementation Achievements:

- DWQ's Intensive Survey Unit (ISU) collects and interprets a variety of biological, chemical, and physical data that are incorporated in the DWQ basinwide planning concept. Numerous special studies are conducted including lake watershed assessments, water quality characterization studies for model support, sediment evaluations for oxygen demand, nutrient flux, and chemical contamination, and a variety of more intensive water quality investigations. Water quality simulation models are often used for the purpose of constructing wasteload allocations so that appropriate wastewater limits can be included as requirements in National Pollutant Discharge Elimination System (NPDES) permits.

- DWQ's Environmental Sciences Branch has been working on the development of estuarine biological criteria in an effort to find and evaluate indicators of water quality degradation in estuarine waters using macroinvertebrate community analysis. Various approaches have been tested to see which combination of methods and analysis best separates areas of different water quality. Currently, evaluation of macroinvertebrates communities, using an estuarine biotic index, total taxa, amphipod and caridian shrimp taxa, collected in multiple habitats with a dip net, appear to give the most consistent separation of sites with varying water qualities. Efforts continue to develop estuarine biological criteria based on these approaches.

Management Action 3
Water Quality Plan - Objective E

Develop and adopt better indicators of shellfish contamination as soon as possible.

Explanation:

The presence of fecal coliform bacteria currently is used to detect sewage contamination in shellfish beds. This practice has been criticized, however, and the National Oceanic and Atmospheric Administration's (NOAA) National Indicator Study is investigating better indicator tests. These tests, which assess both bacterial and viral contamination, better indicate the health risk from eating contaminated shellfish. They also would establish more reliable criteria for closing shellfish areas or re-opening previously closed areas.

1997-98 CCMP Implementation Achievements:

- Due to a lack of federal funding, efforts by NOAA's National Indicator Study to develop better indicators of shellfish contamination have been put on hold.

VITAL HABITATS PLAN

GOAL: Conserve and protect vital fish and wildlife habitats and maintain the natural heritage of the Albemarle-Pamlico region.

OBJECTIVE A:

PROMOTE REGIONAL PLANNING TO PROTECT AND RESTORE THE NATURAL HERITAGE OF THE APES REGION.

Management Action 1
Vital Habitats Plan - Objective A

Develop ecosystem protection and restoration plans (basinwide ecosystem plans) for each river basin in the region. Individual basinwide ecosystem plans will be completed and implemented according to the schedule established for basinwide water quality management plans. (See Objective A in the Water Quality Plan.) Plans should establish coordinated priorities for protecting habitats and critical areas in each basin, and should target areas most vital to the survival of wildlife and fisheries and the protection of natural heritage.

Explanation:

Protecting vital habitats involves a great number of agencies and organizations. The coordination of their efforts with strategies that target management at the most critical areas would be best accomplished through basinwide ecosystem planning. Planning on a river basin level encompasses important ecological habitats that do not correspond to local jurisdictional boundaries. Restoration plans for river basins would provide a means for assessing the sources and causes of habitat damage and enable the appropriate agencies and organizations to coordinate priorities within the entire basin.

1997-98 CCMP Implementation Achievements:

- The Division of State Parks' Natural Heritage Program (NC NHP) has identified priority natural areas for protection in each county of the Albemarle-Pamlico region. Information about priority natural areas that may affect water quality - such as wetlands or riparian areas - is incorporated in the Division of Water Quality's Basinwide Water Quality Management Plans. NC NHP has also provided input to the Wetlands Restoration Program's interim Basinwide Wetlands and Riparian Restoration Plans.

- NC NHP has participated in the 1997-1999 advisory committee for the Triennial Review of Surface Water Quality Standards and Classification Rules. NHP has recommended to the committee that a rule be adopted to develop plans for the protection of federally-listed threatened and endangered aquatic animal species. Such a rule would fulfill the obligation stated above in Management Action 1. Should the rule change be adopted, habitat and water quality protection plans for nine aquatic animal species would be developed by a team of biologists representing various state and federal agencies. The management plans would then be incorporated in the Basinwide Water Quality Management Plans prepared by the Division of Water Quality.

- The Fisheries Reform Act of 1997 directs the NC Department of Environment and Natural Resources to coordinate the preparation of draft Coastal Habitat Protection Plans for critical fisheries habitats. The Act further directs the Department to use the staffs of the Division of Marine Fisheries, Water Quality and Coastal Management in preparing these plans.

  Draft Plans will be reviewed by a six member review committee comprised of two members each from the Environmental Management Commission, the Marine Fisheries Commission and the Coastal Resources Commission. This intercommission review committee may

revise a draft Plan as necessary and then submit a consensus draft to the three Commissions for their review and adoption. A Plan outline has been drafted and the Department is soliciting comments from all three Commissions. Work on actual plans will begin in early 1999.

- DWQ is currently pursuing wetland protection initiatives and targeting sites for wetland restoration, through the Wetlands Restoration Program. Basinwide Wetlands and Riparian Restoration Plans are being developed in concert with the Basinwide Water Quality Management Plan schedule. These plans include the following information:
  - A statement of the restoration goals for each river basin.
  - A map of each priority subbasin showing water quality information and watershed boundaries.
  - A map of each priority subbasin showing water quality information, watershed boundaries and land cover by type (agricultural, forested or developed).
  - A narrative overview of the river basin, including general information on
  - existing water quality-related problems.
  - Summary information on natural resources.
  - Descriptions of each priority subbasin.
  - Data on wetland impacts.

  Interim plans have been completed for all five of the Albemarle-Pamlico Sounds region river basins.

- Evaluation methods to be used in the Division of Water Resources' North Carolina Rivers Assessment (NCRA) were approved in August 1997 by the NCRA Advisory Committee. The Committee recommended that pilot studies be conducted in three sub-basins, including the lower Neuse River Sub-Basin, to test the methods to be used to evaluate each of the river-related resource categories. The pilot assessments were completed during the winter-spring of 1997-98 and revealed opportunities for improving the evaluation methodology for some of the resource categories. The Advisory Committee modified the names of some of the nine riverine resource categories and completed the objectives which will guide the NCRA.

- CAMA local government land use plans updated since 1996 have identified different small watersheds (15 digit hydrologic units) within their jurisdiction and, in some cases, recognized the different development patterns occurring within those watersheds. The Division of Coastal Management will continue to work with local governments to consider those different watersheds as it plans future development within the community.

- Since it began offering grants for regional planning in 1996, the Division of Coastal Management has contributed funds for the completion of nine regional planning projects, each addressing an issue of concern to neighboring local governments. A regional GIS for land-use planning and hazard mitigation for Carteret County governments is an example.

- The Conservation Fund has developed the "Albemarle-Pamlico Bioregional Greenway Plan" which describes a proposed network of conservation and heritage corridors that link parks, wildlife refuges, education centers, historic sites, and recreational facilities in the 30,000 square mile Albemarle-Pamlico estuarine region.

Management Action 2
Vital Habitats Plan - Objective A

Develop and maintain accurate maps and records of wetlands, fisheries habitats, federal and state endangered species and their habitats, natural areas, and natural communities.

Explanation:

Accurate maps of natural areas are essential to the development of basinwide ecosystem plans. They allow for more accurate analysis of protection and enhancement priorities for various habitat types. A biological inventory of the region was part of the Albemarle-Pamlico Study and additional detailed inventory and monitoring projects would be completed for individual counties and for the most significant natural areas. This information would be kept current and accurate. Up-to-date, readily available biological inventories, maps, and data would provide local governments, planners, land managers, and private citizens with the information they need to protect habitats.

1997-98 CCMP Implementation Achievements:

- The Division of Marine Fisheries (DMF) maps coastal waters to find concentrations of oysters, clams and scallops and locate areas that are well suited for growing shellfish. To date, the DMF has mapped over 95,000 acres of waters from the Cape Fear River to the Newport River, including South River and areas in Core and Roanoke sounds. Shellfish substrate data layer is a component of the CGIA Corporate Geographic Database.

- The Division of Parks and Recreation's Natural Heritage Program continues to maintain databases and GIS database layers of rare species occurrences and ecologically significant areas (Significant Natural Heritage Areas). In addition, detailed natural community and rare species inventories have been conducted at several important sites in the Albemarle-Pamlico region. A recent inventory of Nonriverine Wet Hardwood Forests, a rare natural wetland community type that occurs mostly in the Albemarle-Pamlico region, identified the best remaining stands of Nonriverine Wet Hardwood Forest. These sites have become high priorities for protection.

- The Division of Parks and Recreation's Natural Heritage Program conducted a survey in the A/P Sounds region that provides information on the condition of the riparian buffer along Swift Creek in Franklin and Nash counties. This information will be incorporated in the Upper Tar River basin conservation strategy being prepared by NC NHP. Such site- and community-specific inventories supplement the county level natural area inventories that were conducted as part of the Albemarle-Pamlico Estuarine Study.

- The US Fish and Wildlife Service has completed National Wetland Inventory (NWI) maps for the Albemarle-Pamlico region. The national wetland inventory is a component of the CGIA Corporate Geographic Database.

- The US Soil Conservation Service has completed and digitized soil survey maps for all 36 counties located in the Albemarle-Pamlico region. Hard copies of these maps are available at the Natural Resources Conservation Service's field office in each county. Digital versions of these maps are being archived and distributed through the NC Center for Geographic Information and Analysis (CGIA). Digital soils surveys are a component of the Corporate Geographic Database.

- The Division of Coastal Management (DCM) has mapped wetlands in all 20 coastal counties, has developed a wetlands functional assessment called North Carolina Coastal Region Evaluation of Wetland Significance (NC-CREWS). Draft functional assessment ratings have been completed for 3 of the 20 counties in the CAMA area.

- DCM is conducting a comprehensive Accuracy Assessment Project to determine the accuracy of the wetland type and functional assessment maps that it creates. Using this data, DCM can generate paper maps of watersheds and their important

functions. In addition, these maps can be used to make CAMA permit, management, protection and development decisions. DCM maps for the coastal area form the cornerstone of a Wetlands Conservation Plan (which is described under Management Action 3).

- DCM supported a project to update land cover information with more recent (1994) imagery. The land cover update project included an analysis of the change that has occurred between the two sets of satellite imagery.

- The Center for Geographic Information & Analysis (CGIA) released a final version of statewide land cover data layer as a component of the Corporate Geographic Database. The data layer was developed using multi-temporal Landsat thematic mapper data, 30 meter resolution.

- The Center for Geographic Information & Analysis (CGIA), on behalf of the Geographic Information Coordinating Council and in cooperation with the US Geological Survey entered a cost-share agreement to develop statewide color-infrared aerial photography in 1998. Color infrared photography is now available for most of the state and prints are currently available from the US Geological Survey. An agreement to develop digital orthophotographs of the imagery is under negotiation.

- DWQ has developed General Certifications (CG) that will satisfy Section 401 of the CWA and correspond to the COE's Nationwide or Regional (i.e., applicable within the state of North Carolina) Permits.

Management Action 3
Vital Habitats Plan - Objective A

Expand programs to identify wetlands on a regional scale and to evaluate and rank wetland function.

Explanation:

An accurate identification and evaluation of wetlands, in advance of proposed activities that disturb wetlands, improves our ability to protect the most critical wetlands and to make wetlands permitting more predictable for developers and local governments. An Advanced Identification (ADID) program is a multi-agency effort that tests a variety of methods to evaluate wetlands. Under this program, wetlands regulations would not be expanded. Instead, the wetlands permitting process would become more efficient.

1997-98 CCMP Implementation Achievements:

- DCM has developed a Wetlands Conservation Plan for the North Carolina coastal area. The primary purpose of the plan is to provide detailed wetland information to local, state and federal governments, businesses, non-profit organizations and the public, so they can make better resource management decisions. The Wetlands Conservation Plan has several components:

  - a wetlands inventory;
  - functional assessment;
  - wetland restoration;
  - agency coordination;
  - coastal area wetland policies; and
  - local land use planning.

  DCM has nearly completed its' wetlands inventory, using an extensive GIS-based wetlands mapping program. Using the GIS coverage, DCM can generate paper maps showing wetland locations and types.

  The functional assessment examines the ecological significance of all wetlands. DCM makes this assessment using a GIS-based landscape analysis of each wetland in a watershed. The analysis evaluates the contribution each wetland has to water

quality, hydrology and wildlife habitat, and the risk to the watershed integrity should a wetland be removed.

Wetland restoration, agency coordination, coastal area wetland policies and land use planning all are means by which the wetlands maps and functional assessments will be used to improve wetland protection and management.

The results of the functional assessment will provide additional information about the ecological significance of wetlands in each coastal county. This information will be help regulatory agencies determine the importance of protecting a particular wetland site in the event a fill permit is requested. It will also enable development projects to be planned so as to avoid, at all reasonable cost, the most ecologically important wetlands.

- DWQ's NCWRP is focusing on sites within priority watersheds that are consistent with the guidelines developed in the Basinwide Wetlands and Riparian Restoration Plans, such as:
  - Channelized streams bordered by previously converted agricultural land;
  - Streamside areas in the headwaters of a priority watershed which have been altered (clear cut, farmed, channelized, ditched);
  - Any streams or areas adjacent to streams that are degraded in some way (bank erosion, channelized, lack of vegetated buffer, heavy sediment deposition).

  Taking a complete watershed approach, sites are evaluated according to set criteria, which include:
  - Site location within a NCWRP priority watershed for restoration;
  - Cost and difficulty to restore a site;
  - Potential benefits of restoration for water quality improvement, flood prevention, fisheries and wildlife habitat and recreational opportunities.;

OBJECTIVE B:

PROMOTE THE RESPONSIBLE STEWARDSHIP, PROTECTION, AND CONSERVATION OF VALUABLE NATURAL AREAS IN THE APES REGION.

Management Action 1

Vital Habitats Plan - Objective B

Bring areas identified as having the highest priority for protection into public ownership and/or management. Expand funding for public acquisition of park lands, gamelands, coastal reserves, and other natural areas.

Explanation:

Natural areas that are most vital to maintaining the region's natural heritage have been identified. Further priorities will be determined through basinwide ecosystem planning. Where possible, voluntary acquisition is an important tool for protecting these areas. In addition to preserving rare species and natural communities, public areas that are managed by different agencies can serve a variety of purposes such as recreation, education, or hunting.

1997-98 CCMP Implementation Achievements:

- In 1998, the Natural Heritage Trust Fund provided grants to the NC Department of Agriculture, Division of Coastal Management, and the NC Wildlife Resources Commission for acquisition of five significant natural areas in the Albemarle-Pamlico region. Acquisitions include lands at Bull Neck Swamp, Buckridge (described in greater detail later in this Management Action) and North River Landing. These natural areas were identified during the APES-funded natural area inventory.

- Four state parks in the A/P Sounds region expanded their boundaries in 1998. Additions of land were made at Jockey's Ridge, William B. Umstead, Merchants Millpond, and Medoc Mountain state parks. The expansion of Medoc Mountain State

Park represents the first addition of land to the park in twenty years.

- DCM's latest efforts in maritime forest protection have been in Kitty Hawk Woods. A total of 394 acres were purchased and combined with an existing 462-acre conservation easement to establish the Kitty Hawk Woods Coastal Reserve. The Division anticipates purchasing an additional 180 acres in Kitty Hawk within the next 12 months.

- DCM is working on the acquisition of the 17,774-acre Buckridge Tract (a.k.a. Buck Island Bay Forest) along the Alligator River in Tyrrell County. This extensive swamp forest was identified by APES and the Pasquotank River Basinwide Water Quality Management Plan as performing a vital function in filtering the waters entering the Outstanding Resource Waters of the Alligator River. The division expects to close on the property by the end of 1998 and incorporate Buckridge as the ninth component of the Coastal Reserve system. The acquisition of these vital habitats will enhance the education and research goals of the NC Coastal Reserve and associated National Estuarine Research Reserve Program.

Management Action 2
Vital Habitats Plan - Objective B

Provide incentives and technical assistance for the protection of privately owned vital habitats.

Explanation:

High-priority natural areas that are not brought into public ownership can be targeted for private conservation. Efforts would be expanded to inform private land owners of the ecological values of their land, to advise them on appropriate management strategies, and to help them explore options for voluntary protection. Where possible, conservation organizations could acquire vital habitats in order to consolidate management and protection efforts.

1997-98 CCMP Implementation Achievements:

- In 1998, the Upper Tar Collaboration, a partnership of state, federal, and private conservation organizations, received an award from the Clean Water Management Trust Fund to protect and restore water quality in the Upper Tar River basin. The Upper Tar River basin is unique in North Carolina for its assemblage of rare aquatic species -- including fish, amphibians, and especially freshwater mussels. As a partner in the Upper Tar Collaboration, the Natural Heritage Program is committed to developing a conservation strategy to guide the protection and restoration of riparian buffers along the Upper Tar River and its tributaries.

- Champion International, a private forest products company, has pledged to maintain 200-foot buffers on 32 miles of streamside buffer on company land in the Upper Tar River basin.

- The Division of Coastal Management continues to provide comprehensive information packages to local governments for updating their local land use plans.

- The Wetlands Restoration Program, in conjunction with the recently formed North Carolina Wetlands Partnership, is preparing a brochure that will outline all state, federal and privately funded programs that are available to landowners for the purposes of preserving, enhancing and restoring wetlands and riparian areas. This brochure will be available in early 1999.

- The Wetlands Restoration Program has developed a web page (http://h2o.enr.state.nc.us/wrp/index.htm) for the purpose of providing access to the Wetland and Riparian Restoration Plans and other information concerning restoration activities. All projects implemented by the Wetlands Restoration Program will be

shown on this web page and others involved with restoration and preservation activities will be encouraged to submit information to be included on this site.

OBJECTIVE C:

MAINTAIN, RESTORE, AND ENHANCE VITAL HABITAT FUNCTIONS TO ENSURE THE SURVIVAL OF WILDLIFE AND FISHERIES.

Management Action 1
Vital Habitats Plan - Objective C

Enhance the ability of state and federal agencies to enforce existing wetlands regulations by 1995.

Explanation:

Strengthening enforcement of current wetlands regulations and ensuring compliance with the existing permitting process are essential to minimizing inappropriate development in wetlands areas. Aerial monitoring would be expanded to increase coverage and ensure efficient enforcement. Enhanced enforcement would prevent some actors from gaining an unfair advantage through their failure to comply with wetlands regulations.

1997-98 CCMP Implementation Achievements:

- DWQ has maintained a 401 enforcement and compliance program for over 3 years. The program consists of monitoring/ inspection of previously issued 401's for compliance with conditions. When non-compliance is found enforcement (usually consisting of restoration of the site or other forms of mitigation) is conducted. Additional activities of the program include responding to unauthorized activities in wetlands and streams which were completed without permits.

- Recent appropriations by the State Legislature will result in the allocation of 7 positions (one in each region) to conduct wetland inspections and enforcement/ compliance activities (among other responsibilities).

Management Action 2
Vital Habitats Plan - Objective C

Strengthen regulatory programs to protect vital fisheries habitats, which include submerged aquatic vegetation, shellfish beds, and spawning areas by 1995.

Explanation:

Vital fisheries habitats are threatened by water quality degradation, physical destruction and the cumulative impacts of development in the region. Protecting areas in which aquatic organisms breed, live, and feed is essential to the successful propagation of many finfish and shellfish species. Increased protection for vital fisheries habitats will help maintain healthy fish populations for abundant commercial and recreational harvests.

1997-98 CCMP Implementation Achievements:

- The Department of Environment and Natural Resources hosted a habitat summit on June 1, 1998 to launch the process of developing Coastal Habitat Protection Plans. The Fisheries Reform Act calls for DENR to create the plans to improve protection of wetlands, spawning areas, threatened/ endangered species habitat, nursery areas, shellfish beds, submerged aquatic vegetation and outstanding resource waters. The Marine Fisheries, Coastal Management and Environmental Management commissions will jointly develop plans to protect this essential habitat, while ensuring that all future regulations are consistent with the plans.

- The Coastal Resources Commission (CRC) is proposing to increase its permit jurisdiction landward and upstream of the current boundaries. This area will be referred to as the Coastal Shoreline Area of Environmental Concern (AEC). Along public trust waters, the new AEC would extend 200 feet landward from the waters

edge, or landward edge of coastal wetlands. Along waters needing special protection (Outstanding Resource Waters, Primary Nursery Areas and Nutrient Sensitive Waters), the AEC would extend 575 feet.

The proposed rules would require a 75 foot buffer with development limited to water dependent structures in the first 50 feet. Built upon areas in the AEC would be limited to 15% and 12% in the case of special protection waters. The CRC is also proposing to tailor estuarine shoreline stabilization to site conditions. Vertical bulkheads would only be allowed when other methods, such as management of existing vegetation, low-profile or sloping breakwaters or riprap, will not work. The CRC is still working on the draft rules which won't go to public hearing before the spring of 1999. If the CRC approves the proposals in 1999, the changes would become effective in August of 2000.

Management Action 3
Vital Habitats Plan - Objective C

Enhance existing efforts to restore the functions and values of degraded wetlands and vital fisheries habitats. Develop and begin implementing an expanded program to restore wetlands.

Explanation:

Natural areas that have been slightly or moderately damaged may be restored by means such as replanting vegetation, repairing hydrological systems and improving water quality. Expanding restoration will increase the region's acreage of valuable, functioning vital habitats. Research and development of successful restoration techniques will ensure that these efforts are cost-effective.

1997-98 CCMP Implementation Achievements:

- During the 1996 session of the North Carolina General Assembly, legislation was ratified that established the Wetlands Restoration Program. The legislation provided $500,000 to support the staff of the program and appropriated an additional $9,200,000 to be used for restoration and protection of wetlands and riparian areas.

  This program has since developed Basinwide Wetlands and Riparian Restoration Plans for each major river basin in the A/P Sounds Region. During the development of these plans, data on existing wetland and riparian area functions, DWQ use support water quality information, NHP priority areas and land use/land cover data were evaluated for each basin. This evaluation will be used to guide wetland and riparian area restoration efforts to protect and enhance water quality, flood attenuation, wildlife and aquatic habitat, fisheries and recreational opportunities throughout the each basin. One primary objective of these plans is to ensure that the funds used to protect existing wetlands and to restore and enhance degraded areas are used so that the greatest environmental benefit is achieved. Implementation of projects to restore wetlands and riparian areas will begin during 1999.

- One of the major roadblocks to improving fish migration in the state was the Quaker Neck Dam that spanned the Neuse River just below Goldsboro. In the first voluntary dam removal of its kind, Carolina Power & Light Company, owners of the dam, worked with several state and federal agencies to remove the dam.

  Funds were pooled from several state and federal sources. The dam removal process began in December, 1997, and was completed in August, 1998. Removal of the Quaker Neck Dam restored approximately 1,000 miles of anadromous fish habitat in the Neuse Basin.

- During May through June, 1998, state and federal agencies removed the Cherry Hospital Dam from the Little River near

Goldsboro. Removal of this dam opened 21 miles of the Little River and 33 miles of tributaries to the fish species that migrate from the ocean. Fish species that will benefit from the removal of these dams are American shad, striped bass, short-nosed sturgeon, Atlantic sturgeon, hickory shad and alewife.

Management Action 4
Vital Habitats Plan - Objective C

Establish by 1995 a consistent and effective mitigation program to compensate for unavoidable permitted wetlands losses.

Explanation:

Mitigation compensates for the loss of smaller, fragmented wetlands with the acquisition, enhancement or restoration of larger, contiguous wetlands. A practical and coordinated system of mitigating wetlands damage, that is permitted only after all efforts to avoid and minimize alteration of wetlands have been considered, would ensure the greatest possible long-term benefit to vital habitats. Mitigation banking is a mechanism that allows land developers to alter wetlands in exchange for financial contributions toward the acquisition, enhancement, restoration, or creation of wetlands with similar value. This practice would be evaluated for expanded use in the region.

1997-98 CCMP Implementation Achievements:

- The Wetlands Restoration Program has drawn upon information and comments from the Divisions of Water Quality, Coastal Management, Soil and Water Conservation and Wildlife Resources Commission, federal agencies, local governments, non-profit organizations and the general public in the development of the Basinwide Wetlands and Riparian Restoration Plans. The plans will prioritize watersheds within which restoration could provide sufficient water quality benefits to the basin. The prioritization methodology relies on the GIS-based mapping methodology referenced in Objective A, Management Action 2. These plans provide a mechanism for ensuring that all wetlands restoration and compensatory mitigation performed by NCWRP is conducted in a manner that will restore those wetland and riparian area functions that are most needed within the basin.

- The Wetlands Restoration Fund, which is a non-reverting fund established by the General Assembly as a component of the Wetlands Restoration Program, provides an option for complying with compensatory mitigation requirements associated with Section 404 permits and 401 Water Quality Certifications. Applicants will be able to pay a per acre fee that has been established by the Environmental Management Commission instead of designing and implementing their own mitigation project. This option is only available after the Army Corps of Engineers and DWQ have determined that the wetland impacts have been minimized to the maximum extent practicable. The fees paid by applicants will be used by the Wetlands Restoration Program to implement restoration projects that provide water quality benefits, fisheries and wildlife habitat and recreational opportunities in accordance with the Basinwide Wetlands and Riparian Restoration Plans.

- The Natural Heritage Program has collaborated with a private company to pursue the long-term protection of wetlands adjacent to Albemarle Sound as a wetland mitigation bank. Dedication of the private wetland mitigation bank will ensure that the land remains in its natural state for current and future generations to enjoy, explore, and study.

FISHERIES PLAN

GOAL: Restore or maintain fisheries and provide for their long-term, sustainable use, both commercial and recreational.

OBJECTIVE A:

CONTROL OVER-FISHING BY DEVELOPING AND IMPLEMENTING FISHERY MANAGEMENT PLANS FOR ALL IMPORTANT ESTUARINE SPECIES.

Management Action 1
Fisheries Plan - Objective A

Develop and implement management plans for fisheries that are important to recreational and commercial fishing interests. These plans would include recovery objectives for severely depleted stocks by 1999.

Explanation:

State fishery management plans will allow the Marine Fisheries Commission (MFC) and Wildlife Resources Commission (WRC) to identify and maintain healthy stocks of important commercial and recreational fish. The plans will enhance depleted and declining stocks and restore economically important species for future harvest.

1997-98 CCMP Implementation Achievements

- The Marine Fisheries Reform Act (FRA), passed by the General Assembly during the 1997 session, is designed to improve fisheries management in North Carolina. It requires that detailed Fishery Management Plans (FMPs) for commercially and recreationally significant species be developed for improving fish habitats and managing fish stocks. It also calls for stricter enforcement of fisheries laws, including increased penalties for illegal fishing, higher fees for commercial licenses and a cap on the number of licenses issued.

  The reform legislation addresses four key areas: resource planning and management, organization, licensing, and law enforcement and public education.

- The Blue Crab FMP was given preliminary approval by the Marine Fisheries Commission (MFC) in September 1998, and forwarded to the Joint Legislative Commission on Seafood and Aquaculture and the Environmental Review Commission for their review, as required by the FRA. The MFC plans to review the comments of those legislative bodies and approve the FMP in December 1998 in order to meet the FRA deadline of 1 January 1999 for that specific plan. Work is underway on a plan for the river herring fishery in the Albemarle Sound area. In addition, initial steps will soon be taken for a Red Drum FMP.

- The 1997 stock status report showed that out of 36 major fish or shellfish stocks, 18 were considered either "healthy" or "recovering," eight were listed as "declining" or "depressed," and 10 were listed as "unknown." Significant in this recovery was the status of weakfish and bluefish, which were moved from the "depressed" category to the "recovering" category.

- In October 1997, striped bass stocks in the Albemarle Sound/Roanoke River were declared recovered by the Atlantic States Marine Fisheries Commission. After a decade of intensive management and monitoring by the DMF and the WRC, this historic fishery has rebounded.

Management Action 2
Fisheries Plan - Objective A

Modify the existing marine fisheries license structure to improve data collection with respect to landings, demographics and fishing effort, and to generate increased revenues for fisheries management.

Explanation:

A license system that enhances fisheries data collection is critical to developing and implementing state fishery management plans. The data collected is necessary for additional research on how regulations impact the fisheries. License revenues can support fisheries research, habitat restoration and other management improvements.

1997-98 CCMP Implementation Achievements:

- The FRA also revised the existing coastal fishing license system. New licenses will be effective 1 July 1999. Commercial fishermen will be eligible for a Standard Commercial Fishing License (SCFL), which will enable them to fish with commercial fishing gear and sell their catch to licensed dealers. The number of persons holding this license will be restricted to those fishermen holding an endorsement to sell license under the existing system as of 30 June 1999. Persons wishing to commercially catch and sell to licensed dealers only oysters, clams, scallops, and mussels will be able to do so with a simple Shellfish License. Fishermen who use limited amounts of commercial fishing gear recreationally will be able to continue this traditional activity under the Recreational Commercial Gear License (RCGL). Dealer licenses were modified and reduced in cost. There are also several other license changes which affect small groups of fishermen. Revenues from these licenses are expected to be similar to current revenues. A coastal recreational fishing license was not included in the FRA, but will continue to be studied by the General Assembly.

OBJECTIVE B:
PROMOTE THE USE OF BEST FISHING PRACTICES THAT REDUCE BYCATCH AND IMPACTS ON FISHERIES HABITATS.

Management Action 1
Fisheries Plan - Objective B

Continue and expand the development of bycatch reduction gear and practices, and require their use as practicality is demonstrated. Aim to reduce inside trawl, long haul seine, pound net, and gill net bycatch by at least 50 percent by 1995.

Explanation:

Minimizing non-targeted harvests will preserve the diversity of fish populations and support the long-term use of fisheries resources. Implementing efficient and effective measures to reduce bycatch eventually may result in lower costs to commercial fishermen.

1997-98 CCMP Implementation Achievements:

- Bycatch reduction devices (BRDs) have been required in North Carolina's shrimp fishery since 1992. In order to comply with the Atlantic States Marine Fisheries Commission (ASMFC) Weakfish Management Plan, a reduction of 50% of the weakfish in shrimp trawl bycatch must be obtained. The N. C. Division of Marine Fisheries (DMF), working with fishermen, experimented with many different BRD designs aboard Division vessels and commercial shrimp trawlers. These tests yielded three designs which met the ASMFC criteria for weakfish reduction; the Florida Fish Excluder, the large mesh extended funnel excluder, and the large mesh funnel excluder. During April 1996, DMF conducted a series of workshops to discuss upcoming changes in the requirements for BRDs used in shrimp trawls. Effective in 1997, only these devices are allowed as BRDs in shrimp trawls. In September 1998, based again on cooperative research and

testing between DMF and commercial fishermen, the MFC enacted rules requiring BRDs in long haul seines in Pamlico Sound south and west of Bluff Shoal. At the same time, the MFC also passed a rule to require BRDs in flounder pound nets south and east of Alligator River.

Management Action 2
Fisheries Plan - Objective B

Institute a cost share program for best fishing practices for commercial fishing gear by 1995.

Explanation:

A cost share program would help alleviate the financial burden and encourage commercial fishermen to implement best fishing practices.

1997-98 CCMP Implementation Achievements:

- Created by the NC General Assembly in 1994, the Fisheries Resource Grant Program, a $1 million annual grant program, is designed to enable fishermen to test their ideas to improve the fisheries by conducting research in cooperation with scientists. A primary aim is to help fishermen design new gear and studies to ease overfishing, to improve fisheries habitat, and to diversify the fishing industry. The N.C. Marine Fisheries Commission selects the projects to be funded, while the North Carolina Sea Grant program administers the program. More than 100 projects have been conducted under this grass roots program, and the industry has adopted many of the gear developments that were developed through specific grants.

STEWARDSHIP PLAN

GOAL: Promote responsible stewardship of the natural resources of the Albemarle-Pamlico region.

OBJECTIVE A:

PROMOTE LOCAL AND REGIONAL PLANNING THAT PROTECTS THE ENVIRONMENT AND ALLOWS FOR ECONOMIC GROWTH

Management Action 1

Stewardship Plan - Objective A

Support local planning by providing funding and economic incentives to local governments to integrate environmental and economic planning by 1999.

Explanation:

Local planning gives governments the opportunity to direct their own growth and enables private investors and local citizens to make informed decisions. Comprehensive planning also promotes economic development and environmental protection that are compatible. Financial assistance to local communities would encourage land and water uses that have the least impact on natural resources while promoting sound economic growth, including increased opportunities for nature-based tourism.

1997-98 CCMP Implementation Achievements:

- The Division of Community Assistance has requested four (4) additional planner positions as part of the division's expansion request for the 1999 Session of the General Assembly. Two of these positions, located in the Department of Commerce's Washington and Wilmington-Greenville regional offices, would cover major portions of the APES river basins. A third position in the Fayetteville regional office would cover a small portion of the APES region. These positions are linked to the Governor's clean environment goal, and they will help fulfill mandates in the Hog Farm Bill and incentives in the Clean Water bond bill.

- DCA is currently preparing water quality-based land use planning guidelines for use by local governments throughout the state. These guidelines are being prepared by the Center for Urban and Regional Studies through a CWMTF grant. An advisory committee with members from local government, private business and environmental groups is providing input to this process. After the guidelines are completed, Division of Community Assistance regional offices will hold workshops around the state to promote use of the guidelines. This project should yield water quality benefits in the entire APES region.

- Two projects funded by the AP NEP CCMP implementation grant, "Environmental & Economic Planning Handbook" and "Open Space Design Guidebook, Albemarle-Pamlico Estuarine Region" have been completed and are available to help local governments and citizens with local and regional planning efforts.

Management Action 2:

Stewardship Plan - Objective A

Provide to local governments affordable and accessible data from the state Geographic Information System (GIS) for use in planning and public education within the region by 1996.

Explanation:

Local comprehensive plans influence private and public development and management decisions, and should be supported with accurate and timely geographic information. Increasing the availability of state GIS data to local governments will help in environmental and economic planning.

1997-98 CCMP Implementation Achievements:

- CGIA provides GIS services to numerous clients. Products and services such as custom maps, customized data, analytical reports, and GIS analysis are rendered on a fee basis. Numerous clients representing local government or representing local government interests were served during this past year.

  Relating to the APES region, CGIA distributed digital data to Vance County GIS in the Planning Department, to the Triangle J Council of Governments for water quality analysis in river basins, to the NC Division of Coastal Management for Coastal Area Management Act planning, and to the NC Division of Marine Fisheries. For the latter, CGIA also provided technical assistance in the mapping of shellfish strata in Core Sound. CGIA created custom maps of hurricane storm surge inundation areas for the US Army Corps of Engineers Wilmington District and for the NC Division of Emergency Management for distribution to local emergency managers as well as for internal use.

- More than 60 digital data layers are now being distributed as part of the North Carolina Corporate Geographic Database (CGDB). The layers are available through the CGIA Distribution Office which is "on-line" to more than a dozen agencies through the North Carolina Information Highway. Two agencies, the NC Division of Coastal Management and the NOAA Coastal Services Center directly assist local governments using this data.

- Many of the GIS data layers in the CGDB are updated by source agencies on a regular basis. Other layers are updated as funding permits. All data layers are available through CGIA. Recent additions and updates to the CGDB that have APES and coastal area interest include:

  - Digital Orthophotography Quarter Quadrangles (DOQQ) for APES and CAMA counties are now completed. This is 1993-4 panchromatic digital aerial photography, 1-3 meter resolution, in which displacements caused by the camera and terrain have been removed. The digital processing of the photography was a cost share involving CGIA, the North Carolina Geological Survey, the North Carolina Department of Transportation and numerous federal agencies led by the US Geological Survey. The data is available through CGIA or as CDs of individual counties from the North Carolina Geological Survey. Images of the DOQQ are now viewable through the Microsoft Terraserver Web Site (www.terraserver.com) at no cost.

  - Water Distribution Systems and Sanitary Sewer Systems data for 75 counties of a statewide project is complete. The data describe each public system and contain pipes and major mechanical components (such as water tanks and treatment facilities) All local governments were given an opportunity to participate in this project. The coastal phase of the project was funded by the NC Rural Economic Development Center, NC Department of Commerce, Division of Community Assistance, the Northeast Partnership, North Carolina's Southeast, and the Lower Cape Fear Water and Sewer Authority (source: NC Rural Economic Development Center). GIS data were distributed to all participating local governments by the Rural Center and are now available through CGIA.

  - Land Cover, 1996. The statewide land cover data layer was officially released by CGIA. The data layer was developed using multi-temporal Landsat thematic mapper data, 30 meter resolution.

  - Other data layers updated or released:
    - Hurricane Storm Surge Inundation Areas
    - North Carolina Legislative Districts for the House and Senate, 1992.
    - North Carolina Congressional Districts, 1992 and 1997.
    - State-Owned Complexes

- Geodetic Control Monuments
- Archaeological Sites, Districts, and Shipwreck Sites - National Register List
- Beach Access Sites

- Network access to the CGDB across high-speed communication line (T-1, NCIH) has been completed for the Division of Marine Fisheries (Morehead City, NC) and the NOAA Coastal Service Center (Charleston, SC). Other organizations that are now connected to the CGIA servers are:

  - NC State Property Office
  - NC Department of Agriculture
  - NC Division of Community Assistance
  - NC Division of Water Resources
  - NC Division of Coastal Management
  - NC Division of Environmental Management
  - NC Division of Water Quality
  - NC Division of Land Resources
  - Duke University Marine Lab
  - North Carolina State University, Raleigh Campus
  - Western Piedmont Council of Government

- The NC Geographic Data Clearinghouse is continually enhanced. The spatial, temporal and keyword search capability allows custom geographic data searches on the Internet. The Clearinghouse indexes all data sets in the Corporate Geographic Database and also from local government sources, and maintains links to comprehensive metadata (data about the data) on each set.

  Wake County, the City of Raleigh, and the Town of Cary in cooperation with CGIA are developing metadata and an Internet node on the Clearinghouse for access to locally-developed GIS data. The information includes data about land ownership land use, and topography. Guidelines and a web how-to for documentation of local GIS data will be completed in this project. Outcomes of the Wake County project can be used as a model to assist local governments in the APES region and the coast with GIS metadata training and clearinghouse implementation.

- The North Carolina Geographic Information Coordinating Council (GICC) oversees the policies for GIS statewide. The Council offers a forum for shaping these policies and has recently added two representatives from the NC League of Municipalities and the NC Association of County Commissioners as ***ex officio*** members. Voting members of the Council represent federal, state, academic, private, and local government sectors. Local government members represent Lead Regional Organizations, Counties, Municipalities, and the Affiliated GIS User Committee. The Council is staffed by CGIA.

- The Affiliated GIS Users Committee (AGUC) of the GICC provides a forum for local government to influence GIS policy and directives statewide. The committee meets four times during the year by video-teleconference and holds special workshops as necessary. The AGUC is staffed by CGIA.

- CGIA participated in the October 1998 NC State Fair "Cyberspace Exhibit." Organized by the State Government Users Committee, the exhibit included a continuous hands-on GIS demonstration where participants zoomed into their county to view CGDB data, learned about their river basin, and viewed health statistics. An Internet connection provided access to Digital Orthophotography Quarter Quadrangles by way of the Microsoft Terraserver site and to a GIS public access site that provides free information about land ownership, land use zoning, soils surveys, and school locations.

- The DENR Office of Environmental Education in cooperation with the Department of Public Instruction, NC State

University's College of Education SCI-LINK/GLOBE-NET project, NC State University Computer Graphic Center and CGIA conducted another GIS teacher training workshop in July 1998. The week-long workshop used thematic and environmental data from the CGDB for the Neuse River Basin to support curriculum objectives and classroom adoption of GIS into interdisciplinary instruction.

- CGIA also participates and offers presentations and GIS demonstrations at numerous other events sponsored by organizations with local government interests.

Management Action 3

Stewardship Plan - Objective A

Implement a comprehensive, coordinated and proactive approach to managing the state's public trust waters by 1996.

Explanation:

North Carolina holds the waters, the lands beneath them and the resources living in them in trust for its citizens. The state has the authority and responsibility to preserve their natural value as a part of our common heritage. Several state agencies are responsible for the stewardship of this public trust. As the region's population continues to grow, public use of the sounds and waterways will increase as well. Greater conflicts are likely between various groups, including those who use the resources of public trust areas for profit. Therefore, closer coordination is necessary between the agencies that manage these resources. Public trust policy should be proactive and should consider issues related to future population growth, including public access and compensation for uses of public trust resources.

1997-98 CCMP Implementation Achievements:

- The state has taken a few actions regarding public trust management. One of the most significant actions came from the Coastal Resources Commission in 1996, when the Commission inserted a requirement that local governments develop water use plans as part of the process of establishing boat mooring areas. The idea for local water use plans originated in a study funded by the APES program. In 1997, the legislature funded a one year user study of Core Sound which is being completed at the Duke University Marine Laboratory in Beaufort. The study also has roots in the APES study.

Management Action 4

Stewardship Plan - Objective A

Provide support to organizations that promote nature-based tourism and environmental education as a way of fostering environmentally sound economic development in the region.

Explanation:

The mission of the Partnership for the Sounds, Inc. (PfS) is to stimulate local, sustainable, community-driven economic well-being within the Albemarle-Pamlico region through the promotion of eco/cultural tourism, environmental stewardship, and education.

PfS was chartered in 1993 as a non-profit organization and is overseen by a Board of Directors comprised of representatives from local governments, non-profit organizations, businesses, and industries in the Albemarle-Pamlico region. The focus area of Partnership activities includes Beaufort, Bertie, mainland Dare, Hyde, Tyrrell, and Washington counties.

The diverse groups represented by the Partnership were brought together by a common interest in developing environmental/cultural education facilities that would provide focal points for tourism in the region. With coordinated infrastructure improvement, the area could become an appealing destination to the rapidly growing ecotourism and heritage tourism markets. By helping to develop that infrastructure, PfS hopes to foster an economic niche that celebrates and conserves the region's unique ecology and ways of life.

1997-98 CCMP Implementation Achievements:

- The NC General Assembly has appropriated funds to the Partnership each year since 1993-'94. Capital funding has been provided for the construction or renovation of PfS

educational facilities while a recurring line item has helped cover staffing and administrative costs.

- The Partnership is coordinating the development of five education-oriented sites, as well as several other ecotourism-related projects on the Albemarle-Pamlico peninsula. Each site will interpret different aspects of the ecosystem that encompasses the region, promote visitation to the other facilities and be associated natural areas and historic sites - including other points of interest - in the five-county PfS area.

  The five PfS sites are:
  1. The North Carolina Estuarium
  2. The Lake Mattamuskeet Lodge
  3. The Walter B. Jones Center for the Sounds
  4. The Columbia Theater Cultural Resources Center
  5. The Roanoke/Cashie River Center

  1. The North Carolina Estuarium
  The North Carolina Estuarium opened in January, 1998. The Estuarium's focus is on North Carolina coastal estuarine systems as exemplified by the Pamlico Sound and the Tar-Pamlico River. Located on the waterfront in downtown Washington, the Estuarium will have direct access to the Pamlico River.

  2. Lake Mattamuskeet Lodge
  Refurbishment of the Lake Mattamuskeet Lodge has continued to the point where the facility is usable for meetings, gatherings, and short-term overnight use. A complete renovation plan for the Lodge was finalized with funds from an earlier appropriation. PfS continues to work closely with US Fish and Wildlife Service officials in seeking federal funds to carry out the full plan. The interpretive focus of the Lodge is the natural and human history of Lake Mattamuskeet, and the lake's role in the Atlantic Flyway for migratory waterfowl.

  3. Walter B. Jones Center for the Sounds
  A preliminary design scheme was completed for the Center for the Sounds through a previous appropriation. Since this facility will house the staff for the Pocosin Lakes National Wildlife Refuge and will be on US Fish and Wildlife Service land, federal funding will be necessary to complete the Center. The Partnership worked with the US Fish and Wildlife Service to secure funding during this year's federal budget cycle. A previous appropriation went to construct an interpretive boardwalk and outdoor classroom along the Scuppernong River in front of the Center site.

  4. Columbia Theater Cultural Resources Center
  The Cultural Resources Center, formerly the old Columbia Theater in downtown Columbia, NC opened in October 1998 following two years of renovation and exhibit preparation. The focus of the center is on human interaction with the environment on the upper Albemarle-Pamlico peninsula, especially as witnessed through the heritage of farming, fishing, and forestry.

  5. Roanoke/Cashie River Visitor's Center
  The Roanoke/Cashie River Center made excellent progress toward completion this year. Renovation plans for the building that will serve as the Center are finished and an exhibit scheme has been devised. A boardwalk and park area is open on site. The Roanoke/Cashie Center will focus on the vast floodplain and bottomland swamp system of the lower Roanoke basin. This system is the largest of its type east of the Mississippi River.

- The Natural Heritage Program (NHP) of the Division of Parks and Recreation is working to enhance the region's attraction as a nature-tourism destination by working with landowners to protect key tracts of land and promote establishment of corridors to connect natural areas.

- Working through the Upper Tar River Collaboration, NHP is incorporating the clean water and greenway planning efforts of local governments in its conservation strategy for the Upper Tar River basin.

- The Conservation Fund, a private conservation organization, worked with PfS, the Natural Heritage Program of the Division of Parks and Recreation, the Wildlife Resources Commission, the Conservation Trust of North Carolina and North Carolina State University to develop a planning map for the conservation of greenways in the Albemarle-Pamlico region.

OBJECTIVE B:
INCREASE PUBLIC UNDERSTANDING OF ENVIRONMENTAL ISSUES AND CITIZEN INVOLVEMENT IN ENVIRONMENTAL POLICY MAKING.

Management Action 1
Stewardship Plan - Objective B

Expand and coordinate education projects about the Albemarle-Pamlico estuary, focusing on both environmental and economic issues.

Explanation:

The future security of the estuary depends on whether people who live, work and vacation there understand its environmental challenges. These education efforts must be innovative, must include adults as well as children, and must take place outside of traditional school settings as well as in the classroom.

1997-98 CCMP Implementation Achievements:

- The development and publishing of the Teacher's Guide to Environmental Education Programs and Resources and its companion document, the Neuse River Basin Supplement to the Teachers' Guide have occurred. The original Teachers' Guide focuses on environmental education resources available within the NC Department of Environment and Natural Resources and lists a variety of environmental education resources external to the DENR. A new version of the original Teacher's Guide is now underway.

  The supplement to the teacher's guide expands this information to include resources available from non-profit groups, colleges and universities, and other groups that have environmental education information specifically relating to the Neuse River.

- All 378 public libraries in North Carolina have river basin resource information for their patrons which includes an ecological address brochure, a river basin map, the Teacher's Guide to Environmental Education Programs and Resources, the Neuse River Basin Supplement to the Teacher's Guide to Environmental Education Programs and Resources, the Citizen's Guide to Neuse River Basin Environmental Education Programs and Resources and the Green Sheet.

- A Citizen's Guide to Neuse River Basin Environmental Education Programs and Resources has been published and placed in all public libraries and other repositories in the state. Unlike the Supplement to the Teachers' Guide, which is specifically intended for educators, the Citizen's Guide targets all stakeholders in the Neuse River Basin. It identifies 150 environmental education programs and resources of the Neuse River Basin and includes a color map of the Neuse River Basin, a section on "What You Can Do," and is indexed by program, organization, audience, program type and counties served.

- "Know Your Ecological Address" - The activity, "Know Your Ecological Address", developed by Dr. Denis DuBay of the

Office of Environmental Education, encourages all citizens to know which river basin they live in (including knowledge of soil types, air shed, flora and fauna, etc) and is available to the public through public libraries and from the Office of Environmental Education. In conjunction with this project, four 30 second television public service announcements (PSAs) involving children talking about their "ecological address" were produced by the Agency or Public Telecommunications -- one each for the Catawba, French Broad, Cape Fear and Neuse River Basins. The educational message refers viewers to their local library for more information. The PSAs were distributed to TV stations in late May 1996. In October of 1996 the International Television Association with its Silver Reel Award recognized the PSAs.

- The "Know Your Ecological Address" and the "Know Your River Basin" campaigns were further communicated to the public through utility bill inserts. Duke Power, CP&L and North Carolina Power included "Know Your Ecological Address" and "Know Your River Basin" educational information in utility bill mailings to 2,000,000 households statewide at a cost equivalent to $1.6 million in postage alone.

- River Basin Environmental Data - Environmental data including river basin information has been placed on CD-ROM in computerized mapping format (GIS). Selected teachers met for five days in June 1996 to develop accompanying classroom activities. Thirty science, math, social studies and language arts teachers and environmental educators from NCSU, Department of Public Instruction and DENR were participants. Participants shared their experiences and ideas during the Environmental Education Conference held at the Research Triangle Park in January 1997.

- Using the Neuse River Basin as a pilot, DENR worked with the Center for Geographic Information and Analysis (CGIA) to identify river basin boundary line crossings on interstate, primary and secondary roads; and with the NC Department of Transportation (DOT) to place bridge signs on interstate, primary and secondary roads. The Department of Transportation erected "Neuse River Basin" highway signs at 38 locations in 12 counties to educate travelers that they live, work and go to school within a river basin. Neuse River Basin signs were erected in 1996 and the Cape Fear will be the second of the 17 river basins in North Carolina to receive this signage. The Board of Transportation has voted to continue the Environmental Education River Basin Awareness Program Statewide.

- An "Educator's Guide to Environmental Education Programs at Water Treatment Plants and Wastewater Treatment Plants" is being developed for publication in 1999. These facilities represent environmental education resources that enable students to learn what river basin they live in, where their water comes from, where is goes and how they as individuals can affect the operation of these facilities. The Office of Environmental Education is partnering with the North Carolina League of Municipalities, the North Carolina Association of County Commissioners and the North Carolina American Water Works Association/Water Environment Association on this project.

- Lawn Care and Fertilizer Industry Environmental Education Campaign - Executives from more than 10 major home lawn fertilizer manufacturers and lawn care services from North Carolina, Florida, Georgia, Alabama, Virginia, and Ohio are collaborating to use their corporate policies, resources, networks and employees to raise public awareness of river basin systems and

human impacts on these systems through the theme "Discover Your Ecological Address." Twenty-one million contacts could be made through radio, telephone, point-of-sale materials, the Internet and employee training.

- Love a Tree Program - The Love a Tree program was created in 1996 through a partnership with International Paper and the North Carolina Department of Environment and Natural Resources. In the first two years, more than 350,000 students planted 1.2 million acorns as part of Love A Tree. Those same students used the materials in those kits to learn about their ecological address, how animals rely on forests, how trees help water quality and how we all have a role to play in protecting the environment.

- In 1998, 5,500 environmental education kits containing resources from a variety of environmental education programs were distributed to 600 teachers, reaching approximately 150,000 elementary school students. The kits were distributed through a network of approximately 65 Environmental Education Centers across the State.

- Guide to Environmental Education Centers The process of identifying North Carolina's environmental education centers began in 1993, and by 1998, over 150 center had been identified and their resources documented in the North Carolina Guide to Environmental Education Centers. In August of 1996, the Environmental Education Centers formed the nation's first Association of Environmental Education Centers. As of October 1998, there were 78 voting members and 56 associate members of the North Carolina Association of Environmental Education Centers

- Creation of a World Wide Web (WWW) home page for the NC Office of Environmental Education has been implemented. In addition, the Teachers' Guide to Environmental Education Programs and Resources, its companion document, the Neuse River Basin Supplement, and the Citizens' Guide to Neuse River Basin Environmental Education Programs and Resources can be found at http: //www.enr.state.nc.us/ENR/ee

- The Office of Environmental Education has developed, for informational purposes, a "Green Sheet" which lists, among other things, resources available free upon request, and contact information needed for obtaining additional information on specific activities.

- Environmental Education Newspaper supplements featuring Environmental Education Centers across the state and the "Discover Your Ecological Address" theme were published in April 1997 and 1998 Sunday editions of the News and Observer, reaching over 200,000 households each year and helping to bring environmental awareness into North Carolina homes and businesses. EPA funded 20,000 additional copies both years for distribution to schools and environmental education centers.

- The Office of Environmental Education worked with the Center for Geographic Information and Analysis (CGIA) to produce and distribute 8 1/2" x 11" river basins maps as well as 20" x 40" maps of North Carolina, delineating all 17 river basins located in the state. The GIS data pertaining to the Neuse River basin was incorporated into a teacher-training workshop held June 24-28, 1996. At the workshop, master teachers crafted age-appropriate activities thus moving GIS applications into North Carolina classrooms. Four more GIS teacher-training workshops took place in the summers of 1997 and 1998

focusing on hazardous waste, river basins and other aspects of the environment.

- The Project Tomorrow Environmental Education Model Library Grant program provides financial and other support to develop and enhance environmental education library collections, field trips to environmental education centers and materials for hands-on learning activities that promote problem solving, critical thinking, and the integration of environmental education in the teaching of NC's competency-based curriculum. Funding from both the general assembly and the private sector has enabled the Office of Environmental Education to administer 228 grants to public schools, public libraries, and environmental education centers and provide the Project Tomorrow's Environmental Education Bibliography of reviewed resources throughout North Carolina including the Albemarle-Pamlico Region.

Management Action 2

Stewardship Plan - Objective B

Increase opportunities for citizens to communicate with members of environmental agencies and policy-making commissions.

Explanation:

Citizens are more likely to support environmental protection and be involved in decision making when they feel governments and regulatory agencies are working with them as equal partners. Increased opportunities for public participation and education will promote citizen involvement in environmental policy making.

1997-98 CCMP Implementation Achievements:

- Five river basin Regional Councils have been formed and are meeting regularly. The membership consists of stakeholders and local government representatives for all the counties within the Neuse, Chowan, Pasquotank, Tar-Pamlico and Roanoke River basins. The purpose of the Regional Councils is to advise and consult with local, state, and federal governments, as well as the general public and different interest groups within the basin, on the implementation of environmental management programs in the river basins. The Regional Councils are staffed by the Public Coordinator/ Implementation Group within the Water Quality Section of the Division of Water Quality (DWQ). The Regional Councils meet (approximately) every 6-8 weeks.

- Further fulfillment of this management action occurs with each of the public meetings held during the preliminary stages of Basinwide Water Quality Management Plan development. These plans, which have been created for all seventeen river basins throughout North Carolina, are scheduled at various times to coincide with NPDES permit renewal. A concerted effort has been made to involve stakeholders in this planning process through workshops and public meetings.

Management Action 3

Stewardship Plan - Objective B

Enhance and heighten local public involvement in issues affecting the estuary.

Explanation:

Public involvement in local policy processes can be promoted through Environmental Advisory Boards. These boards would not have a regulatory role. Instead, they would provide credible information and insight to local governments on the environmental issues surrounding projects such as landfill and roadway siting, water supply and sewage discharge, land use planning and stormwater control.

1997-98 CCMP Implementation Achievements:

- There is scattered involvement with Environmental Advisory Boards (Councils) at the local government level throughout the Albemarle-Pamlico estuarine region. An

example is the group working in Greenville (Pitt County). They have been addressed at their meetings by personnel from the DWQ.

- The Chowan and Pasquotank Regional Councils co-sponsored an educational forum (which was attended by 450+ persons) pertaining to the process necessary for siting heavy industry in the region. Representatives from federal, state and local government, area citizens, industry and environmental advocacy groups participated. Issues centered around the necessity of conducting an Environmental Impact Study (EIS) for the proposed industrial siting.

- Numerous public meetings were held in the Chowan River basin for the purpose of heightening public awareness concerning the impacts to air, land and water due to the introduction of certain types of industry. Chowan River Basin Regional Council members participated heavily in these meetings.

- Through an independent facilitator, DWQ is convening stakeholders, by potential rule subject areas. DWQ convened a steering committee of stakeholders in late September. The steering committee established the following stakeholder groups:
  - Atmospheric emissions
  - Storm water
  - Agriculture
  - Onsite wastewater
  - Restoration
  - Erosion & sedimentation control - Urban
  - Buffer protection
  - Nutrient management

The first stakeholder meetings will take place in November, 1998 and meetings will continue through January, 1999.

Management Action 4

Stewardship Plan - Objective B

Expand involvement in the Citizens' Water Quality Monitoring Program (CWQMP) and make the program more interactive with regulatory agencies.

Explanation:

Citizen monitoring gauges the estuary's health and it is an important education tool. In the Albemarle-Pamlico region, the CWQMP has served both purposes. The CWQMP would continue and broaden efforts to provide accurate data to water quality management agencies, thereby expanding their ability to track potential problems.

1997-98 CCMP Implementation Achievements:

- The CWQMP continues to grow in numbers of volunteer participants, sites monitored, and parameters measured. Among those requesting CWQMP data are various state and federal agencies, local governments, non-profit organizations, colleges and universities, and private sector groups. The Division of Water Quality (DWQ) has utilized the CWQMP data and recognizes the potential benefits of expanding the volunteer monitoring program into other areas of the state. Over 100 citizen monitors have been trained, and monitoring equipment has been distributed to all program volunteers.

Management Action 5

Stewardship Plan - Objective B

Create a citizen ombudsman position within the Department of Environment, Health and Natural Resources (DEHNR).

Explanation:

A citizen ombudsman is an independent advocate for citizen concerns within a government agency. An ombudsman would respond to and track these concerns, and would serve as the public's "eyes and ears" with regard to activities of DEHNR divisions.

1997-98 CCMP Implementation Achievements:

- There has been no movement toward establishing this position.

OBJECTIVE C:

ENSURE THAT STUDENTS, PARTICULARLY IN GRADES K-5, ARE EXPOSED TO SCIENCE AND ENVIRONMENTAL EDUCATION.

Management Action 1

Stewardship Plan - Objective C

Support the development of a comprehensive environmental science and education curriculum.

Explanation:

The Department of Environment, Health and Natural Resources (DEHNR) will expand the operation of the Office of Environmental Education (OEE) to establish an ongoing liaison between the Department of Public Instruction (DPI) and OEE. DPI must address a variety of concerns in developing curriculum. However, OEE would provide assistance as needed in targeting environmental education components.

1997-98 CCMP Implementation Achievements:

- The 1998 NC General Assembly has appropriated two hundred thousand dollars ($200,000) to the Department of Environment and Natural Resources for the 1998-99 fiscal year for environmental education grants that shall be used to promote environmental education throughout the State.

- The Office of Environmental Education has established a positive working relationship with the NC Department of Public Instruction. All environmental education curriculum offered by DENR, including Project Estuary, Sound Ideas, Aquatic WILD, Project WET, Project Learning Tree, Project WILD (Wildlife in Learning Design), and NC State Park Environmental Education Learning Experiences (EELEs) are being correlated to the North Carolina Competency based curriculum for science, math, social studies, and language arts. The correlation was updated in 1996 and is offered free on diskette or can be downloaded from the Office of Environmental Education's web site.

- The Office of Environmental Education has developed and is administering the North Carolina Environmental Education Certification Program for educators working with youth and adults both in the school setting and outside the school setting. The Certification Program is cosponsored by the Environmental Educators of North Carolina. The Certification Review Committee, composed of representatives of DENR, Environmental Educators of North Carolina, the NC Department of Public Instruction, and colleges and universities, will serve as the oversight body for this program. The NC Environmental Education Certification Program was unveiled in July 1996. All requirements for environmental education certification meet local school district requirements for Certification Renewal Credits, or CEUs. The first 25 Certified Environmental Educators were recognized at the state's 1997 Environmental Education Conference. Post-conference Certification workshops will be offered as a conclusion to the 1999 North Carolina Environmental Education Conference in February. To date we have 545 educators enrolled in the program and 135 certified educators who will be recognized at the 1999 Environmental Education Conference.

- The Office of Environmental Education coordinated a department-wide review of the state's high school earth/environmental science curriculum outline. This review was important given the new high school science graduation requirement - one earth

environmental science elective. The product of this review was a set of competency goals that were transmitted to the state Department of Public Instruction.

- The Office of Environmental Education is working to develop a directory of environmental education courses available at colleges and universities in North Carolina.

- The Office of Environmental Education operates an Environmental Education Clearinghouse for North Carolina.

- The Division of Parks and Recreation, with support from Carolina Power & Light Company (CP&L), has developed Environmental Education Learning Experience guides for each of the state parks in the Albemarle-Pamlico region. These guides provide age-appropriate environmental education through hands-on activities.

Management Action 2

Stewardship Plan - Objective C

Provide for teachers at all levels ongoing opportunities to gain renewal credits in workshops on environmental and estuarine education.

Explanation:

The Office of Environmental Education would assist DPI and other state agencies, such as the Wildlife Resources Commission (WRC), Division of Parks and Recreation (DPR), and the Division of Soil and Water Conservation (DSWC), in conducting teacher in-service workshops that provide renewal credits. These workshops not only would help teachers stay current in environmental science, but would provide broad perspectives on the relationship between the estuary and human activities.

1997-98 CCMP Implementation Achievements:

- A number of teacher workshops have been promoted by the Office of Environmental Education. All teacher-training opportunities provided participants with continuing education units. Several workshops designed to introduce teachers to the use of GIS to access environmental data were held during the summers of 1996, 1997, and 1998.

- Correlation Workshops- (2) two-day workshops were held. NC school teachers who are experts on curriculum mandates correlated DENR curriculum materials in the areas of science, social studies, math and language arts.

- Year of the Mountains Environmental Teacher Training Institutes- The Year of the Mountains Commission sponsored two environmental education institutes in 1996. One at the North Carolina Center for the Advancement of Teaching in Cullowhee on February 23 & 24 and another at the Broyhill Center in Boone on March 8 & 9. Participants took one of the following workshops: Project WILD, Project WET, The Search for Clean Air (based on the PBS documentary with curriculum produced by Dr. Harriet Stubbs of SCI-LINK), Project Estuary and Sound Ideas, and a cooperative workshop by the NC Zoo, Office of Waste Reduction, the Museum of Natural Sciences and the Aquaria.

- Environmental Education Smorgasbord - During the summer of 1994, the Department of Public Instruction sponsored a teacher leadership training week. One evening was devoted to introducing participating teachers to the environmental education programs available through the DENR.

- North Carolina Environmental Education Conference - In December 1994 ("Making the Commitment") and in January 1997 ("Sharing the Commitment"), the Office of Environmental Education held an

environmental education conference. Participants included educators teaching in classrooms as well as those working outside the classroom with both youth and adult groups. Presenters represented environmental interests, not only from state and federal agencies (including the Navy and Coast Guard), but also from colleges and universities, non-profit groups, and environmentally related business. The purpose of the Conference was to gather input for the development of the North Carolina Environmental Education Plan. From January to March 1995, a series of regional meetings were held across the state to allow input from those persons unable to attend the Conference. As a result, over 1300 citizens expressed their perceived environmental education needs in their communities. In April 1995, the North Carolina Environmental Education Plan was accepted by Governor Hunt and presented to the public.

- The 1999 North Carolina Environmental Education Conference "Living the Commitment" will be held at the Sheraton Imperial, Research Triangle Park, February 10-12, 1999. The purpose of the 1999 Environmental Education Conference is to both demonstrate and debate the value of a knowledge-based and learning-driven approach to environmental quality to go beyond the familiar, traditional regulatory-based approach. Partnerships among schools, businesses, communities and nonprofit organizations will demonstrate their commitment to a compelling alternative to environmental business as usual.

- The Division of Parks and Recreation (DPR) holds teacher workshops based on park EELEs at each of the State Parks in the Albemarle-Pamlico region. These workshops provide CEUs. Also, DPR assists with Project Learning Tree and Soil and Water Conservation District teacher workshops.

IMPLEMENTATION PLAN

GOAL: Implement the Comprehensive Conservation and Management Plan in a way that protects environmental quality while using the most cost-effective and equitable strategies.

OBJECTIVE A:

COORDINATE PUBLIC AGENCIES INVOLVED IN RESOURCE MANAGEMENT AND ENVIRONMENTAL PROTECTION TO IMPLEMENT THE RECOMMENDATIONS OF THE CCMP.

Management Action 1
Implementation Plan - Objective A

Create a Coordinating Council and five Regional Councils through executive order by the Governor of North Carolina upon approval of the CCMP.

Explanation:

The APES program has provided extensive opportunities for interaction between government agencies, private organizations, citizens and local governments. Continued coordination in implementing recommendations in the CCMP would be provided through a Coordinating Council and five Regional Councils. The Regional Councils would include representatives from each county in the region, including elected and/or appointed local government officials, interest groups, and members of the general public in each river basin. The Coordinating Council would include fifteen representatives from the Regional Councils (ten of whom will be local elected and/or appointed officials), seven representatives of citizen commissions and councils, four representative of federal resource agencies and three representatives of state government. This structure would provide continued opportunity for interagency coordination and citizen and local government input.

1997-98 CCMP Implementation Achievements

- All five river basin Regional Councils have been formed and are meeting regularly. Membership consists of stakeholders and local government representatives from every county within the Neuse, Chowan, Pasquotank, Tar-Pamlico and Roanoke River basins. The purpose of the Regional Councils is to advise and consult with local, state, and federal governments, as well as the general public and different interest groups within the basin, on the implementation of environmental management programs in the river basins.

- The Coordinating Council met for the first time in March, and again in October, 1998. The Coordinating Council includes fifteen representatives from the Regional Councils (ten of whom are local elected and/or appointed officials), seven representatives of citizen commissions and councils, four representative of federal resource agencies and three representatives of state government. This structure will provide continued opportunity for interagency coordination and citizen and local government input.

Management Action 2
Implementation Plan - Objective A

Coordinate implementation of the CCMP.

Explanation:

The best way to ensure efficient operation of government is to increase the coordination and cooperation of existing agencies. Each agency should fulfill its responsibilities without duplicating the efforts of other agencies. The Coordinating Council would take advantage of existing resources and staff, establishing connections between public and private interests and all levels of government, rather than creating another layer of government. The Coordinating Council will guide the implementation process to ensure the highest level of cooperation and coordination among interested parties, as was demonstrated by the original APES Management Conference during the plan's development.

1997-98 CCMP Implementation Achievements:

- The Regional Councils and Coordinating Council have been formed and are meeting. The next meeting of the Coordinating Council is scheduled for January, 1999.

OBJECTIVE B:

ASSESS THE PROGRESS AND SUCCESS OF IMPLEMENTING CCMP RECOMMENDATIONS AND THE STATUS OF ENVIRONMENTAL QUALITY IN THE ALBEMARLE-PAMLICO REGION.

Management Action 1
Implementation Plan - Objective B

Develop an annual "progress review" of the implementation of CCMP recommendations.

Explanation:

The most critical stage of the management program is its implementation. Without carefully thought-out and monitored implementation, the goals of the management plan may never be achieved. A progress review would allow the Coordinating Council, or any interested party, to comment on the implementation process. It also allows corrections or changes to be made as necessary.

1997-98 CCMP Implementation Achievements:

- DWQ is a co-sponsor, along with the EPA, of the A/P Sounds NEP Conference entitled "Managing the Albemarle-Pamlico Sounds: It's Everyone's Responsibility" being held in New Bern, NC on November19 and 20, 1998. This forum will examine the public's role in protecting the natural resources of the A/P Sounds Region and update the status of CCMP implementation.

- DWQ staff members completed the 1997 A/P NEP "Comprehensive Conservation and Management Plan Implementation Summary Report," and are developing this document to serve as the 1998 update. Public comment relating to this document will be solicited to fulfill the need for public involvement in accessing CCMP progress.

Management Action 2
Implementation Plan - Objective B

Assess the health of the Albemarle-Pamlico Estuary and the success of CCMP recommendations in protecting the environment.

Explanation:

Assessing the success of the implementation of the CCMP also requires monitoring the environment and a thorough evaluation of the results. The CCMP must be flexible to adapt to natural conditions. Data gathered on the state of water quality, habitats, and fisheries may be used to adjust strategies as necessary.

1997-98 CCMP Implementation Achievements:

- Assessing the health of the estuary is an on-going challenge. The document entitled "Comprehensive Conservation and Management Plan Summary Report" offers an up-to-date and comprehensive summary of the changes that have taken place in the Albemarle-Pamlico Sounds region over the past year.