MINUTES
ALBEMARLE-PAMALICO ESTUARINE STUDY
Technical Committee
MAY 25, 1988

Raleigh, NC

Co-chairman Mr. Bruce Barrett called the meeting to order at 10:05 a.m. (agenda/Attachment A) and welcomed attendees (Attachment B). He introduced Mr. Bob Holman, who officially became the new Program Coordinator on April 12, 1988.

A. Director's Report

Holman gave his report: (1) He met with the Doug Rader and most of the Policy Committee Members to receive their updates and views on APES; (2) He met with EPA Region IV staff on April 25th; (2) He attended the April 26-28 media tour funded by APES and facilitated by the North Carolina Coastal Federation. Seventeen various media representatives attended as far away as Washington, D.C., resulting in good coverage for APES; (3) He plans to attend the EPA/OMEP Technology Transfer Meeting in Annapolis, MD on June 7, 1988; (3) On June 30, 1988 he will meet with EPA Headquarters to update them on the project and to discuss further program funding; (4) He met with both CAC's at their May meetings and gave the Citizens Advisory Committees (CAC) two challenges. The first challenge is to come up with a display for the State fair and the second is to plan for an annual review meeting in November; (5) The program newsletter will be printed and distributed by July; and (6) He plans to have local government workshops scheduled for early Spring 1989, as an update and for their input to APES.

Barrett said he is very impressed with the way Holman has handled the transfer of Program Coordinator. Dr. Ernie Carl offered thanks to Ted Bisterfeld for his additional help and stepping in during this transfer. Ted Bisterfeld thanked Kathy Norris, APES program office secretary, for her continued support during this time.

B. Proposal Review

Dr. James Turner reported on the recommendations of the Technical Review Subcommitte (members/attachment C). The subcommittee reviewed 76 new proposals, reviewed on-going studies, and made recommendations on projects for funding. They are recommending continuing with nine on-going studies, concluding four projects at the end of this funding period, with the yearly budget totaling $534,000. Of the 76 proposals, 50 were rated by the subcommittee and 26 were forwarded to other committees as appropriate. Holman noted that proposals are now numbered to reflect the funding year (e.g., the first year proposals were assigned the 100 series and the second year the 200 series).

Overall, the subcommittee was disappointed with the lack of quality proposals, attributing it to the lack of preparation

time. He suggests that the Technical Committee give preparers more time the next round and that future proposals be directed to fill in gaps. Barrett asked that Bisterfeld and Holman develop a plan to look at the timing of RFP's and to give more thought on timing to assure quality proposals.

Dr. Turner distributed three pages on these recommendations and a fourth page showing percentage of budget recommended (attachment D). The dollar amounts represent one year. Some proposals lack milestones and due dates and the subcommittee is intending to ask submitters to add them. Negotiations will be made to reduce funding costs, particularly in the overhead area.

Mike Orbach noted that funding in the Human Environment category is recommended at about 25% less than that approved by the Policy and Technical Committees. Dr. B.J. Copeland responded that the reviewers rated many of these proposals poorly, with the highest technical review receiving a rating of two out of five. Mr. Dave Owens said that the subcommitee had agreed that APES must focus on improved management for the Sounds and looked at projects that would bring results and not just more data. He said that some proposals were good but do not meet APES needs and that others were costly or overlapped with other proposals. One proposal was on how to develop a socio-economic impact tool, but Owens explained that APES needs the job done rather than a design tool. The subcommittee also determined that a proposal dealing with a survey of citizens' attitudes was viewed as a public involvement (CAC) activity and not a socio-economic study. He further mentioned that some proposals listed under water quality are actually human environment related. Paul Wilms asked that such proposals be moved to the human environment category to reflect the proper category, percentage and funding level.

Turner noted that the subcommittee's recommendation of nine new proposals exceeds the present budget and asked how much supplemental funding the program can expect. Ted Bisterfeld stated there may be a supplemental funding of $400,000 and that he and Bob Holman will make a presentation in late June at EPA to request additional funding. Bisterfeld said that present money is for technical information and he anticipates that supplemental money is earmarked by EPA/OMEP for monitoring.

Barrett asked if there are any further clarifications or recommendations for the Technical Subcommittee. Turner stated that without exception this list represents the subcommittee's recommendations. Hearing no debate on this he asked if there are any clarifications on the projects recommended for conclusion. Orbach asked if there was any reason why the subcommittee could not discuss the reasons that certain projects are being concluded. The Co-Chairs, seeing no reasons, asked Turner to review each project marked for conclusion:

216 This project is considered too experimental. A large portion of the project dealt with mitigation of SAV. Rather, the program needs more on education and a tie to specific SAV species.

238 The original management question was whether or not man's impact has an impact on SAV. This project does not address that management concern. The overflights did not cover the entire Sound--flights were along the eastern Sound and left out the western Sound. The high cost of this project and the questionability of areas covered account for project conclusion.

Mike Gantt asked what products/deliverables will be received from this project. Ted Bisterfeld replied that the program will receive pictures of areas surveyed.

239 There are no useful results from this study.

251 There is a lack of project coordination. It serves no useful purpose and has no results.

Ted Bisterfeld said that products will be required from each project manager at the conclusion of funding.

Copeland said that the Technical Committee needs advice from the CAC on areas they feel should be addressed. For instance, the CAC has indicated that wetlands are of priority concern; however, the proposals received are not specifically directed. The CAC should assess what is needed and convey findings to the Technical Committee. Dr. Carl stated the CAC should be holding meetings with citizens and making a report to the Technical Committee on needs. Stallings said it was not always clear what and why studies are being done. Wilms requested that the CAC's give the TC a list of their questions. Owens asked that the CAC's detail their priorities along with an agenda, for incorporation into the planning process.

Dr. Carl asked why larval studies are being funded since they have never proved useful in the past. Hogarth explained that the projects will help determine if fish are being pushed in the right direction and said there is uncertainty about growth between larval and six inches stages. Hogarth said that this type of study is being done by other organizations and is being coordinated with them. Copeland said that the project will hopefully determine the timing and spatial problems with striped bass and that we are approaching the answers. Stallings indicated this is a top citizen concern. Carl said he wants the record to show that next year at this time he wants the answers.

Newly funded projects were reviewed and commented on by the subcommittee as follows:

203 Ranked relatively high--a project to look at critical areas. While this is a first time effort and proposed for three years, the subcommittee recommends funding one year with a review following.

250 Highly ranked--to look at diseases in blue crabs.

272 Plan to negotiate cost--project to look at losses of bay scallops.

218 Rankings were somewhat lower for this. If there is not additional funding, then this will be on the cut list. It recommends new techniques to measure fecal coliform. TC discussion followed on whether this project is needed and whether it is a basic research element or a management tool. Since this is not measuring techniques but the indicators, it was considered important enough to be funded, and if not possible this year, then next.

242 Managing multiple uses--received one of the highest rankings.

232 Hydrodynamic study of the Sounds--it's a two year project at approximately $60k each. The researcher has a lot of data from the Pamlico Sound to work worth.

256 Water quality vs. water management--there was question as to whether this project ties into BMP's and Bob Ellis confirmed its tie into the USGS agriculture program.

233 Circulation model--this project will fit together with 232 and is being coordinated with them.

Motion: Hogarth made a motion to approve the Technical Subcommittee's recommendations for continued projects to be funded; projects to be concluded; and the new projects to be funded. Wilms seconded. Motion carried.

Barrett said the recommendation will be made to the Policy Committee at their next meeting.

Hogarth requested that the Technical Subcommittee start writing the scope of work immediately and to follow through to have requests for proposals started for the next funding cycle.

C. Minutes Approval

Minutes from the previous meeting were tabled for consideration.

Motion: Copeland motioned to approve the December 15, 1988 Technical Committee Minutes. Turner seconded. Ayes carried.

D. Citizens Participation

Mike Orbach reported on the February 1988 meeting of the CAC subcommittee (consisting of Tom Ellis, John Stallings, Ernie Larkin, Fred White, and Mike Orbach, Chairman). They helped to draft the Citizen Involvement RFP and also drafted a set of administrative recommendations (Attachment E). He circulated the administrative recommendations along with funding recommendations for public participation (Attachment F).

Orbach reported that the public participation funding received a concensus of high ratings from both CAC's and the CAC subcommittee, with the exception of one proposal. There were 12 public participation proposals for consideration. Six were recommended for funding based upon high ratings. Albemarle priority ranked those six proposals; Pamlico did not. The funding level is the same as that proposed by the TAC subcommittee earlier. The total funding recommendation is $114,798. This figure reflects intended negotiations with the submitters.

Orbach reviewed the six projects as follows.

209 An interpretative exhibit regarding life cycle of the striped bass--This project can serve several functions, therefore, the subcommittee is hoping to find contributing funds that will reduce the cost. Received high ratings.

224 Will take the guide to streams and incorporate into an estuary guide. The subcommittee added extra money to allow for printing.

225 PTRF community outreach (Pamlico school area only). This project is to be closely coordinated with project 240, by the Public Participation Coordinator.

226 Calendar--recommended for its outreach/product.

240 Carson community outreach (Albemarle school area only). See 225 above.

266 T.V. Broadcasts (5 spots). Donations of $500,000 in air time made this a very attractive proposal. Highly ranked.

Dr. Copeland thought that outreach might be incorporated into existing projects and workshops. Mike Orbach noted that it was considered by the CAC's but there is still much useful information needed. These projects are for designing kits for teachers and for ensuring that the public is well educated and prepared for making eventual decisions on implementation. Wilms questioned whether the field guide was sufficient without turning it into an estuarine specific guide. Hogarth asked if a fee could be put on

the document. Bisterfeld said he would look into the policy for fees and reimbursement on government funded documents.

Discussion ensued on the lack of information to determine the contents of the various documents proposed. There was also concern as to whether the proper researchers would be doing the outreach. Orbach explained the intent is to have these proposals supplement on-going program outreach, again, with the coordination of the Public Participation Coordinator. Larkin discussed the PTRF proposal and the importance of disseminating information and letting people know about the study, its goals, workplan and how citizens can get involved.

Ellis said that the APES program must review any TV tape produced. Dr. Carl confirmed that the TC must insist on editorial review of all documents including TV. Mike Orbach reminded the TC that monitoring of APES funded projects mandates program review. For the record, it was restated that any and all official documents must be approved through the Program Coordinator with the advice of the TAC. Bob Holman, Program Coordinator, asked that a Technical subcomittee review all official documents before submitting to the Program Coordinator for final approval.

Bruce Barrett said that based upon the level of technical, citizens, and outside review given to these proposals, that the TC should move forward and vote on their recommendations.

> Motion: Dr. Stewart motioned to approve the public participation proposal. Stallings seconded. A vote of six for and five against carried the motion. (Larkin abstained from voting due to his involvement with PTRF).

E. FY88/89 Budget

Ted Bisterfeld said that the budget which he distributed is referred to as the 1988-89 budget, but noted that the state and Federal fiscal years are different (attachment G). The State is 1988-89, and EPA is FY 88 ($700,000) and FY 87 supplemental funds ($225,000) are construction grants funds. The State has $500,000 available toward the required 25% matching requirement by EPA. The total to APES is $1.5 million and EPA also has FY 88 supplemental money of up to $400,000 earmarked for monitoring. In addition there is $400,000 available from EPA for early implementation projects. Supplemental money for APES totals $800,000. Holman indicated that due to matching mon ies, that APES can only ask for $575,00 without any matching funds.

Ted reviewed the overall percentage distribution of money allocated. The Administrative Budget contains the breakdown of dollars and is close to last year's budget. This year money is being allocated for a data management coordinator and for the added CAC administrative funds distributed by Mike Orbach earlier. There was some question as to the $20,000 CAC fund. Orbach noted that each CAC will be asked to submit a proposal for

specific items for which they need funds and those items are listed in the memorandum which he distributed earlier. Questions arose on administrative and data management budgets.

Bruce Barrett felt that without an ad hoc budget committee, that the TC could not move forward with the budget without clarification of specific items. He suggested a subcommittee of committee chairs (Turner, Orbach, Carl, and Barrett). Mike Orbach said that due to the deadline of getting the budget to EPA on time that those items of concern shoud be asked now and explained. After some discussion on the CAC, Data Management, and Administrative Budgets, Bruce Barrett said that the TC should move forward with the budget, with the understanding that some discretionary action could be taken at a later date if needed. Barrett requested that in the future that the TC be allowed adequate review time. He suggested that the ad hoc group get together to provide adequate justifications for the upcoming PC meeting.

> Motion: Bill Hogarth motioned to approve the budget as submitted by the Program Coordinator. Wilms seconded. Hogarth requested that Holman prepare a more detailed budget report for the PC. Ayes carried unanimously.

Holman requested that the ad hoc budget subcommittee be put together for ensuring that future budgets are adequately reviewed and presented.

F. Data Management Report

Karen Sideralis gave a slide presentation of the Geographic Information System (GIS) being organized for APES. She showed the types of data the system could handle and the spatial extent of the GIS. U.S. Geological Survey information is included into the system to show hydrology, stream flow, political boundaries, etc. Bob Holman informed the TC that a milestone deliverable required by OMEP is a list of relevant databases that are to be added to the Albemarle-Pamlico data system. He requested that each TC member give him a list by June 15th of relevant data items to be included into the GIS.

G. Monitoring Subcommittee

Paul Wilms reported on the Monitoring Subcommittee which met on April 20th to draft a baseline monitoring program (Attachment H). The objectives are to (1) assemble a comprehensive database sufficient for conducting the characterization of the estuary; (2) evaluation of chemical, physical, and biological trends in the system over space and time; (3) acquisition of information sufficient to ground truth and calibrate the remotely sensed water quality data; and (4) establishment of a long-term monitoring system to measure the success of the management strategies. The total costs of the baseline monitoring is $628,240.

Mike Gantt expressed the importance of APES surveying and coordinating on-going efforts with the U.S. Fish and Wildlife Service. She mentioned a two year study funded at $360,000 of fish, sediment, claims, turtles, waterfowl, to determine organic chlorines and heavy metals present. She stressed the need for APES to coordinate efforts with the Service.

Barrett noted that the $400,000 supplemental funding will be for a one year monitoring effort. He asked Wilms to reconvene his subcommitte for establishing monitoring priorities, considering dollar amounts, and involving Mike Gantt as well as Jim Stewart in the review to avoid duplication.

H. Priority Action Plans/Implementation Money

Holman said that the Technical Subcomittee pulled together a listing from the proposals (Attachment I) of possible implementation projects. The purpose is to select a project which demonstrates a good faith effort on the part of APES to protect critical areas of the Sound. Bisterfeld said the TC is to select two projects for submission to EPA for their consideration with other estuary programs.

Orbach cautioned the TC on using the word "implementation" on these projects. It appears that these projects are being used as a model project which the county may want to adopt prematurely. He said the projects are academic research projects for study and not implementation oriented. Dr. Carl also stressed the dangers of the implementation projects, noting that the data is preliminary on these projects and that APES must be careful that the counties do not overreact and try to implement based upon these pilot projects. The TC selected two of the projects as being the ~~least~~ best implementation oriented: (1) Primary Nursery Areas and (2) ~~Lake Mattamuskett~~. Millpond. Merch.

Gantt said that while U.S. Fish and Wildlife Service supports the concept, there may be associated legal problems. For example, the Lake Mattamuskett project is an area that the Service has been studying for nine months with results forthcoming. She cautioned that APES may be premature in using this project area until that data is available. Copeland suggested that implementation is not the issue but that protection of primary nursery areas is, which is a high priority concern. He compared APES implementation study to a study on Broad Creek used to show that shifting winds could cause shifts in salinity and other water quality parameters. The conclusion of the study indicated that the results could be applied not just to that area, but to other areas as well. Hence, the general concept of the Mattamuskett Project should not dictate its implementation there, but, merely a study there.

Motion: Carl motioned to approve the two implementation projects in the context described by Copeland above (specifically, that it is a concept and not a specific site). The motion was seconded and unanimously approved by aye vote.

Gantt asked that any reference to a specific site be removed from the projects so that there is no misunderstanding.

I. Citizens' Committees Representation

Orbach proposed that representation of the Citizens' Advisory Committees be included on the Technical Subcommittees. He said that because the subcommittees are taking on more work with increased involvement in program issues, that it is appropriate to have the CAC's involved.

Barrett stated that because the CAC's hold memberships on the full TC, that, by definition, those CAC chairs are automatically entitled to involement on TC subcomittees. Larkin said that because of all the CAC activities, it is unlikely that the chairs could always attend the subcommittee meetings, and he further requested that a representative be allowed to attend subcommittee meetings. Orbach asked if Larkin was requesting to send a proxy, non-voting representative. Larkin indicated that representation was the issue not voting rights. Dr. Carl was concerned about the committees getting too large. Bisterfeld said that he welcomes technically qualified CAC's to help in the very difficult technical review process. Orbach asked if there should be a vote on this. Barrett said no, that the Program Coordinator is to inform the CAC members of the TC about meetings, when they are held, and that it appears from discussion that a proxy can sit in the meetings. He requested that the CAC's submit a list of subcommittees on which they want to participate.

J. Next Meeting

The next scheduled meeting is August 25th at 10:00 a.m. in Raleigh, N.C.

The meeting adjourned around 4:30 p.m.

Attachments

Attachment A

# AGENDA

## Albemarle-Pamlico Estuarine Study

## Technical Committee Meeting

Time: 10 a.m., May 25, 1988
Location: Third Floor Conference Room
Archdale Building, Raleigh

| | |
|---|---|
| 10:00 - 10:05 | Call to Order<br>Bruce Barrett/Ernie Carl |
| 10:05 - 10:15 | Consideration of Minutes |
| 10:15 - 10:30 | Director's Report<br>Bob Holman |
| 10:30 - 12:00 | Proposed Technical and Public Involvement Recommendations<br>Jim Turner and Mike Orbach |
| 12:00 - 1:00 | Lunch |
| 1:00 - 1:30 | Review Proposed Budget |
| 1:30 - 2:00 | Subcommittee Reports |
| 2:00 - 2:45 | Review of Priority Action Plans |
| 2:45 - 3:00 | Consideration of Citizen Advisory Committee Resolution |

Attachment B

# TAC/APES
# 5/25/88

| Name | Organization | Address | Phone |
|---|---|---|---|
| David Sides | Soil & Water | Raleigh | 733-2302 |
| John W. Slattery | | Windsor | 794-2183 |
| Ernie Larkin | | Greenville | 551-4485 |
| Tom Ellis | NC Dept. of Agriculture | Raleigh | 733-7125 |
| RICHARD HAMILTON | NC WILDLIFE RESOURCES | RAL | 3-3391 |
| James M. Stewart | Water Resources Research Inst | | 737-2815 |
| B J Copeland | UNC Sea Grant College | | 737-2454 |
| Jim Turner | USGS | | 556-4510 |
| Don Hoss | NMFS Beaufort | | 728-8746 |
| MIKE ORBACH | ECU/MSC GREENVILLE | | 757-6883 |
| Bill Hogarth | Div. Marine Fisheries - Morehead City, N.C. | | 726-7021 |
| David Owens | DCM-DNRCD | | 733-2293 |
| R. Paul Wilms | DEM-NRCD | | 733-7015 |
| Ted Bisterfield | EPA, Region IV | | 404/347-2126 |
| Bruce Barrett | " | | 404/347-4450 |
| Ernest Carl | NRCD | | 919/733-4984 |
| Robert Holmes | APES-NRCD | | 919/733-0314 |
| Marguerite Kluffy | SEI Data Systems Annapolis, MD | | 301/757-6660 |
| Karen Ludwig | NRCD/LRIS | | 919/733-2090 |
| Dunb Carter | CAC/Policy Committee | Raleigh | 919/833-4859 |
| Mike Gantt | FWS | | 919/856-4520 |
| Hank Johnson | N.C. DMF | | 919/338/8351 |
| Willard W. Cobb | U.S. Fish & Wildlife | Morehead City | 919 728 8781 |
| Tom Taylor | Wildlife Comm. | | 733-7123 |
| Terry Scholar | N.C. Marine Fisheries | | 946-6481 |
| Cecil W. Butler | USDA-SCS | | 790-2909 |

WADDELL WATTERS WILDLIFE FEDERATION of NC Raleigh 833-1923
Bern Holman CCNC/Sierra Club/NCWF
Raleigh 755-1329
Kathy Negus - APES
Dawson h. Parks ECU Greenville 752-4206

Attachment C
UNITED STATES GOVERNMENT

# memorandum

DATE: May 27, 1988

REPLY TO ATTN OF: Chairman, Technical Review Subcommittee--APES

SUBJECT: Technical Review Subcommittee Report--Recommendations for Ongoing Research, Concluding Research (with existing funding), and Proposed New Research, July 1, 1988 to June 30, 1989

TO: Project Director, APES

On March 24, 1988, the Subcommittee met and prepared a Request for Proposals (RFP) for continuing research on the Albemarle-Pamlico Estuarine Study (APES) for the period July 1, 1988 to June 30, 1989. The RFP was mailed to prospective researchers on April 1, 1988. Seventy-six proposals received by May 1 were distributed to reviewers. On May 19 and 20, the Technical Review Subcommittee met to review ongoing research and proposed new research. Fifteen ongoing projects were reviewed; 9 were recommended for continuation, including redirection of one to better support related research (Attachment I), and four projects were recommended for conclusion with present funding (Attachment II).

Of the new proposals, fifty were evaluated by the subcommittee; remaining proposals were referred to other subcommittees as appropriate for review. Nine proposals were recommended for funding consideration (Attachment III). The relative distribution of funding for ongoing and proposed new research in work plan categories, including water quality, resource critical areas, fisheries, and human environment is summarized in Attachment IV.

The overall quality of the proposals was fair; several were of good to high quality. The Subcommittee felt that the number of proposals and the overall quality of the proposals reviewed would have been better if more preparation time had been possible. For this reason, the Subcommittee is planning to begin formulation of next year's program later this summer. Input from other APES Committees will be solicited and considered.

The Subcommittee also will develop plans for monitoring progress on all ongoing research funded under APES.

James A. Turner

Attachments:
- I Continued Projects to be Funded
- II Projects to be Concluded with Present Funding
- III Proposed New Work
- IV Distribution of Funding

TECHNICAL REVIEW SUBCOMMITTEE

Continued Projects To Be Funded

| Area | No. | Topics | Cost | Researcher |
|---|---|---|---|---|
| Critical Area | 235 | Nursery Area Data | 3,720 | Noble/DMF |
| | 260 | Oyster Bed Success | 68,430 | Sutherland/Duke |
| | 274 | Hyde County Soil Survey | 10,000 | Soil Survey-SCS |
| Water Quality | 205 | Eutrophication & Algal Blooms | 52,416 | Paerl-UNC |
| | 206 | Offsite Effects of BMP | 87,000 | Bales-USGS |
| | 207 | Analysis Hydrologic & W.Q. Data | 30,000 | Bales-USGS |
| | 208 | Flow Patterns in Neuse & Pamlico | 120,000 | Bales-USGS |
| | 213 | Reduction of Nutrients From Swamps | 75,193 | Kuenzler-UNC |
| | 227 | Heavy Metal/Organic-Rich Mud Pollutants | 34,885 | Riggs-ECU |
| | (278) | Roanoke Striped Bass Egg-Larvae Monitoring | 20,130 | Rulifson-ECU |
| Fisheries | 236 | Fisheries Stock Assessment | | Phalen-DMF |
| Human Environment | (279) | Evaluation of Resource Protection Programs | 32,657 | Nichols-RTI |
| TOTAL | | | $534,431 | |

Other Comments

Water Quality
245, 249, 264 Alternative - Wetland Workshop
243 Land Use Mapping Needed but more proposals needed for comparison

Human Environment
229, 254 Management Plan for Currituck Sound needed but needs to be more specific in scope

TECHNICAL REVIEW SUBCOMMITTEE

Projects To Be Concluded With Present Funding

| Area | No. | Topics | Cost | Researcher |
|---|---|---|---|---|
| Critical Area | 216 | Distribution of Submerged Aquatics | 41,063 | Davis-ECU |
| | 238 | Aerial Survey of Submerged Aquatics | 136,454 | Ferguson-NOAA |
| Fisheries | 239 | Excluder Device Testing | 62,861 | Pearce-Private |
| | 251 | Obstruction to Fish Migration | 18,985 | Collier-FWS |
| TOTAL | | | $259,363 | |

## PROPOSED NEW WORK

| | | | | |
|---|---|---|---|---|
| **Critical Areas** | | | | |
| 270 | Larval Fish/Roanoke & Albemarle | $ 38,300 | Rulifson-ECU | 4.00 |
| 203 | Inventory/Natural Areas | 59,500 | ROE-NRCD | 3.63 |
| **Fisheries** | | | | |
| 250 | Shell Disease/Blue Crab | 64,420 | NOGA-NCSU | 3.75 |
| 272 | Losses of Bay Scallops | 32,000 | Peterson-UNC | 3.43 |
| *218 | Microbiological Indicators | 117,028 | Sobsey-UNC | 3.29 |
| **Water Quality** | | | | |
| 242 | Managing Multiple Uses | 53,301 | Clark-NCSU | 4.14 |
| 232 | Coupling Study of Sands (2 yrs) | 62,624 | Pietrafesa-NCSU | 4.14 |
| 256 | Water Management vs Water Quality | 66,179 | Skaggs-NCSU | 4.00 |
| *233 | Circulation Model (2 yrs) | 66,364 | Janowitz | 3.14 |
| | Total | $559,716 | | |
| | Available | $380,000 | | |
| | Less * items ($183,392 ) | $376,324 | | |

Technical Review Subcommittee

Ted Bisterfeld - EPA
B. J. Copeland - Sea Grant - NC State University
Jim Stewart - WRRI
Tom Ellis - NC Dept Agriculture
Bill Hogarth- Div. of Marine Fisheries, NRCD
David Owens - Coastal Resources, NRCD
Jim Turner - US Geological Survey
Bob Holman - NRCD

## DISTRIBUTION OF FUNDING

| Work Plan Category | Target % | FY 89 % | Continuing | Proposed New | Total |
|---|---|---|---|---|---|
| Water Quality | 40 | 63 | $399,494 | $182,104 | $581,598 |
| Resource Critical Area | 25 | 19 | 78,430 | 97,800 | 176,230 |
| Fisheries | 20 | 15 | 41,550 | 96,420 | 137,970 |
| Human Environment | 15 | 4 | 32,657 | -- | 32,657 |
| | | | $552,131 | $376,324 | $928,455 |

State of North Carolina
Department of Natural Resources and Community Development
512 North Salisbury Street • Raleigh, North Carolina 27611

James G. Martin, Governor S. Thomas Rhodes, Secretary

ALBEMARLE-PAMLICO ESTUARINE STUDY

MEMORANDUM

TO: APES Technical Committee

FROM: Citizens' Affairs Subcommittee
Mike Orbach, Chair

SUBJECT: Administrative Recommendations

DATE: May 25, 1988

The following recommendations were developed by the Citizens' Affairs Subcommittee and approved by both Citizens' Affairs Committees:

1) DEDICATED ADMINISTRATIVE BUDGET FOR THE PUBLIC PARTICIPATION PROGRAM

Background

The receiving and dissemination of information and the education and involvement of the public must be integral parts of the Albemarle-Pamlico Estuarine Study if it is to succeed in its objectives of effective management of the estuarine waters. Recognition of this has resulted in the addition of a Public Participation Coordinator to the APES staff.

The coordinator's position has been actively filled since November 14, 1987. The responsibilities and duties of the position are varied, with particular emphasis on written and verbal communication and public relations. Formulation of an APES newsletter, attendance at and coordination of citizens' advisory and subcommittee meetings, responsiveness to public inquiry, and dissemination of program knowledge and information are component parts of the job.

As time passes, program momentum is gained and the constraints posed by undedicated clerical support multiply.

Research, preparation, and mailing of information has been with small exception, the purview of the Public Participation Coordinator.

Requests

Based upon the above, it is requested that a half-time dedicated clerical position be funded to assist with paperwork, thereby freeing the coordinator's time for other responsibilities.

In addition, request is made for the purchase of a camera, tape recorder, and computer/printer/software packages with desktop publishing capabilities. The preparation of the APES newsletter, a direct responsibility of the Public Participation Coordinator, would greatly benefit from such acquisitions. The availability of this equipment would enhance brochure, pamphlet, booklet, and direct mailing endeavors as the program grows. It would substantially reduce reliance upon the NRCD copy machine, which is shared by 63 employees. Over time, the equipment would pay for itself. Recommendations of units are available upon request.

Lastly, request is made for permission to establish a fund of money to be used by the citizens' advisory committees. The chairs of both the Albemarle and the Pamlico groups would submit proposals describing the kinds of expenditures envisioned and details supporting such funding.

Budget

| | |
|---|---|
| Half-time clerical support (salary + fringes) | $ 8,400 |
| Computer/printer/software | 8,000 |
| Camera | 225 |
| Tape recorder | 100 |
| Citizens' Advisory Committee funds ($10,000 ea) | 20,000 |
| Newsletter publication | 13,000 |
| | $49,725 |

It is recommended that these funds be taken from the program administrative portion of the budget.

2) REPRESENTATION OF THE CITIZENS' ADVISORY COMMITTEES ON TECHNICAL COMMITTEE SUBCOMMITTEES

We recommend that a seat on each subcommittee of the Technical Committee be established for a representative from each CAC.

MO:kn

State of North Carolina
Department of Natural Resources and Community Development
512 North Salisbury Street • Raleigh, North Carolina 27611

James G. Martin, Governor

S. Thomas Rhodes, Secretary

ALBEMARLE-PAMLICO ESTUARINE STUDY

MEMORANDUM

TO: APES Technical Committee

FROM: Citizens' Affairs Subcommittee
Mike Orbach, Chair

SUBJECT: Recommendations for Funding of Public Participation Proposals for 1988

DATE: May 25, 1988

The following are public participation proposals recommended for the 1988-89 funding cycle by the Citizens' Affairs Subcommittee.

These recommendations are based on outside reviews of each proposal and the advice of the Albemarle and Pamlico Citizens' Advisory Committees. There was a high degree of consensus concerning funding recommendations between the two CAC's with which our committee concurred.

Several of these proposals will require negotiations to either take into account reviewers' comments or to negotiate appropriate funding levels. We believe that these can be addressed in the normal contracting process.

| No. | Title/Proposal | Dollars | Recommendations |
|---|---|---|---|
| 209 | Striped Bass | $39,500 | $18,000 |
| 224 | PTRF Guide to Streams | 13,140 | 20,140 |
| 225 | PTRF Community Outreach | 25,540 | 18,540 |
| 226 | PTRF Calendar | 14,550 | 14,550 |
| 240 | Carson/Teacher Env. Educator | 13,293 | 13,293 |
| ~~226~~ 266 | Willard/State of Estuary TV | 30,275 | 30,275 |
| | | | $114,798 |

# APES 1988-89 BUDGET

| | | |
|---|---|---|
| $ | 700,000 | EPA FY 1988-89 Funds |
| | 225,000 | EPA FY 1987 Supplemental Funds |
| | 500,000 | State of North Carolina Funds |
| $ | 1,425,000 | Total |
| | (400,000) | EPA FY 1988 Possible Supplemental Funds (Monitoring Effort) |
| | (400,000) | EPA FY 1988 Possible Early Implementation Funds |
| *$ | 800,000 | Total Possible Extra Funds |

(Due to 75%/25% State Match APES can only utilize $575,000 of extra EPA Matching Funds)

*Maximum Budget Could Be $2,000,000

| Budget Breakdown | | | % |
|---|---|---|---|
| Administration | 250,000 | | 17.5 |
| Information Management | 164,000 | | 11.5 |
| Public Participation | 150,000 | | 10.5 |
| Technical Information Acquisition | 861,000 | (Ongoing - 534,431 New Projects - 326,569) | 60.5 |
| Total | $1,425,000 | | 100.0 |

ALBEMARLE-PAMLICO ESTUARINE STUDY
BUDGET: FY 1988-89

I. ADMINISTRATION

| | | | | |
|---|---|---|---|---|
| A. | Personnel | | | |
| 1. | Project Director | (4.5% Cost of | | 45,458 |
| 2. | Clerk/Steno IV | Living Above | | 22,240 |
| 3. | Public Involve. Coordinator | 1987 Wages) | | 27,588 |
| 4. | Data Mgmt. Coordinator | | | 28,000 |
| *5. | Part-time Secretaries (2) | | | 15,000 |
| | | | Total | 138,786 |
| B. | Fringe Benefits | | | |
| 1. | 18.75 of Wages & Hospitalization | | | 26,022 |
| 2. | Longevity Bonus for Project Director and Clerk/Steno IV | | | 1,000 |
| | | | Total | 27,022 |
| C. | Travel | | | |
| 1. | Project Director/Staff | | | 8,000 |
| 2. | Non-State Personnel | | | 2,000 |
| 3. | Emergency Travel Fund | | | 2,000 |
| | | | Total | 12,000 |
| D. | Equipment | | | |
| 1. | Computer Software | | | 1,500 |
| 2. | Projectors (2), Slide Screens (2) | | | 1,000 |
| 3. | Books/Publications | | | 1,000 |
| 4. | Camera/Tape Recorder | | | 400 |
| 5. | Folding Table | | | 100 |
| | | | Total | 4,000 |
| E. | Office Supplies/Film | | Total | 3,000 |
| F. | Contracted Services | | | |
| 1. | M. Duffy (Meeting Coordination/Tech Support) | | | 19,300 |
| *2. | Newsletter (published) | | | 12,000 |
| *3. | Reserve for Contract Work | | | 15,000 |
| | | | Total | 46,300 |
| G. | Other | | | |
| 1. | Advertising | | | 500 |
| 2. | Telephone | | | 2,000 |
| 3. | Postage | | | 2,500 |
| *4. | Printing | | | 9,000 |
| 5. | Photocopying | | | 2,000 |
| 6. | Express Freight | | | 500 |
| 7. | Room Rental | | | 500 |
| 8. | Data Processing Service | | | 500 |
| 9. | Other Services | | | 1,000 |
| | | | Total | 18,500 |
| | | | Grand Total | $249,608 |

II. DATA MANAGEMENT

| | | |
|---|---|---|
| A. | Hardware | 30,000 |
| | The costs to continue payments for financing the computer system upgrade that was required to support APES data management activities. | |
| B. | Software | 10,000 |
| | Contingency funds to pay for additional software if needed by APES. | |
| C. | Maintenance | 22,000 |
| | The costs for maintenance contracts on hardware and software purchased for APES. | |
| D. | Communications Fixed Costs | 20,000 |
| | The costs of installing hardware and software to place the LRIS system on an established network; and the fixed fees associated with a network. | |
| E. | Communications Variable Costs | 20,000 |
| | The costs of using a data communications network. Costs will vary according to usage level. | |
| | (Items E & F are awaiting completion of the data needs study and the user requirements study) | |
| F. | Design/Programming | 10,000 |
| | Costs associated with refining the design of the APES data base and for refining the design of the "front end" software. The major design/programming expenses will be handled with FY '87 funds. | |
| G. | Data Entry and Analysis | 50,000 |
| | LRIS charges for entering and analyzing data. | |
| H. | Supplies | 2,000 |
| | Miscellaneous supplies, e.g., maps, mylar, data tapes (VA. 100K's), etc. | |
| | Grand Total | $164,000 |

# BASELINE MONITORING PROGRAM
# ALBEMARLE-PAMLICO ESTUARINE STUDY

As part of the negotiated designation agreement between the U.S. Environmental Protection Agency and the Albemarle-Pamlico Estuarine Study, a milestone of March, 1988, was identified for a final baseline monitoring plan to be completed. This program is anticipated to be implemented beginning in July, 1988. The following plan resulted from the combined expertise of appropriate state and federal agency staff (US EPA, USGS, NOAA, NC APES, NC DEM, and NC DMF), and represents a comprehensive baseline program. The component parts are carefully tailored in response to EPA guidance to:

- construct a comprehensive baseline dataset to characterize the water quality, sediment and biological resources of the Albemarle-Pamlico system;
- evaluate the inherent spatial and temporal heterogeneity in this system for parameters of concern and to allow adequate evaluation of temporal trends in historical and APES-generaged datasets;
- provide ground-truth and calibration to remotely sensed water quality datasets to be used to validate land use/land cover-driven watershed models and to understand large-scale hydrologic phenomena; and
- be used to develop by November, 1992, a continuing monitoring program which is intended to evaluate the long-term status of this important estuarine system, and measure success of management strategies:

This baseline monitoring program is being designed at the specific request of EPA, in response to the Office of Marine and Estuarine Protection's interpretation of Clean Water Bill requirements. Additional supplemental funds are requested to help activate this program. Considerable cost-sharing by program collaborators (especially UGGS) has been included to maximize the return from this effort.

## PROGRAM COMPONENTS

The comprehensive baseline monitoring plan has five principal components:

- continuous monitors for specific parameters sited at locations of known importance or risk;
- basinwide synoptic water quality studies with emphasis on open water areas previously poorly evaluated;
- survey of sediment and fish tissue toxicants;
- expansion in time and space of the existing ambient water quality monitoring network, especially into open water areas;
- initial implementation of a citizen's monitoring program.

Each component is critical to the adequate characterization of the dynamic parameters of greatest concern in this system.

Synoptic Water Quality Studies

While the amount of water quality data available from the Albemarle-Pamlico system is large, relatively little is available from the open water areas of the system. Little is known about spatial heterogeneity in water quality parameters throughout the basin. The staff working group strongly recommends conducting at least one synoptic study of all portions of the system to characterize baseline variability. Forty continuous sampling points is inadequate to address spatial variability. Without adequate information on spatial variability, no time series data (historical or APES generaged) can be properly analyzed or understood. Such data will also be instrumental in the selection of continuous monitoring locations as well as the expanded ambient monitoring program.

A secondary benefit is the calibration of remotely sensed water quality data, both NOAA AVHRR satellite images and Landsat TM images. It will also allow 30m resolution for certain water quality parameters (temperature, suspended sediment, algal pigments and probably salinity), but must be calibrated by real-time "ground truth" verification data. The proposed synoptic study will be scheduled to coincide with the satellite imagery in order to accomplish both goals. We expect to use continuous monitor data to cue the synoptic study, to guarantee that representative seasonal conditions exist.

Consultation with the Division of Environmental Management personnel who conducted similar limited studies on the Chowan/Albemarle and on the Neuse suggest that the cost for a one-day, systemwide synoptic water quality survey will run approximately $80,000. More than one survey should be scheduled, to demonstrate that the chosen sampling time is not in someway unique, to account for seasonal variability and to provide a safety factor should conditions preclude effective satellite imaging. However, to keep this request to target levels only one study is proposed: other study funds will be used to repeat the process later, as such funds become available.

Synoptic Water Quality Studies
Parametric Coverage

Coverage details will be discussed between agencies and researchers but are likely to include:

| | | |
|---|---|---|
| Dissolved Oxygen | Total Organic Carbon | Sulfide |
| Temperature | Turbidity | $NH_3$ as N |
| pH | Chloride | TKN as N |
| Conductivity | Chlorophyll a Tri | $NO_2 + NO_3$ |
| Salinity | Chlorophyll a Corr | P Total |
| Residue Total | Pheophytin a | $PO_4$ |
| Residue Suspended | Sulfate | Metals |

Total Cost: $80,000.

Continuous Monitors

Albemarle-Pamlico Estuarine Study has already funded initial flow evaluations in the Pamlico and Neuse River tributaries, being conducted collaboratively with USGS. This work includes twelve continuous tide gauging stations and twelve additional water quality stations (see attached map). These water quality stations originally were intended to measure only temperature and conductivity at various depths also allowing salinity evaluations. However, these stations provide a useful opportunity to add additional instrumentation at relatively low cost and monitor additional water quality parameters as well.

The rationale behind a system of continuous water quality monitors is linked to the dynamic nature of the significant problems in this system. The major parameters of concern at this time are nutrient concentration, dissolved oxygen, algal pigment concentration (chlorophyll a), suspended sediment concentration and salinity. Many of these, but particularly salinity and dissolved oxygen, vary significantly within a short period of time and space. Other existing systematic monitoring programs may miss these fluctuations in both time and space. Similarly, vertical stratification changes are often missed by single depth or even top and bottom sampling -- changes in the depth of the anoxia zone can go completely undetected (e.g. the Chesapeake anoxia work).

Furthermore, a real-time capability is needed in this system to allow cueing of emergency response and synoptic studies. Long delays in data availability can be avoided by the use of data collection platforms (DCPs) on a portion of the stations. DCPs have the further advantage that data is continually available from the receiving computer in Columbia, S.C., already processed, to any researcher or program person with an interest.

The minimum number of continuous monitoring units required for such a network in this complex system is forty. This number is composed of 12 existing stations in the Pamlico and Neuse Rivers (USGS), 3 additional in the Pamlico (northshore and farther east of the existing station), 2 additional in the Neuse (Street's Ferry Bridge and eastward of existing stations), 12 stations in the Chowan, Albemarle Sound, Alligator River and Currituck Sound), one each in Croatan and Roanoke Sounds, 6 in outer Pamlico Sound and Core Sound, and three in the Pungo River.

Each station will be equipped to measure dissolved oxygen at four depths, temperature at two depths and conductivity at two depths. Half of the stations will be equipped with DCPs; the remainder will be read by punch tape at USGS. Because of availability, cost efficiency and maintenance benefits, we will rent equipment from USGS. Rental fees of approximately $80/unit and $80/DCP include all maintenance and replacement costs.

Each of the existing USGS stations will require only an additional unit with four channels to accommodate dissolved oxygen measurements.

The total cost of this equipment rental is as follows:

| | | |
|---|---|---|
| 12 stations with one added unit @ $80/month | = | $ 960/month |
| 28 stations with two added units @ $160/month | = | $ 4480/month |
| 20 stations with DCPs @ $80/month | = | $ 1600/month |

~~$7140~~/month X 12 months = $84,480/year

$7040/month

$7040/month

The USGS costshare for installation, replacement service, manual reading of half of the stations, data processing, etc. will run approximately $6000 for installation and maintenance for 28 additional stations plus $2000/station for 12 previously funded stations for a total of $192,000.

The total cost of the development and implementation of the expanded continuous monitoring system then is $276,480, of which the EPA share is $138,240.

Fish Tissue and Sediment Surveys

Sediment contaminant concentration lacks documentation. Preliminary evidence suggests that "hotspots" exist, yet their locations are poorly defined. Furthermore, experienced staff members believe that strong differences in physical composition of the sediment (even across relatively short distances like the north and south shores of the Pamlico River) may be partly responsible for differences in frequency of anoxia events in those areas. Subsequent work on sediment oxygen demand will prove necessary to characterize the system mechanics.

Occasional spot surveys of fish and shellfish tissue and sediment contaminants have been conducted in the past, yet no baseline evaluation has ever been conducted. DEM staff feels very strongly that fish tissues and sediments best reflect this total loadings of substances, and may integrate variable water concentrations over both time and space. Preliminary data from upstream tributaries shows some surprisingly high concentrations of pesticides.

This work will couple nicely with current work being conducted in liaison with APES by FWS on a baseline contaminants study of the Albemarle-Pamlico Peninsula and the counties north of Albemarle Sound (fish, reptiles, birds). Biological monitoring staff believe fish tissue work can be done for about $2000/site. Careful scrutiny of water quality station locations and previous tissue programs suggest that 20 sampling locations will be adequate for first-order characterizational work. The total cost of tissue studies, then, is about 20 X $2000/site = $40,000, sediment oxygen demand $30,000 and sediment evaluation $40,000 for a total of $110,000.

Fish/Shellfish Tissue and Sediment Surveys
Parametric Coverage

Parametric coverage details will be discussed between agencies and researchers but are likely to include:

- Aldrin
- Dieldrin
- Chlordane:
  - cis-Chlordane
  - trans-Chlordane
  - cis-Nonachlor
- p,p'-DDE
- p,p'-DDD
- p,p'-DDT
- Endrin
- Heptachlor
- Heptachlor Epoxide

| | |
|---|---|
| trans Nonachlor | PCB,total: |
| oxychlordane | Toxaphene |
| alpa chlordene | Kepone |
| beta chlordene | Mirex |
| gamma chlordene | 2,4-D |
| chlordene | Cadmium |
| Arsenic | Chromium |
| Mercury | Lead |
| Aluminum | Nickel |
| Copper | TOC |
| Iron | |

Expanded Ambient Water Quality Network

The existing ambient water quality monitoring network maintained by DEM is sparse in the study region, especially the open water. In most cases former ambient stations exist, but the State of North Carolina has been unable to maintain these sites because of lack of resources. The working groups determined that a significant advantage could be gained by reestablishing a portion of the former stations to allow more complete characterization of conditions in the A.P.E.S. area on an ongoing basis. The existence of historical data from particular stations will be one criterion in the selection of stations for reactivation. Previous transect-arranged sampling in Albemarle Sound and the Neuse River has been exceedingly valuable. New stations will probably be transect arranged, in the areas of highest concern, to correspond with continuous monitoring stations. This arrangement would maximize data utility. The recommended expansion is 60 additional sites, mostly concentrated in the Pamlico River, Neuse River and Albemarle Sound. (Approximately five sites would be located on each of four transects in each of the three basins). A two member water quality monitoring team could operate those transects and have the samples analyzed for approximately $180,000 per year.

Expanded Ambient Water Quality Network
Frequency and Parametric Coverage

Parametric coverage details will be discussed between agencies and researchers but are likely to include:

| | | |
|---|---|---|
| Dissolved Oxygen | Total Organic Carbon | Sulfide |
| Temperature | Turbidity | $NH_3$ as N |
| pH | Chloride | TKN as N |
| Conductivity | Chlorophyll a Tri | $NO_2 + NO_3$ |
| Salinity | Chlorophyll a Corr | P total |
| Residue Total | Pheophytin a | PO4 |
| Residue Suspended | Sulfate | Selected metals |

Frequency coverage detail will be discussed between agencies and researchers but are likely to include sampling twice per month during the months of May, June, July, August, September and once per month during the months of October, November, December, January, February, March, April.

Algal Growth Potential Tests

Excessive growth of phytoplankton within estuarine waters is an ongoing and realistic concern. While moderate levels of primary productivity benefit the health of the aquatic ecosystem, rapid growth by single or few species of phytoplankton can be very detrimental. Highly productive situations are created by excessive nutrient concentrations due to anthropogenic inputs. Economically feasible decisions on nutrient control are enhanced with information concerning the source of nutrients. The proportion of those nutrients that are available to phytoplankton growth, and what reductions would be necessary to limit algal growth. These questions will undoubtedly arise and require answers during the course of the program.

The Algal growth potential test (AGPT) has been utilized by federal and state agencies to determine the potential of waters to support unwanted levels of phytoplankton. To culture test species under optimal growth conditions utilizing waters entering and present in a system can provide important comparative data. These data can be used to determine the algal growth potential of the receiving waters, the amount of bioavailable nutrients within the water samples, the nutrient or nutrients most likely to limit excessive growth, and reductions necessary to limit growth potential.

Inclusion of AGPT work in the expanded ambient monitoring within the APES region would provide useful information in comparing chemically measured nutrient concentrations to actual growth rates of test organisms from the same water samples. These data also may be compared to actual standing crops of phytoplankton (Biovolume and Density) in the surface waters at the time of sampling. The most important function of the test would be to provide a quantitative estimate of present growth potential, and estimates of reductions necessary to reduce that potential.

The initial cost of conduct AGPT is $70,000.

Therefore the total cost for the expanded Ambient is $250,000.

Citizens Monitoring Program

An additional function which could prove useful to the baseline program is the establishment of a citizen's monitoring program. Citizens who are involved with activities on or near these waters can provide important information on a day-to-day basis. Information such as weather observations, climatic events, and other less complicated water quality analysis will add to the database to allow a more comprehensive understanding of the system. It is recommended that the scope of this portion of the plan be referred and directed by the citizens committee and an amount of $50,000 be provided for this component of the study.

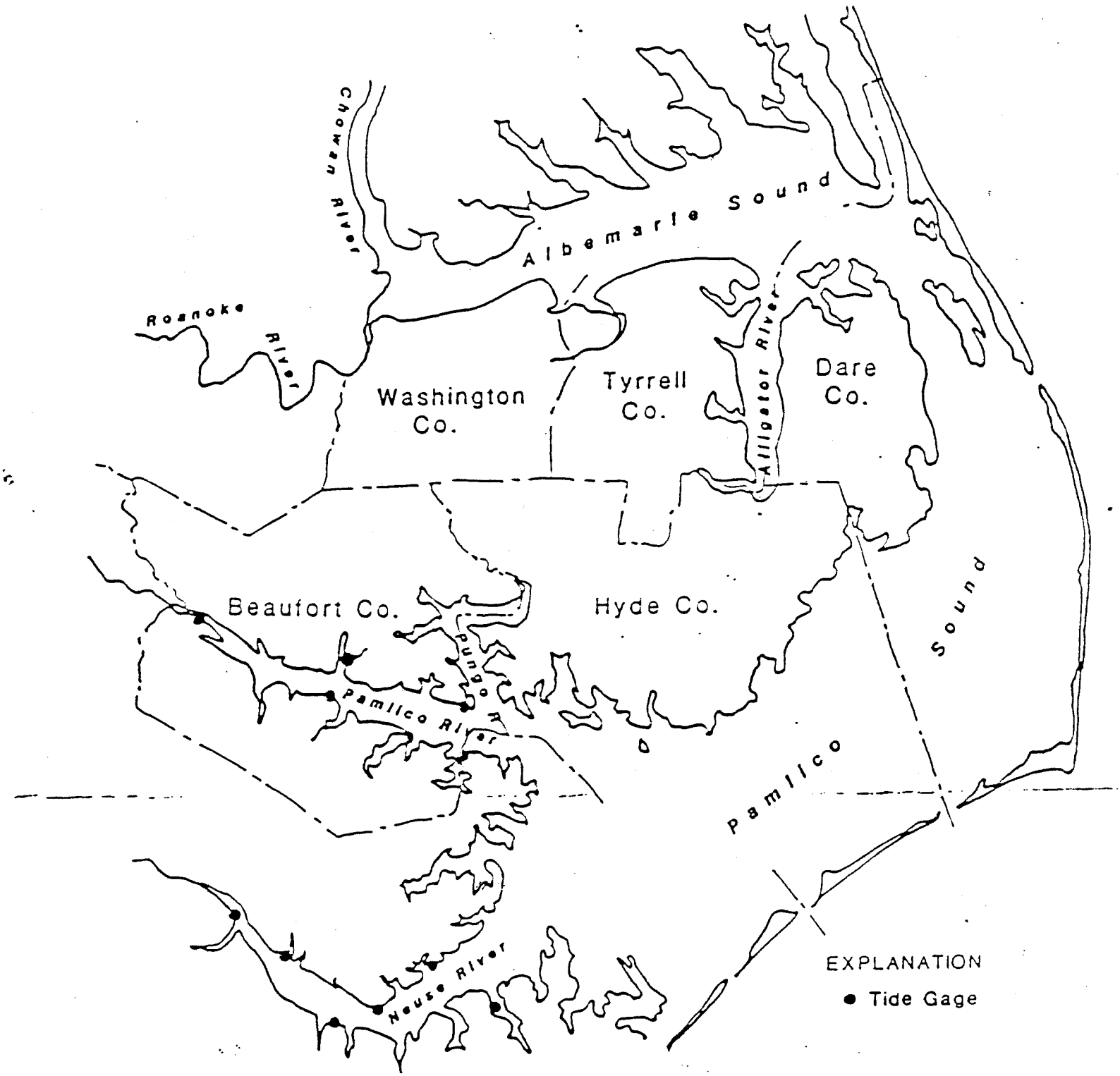
Total Costs

| | |
|---|---|
| Synoptic Water Quality Studies | $ 80,000 |
| Continuous Monitoring Network | 276,480 |
| Fish Tissue and Sediment Surveys | 110,000 |
| Expanded Ambient Water Quality Network | 250,000 |
| Citizens Monitoring Program | 50,000 |
| Total | $686,560 |

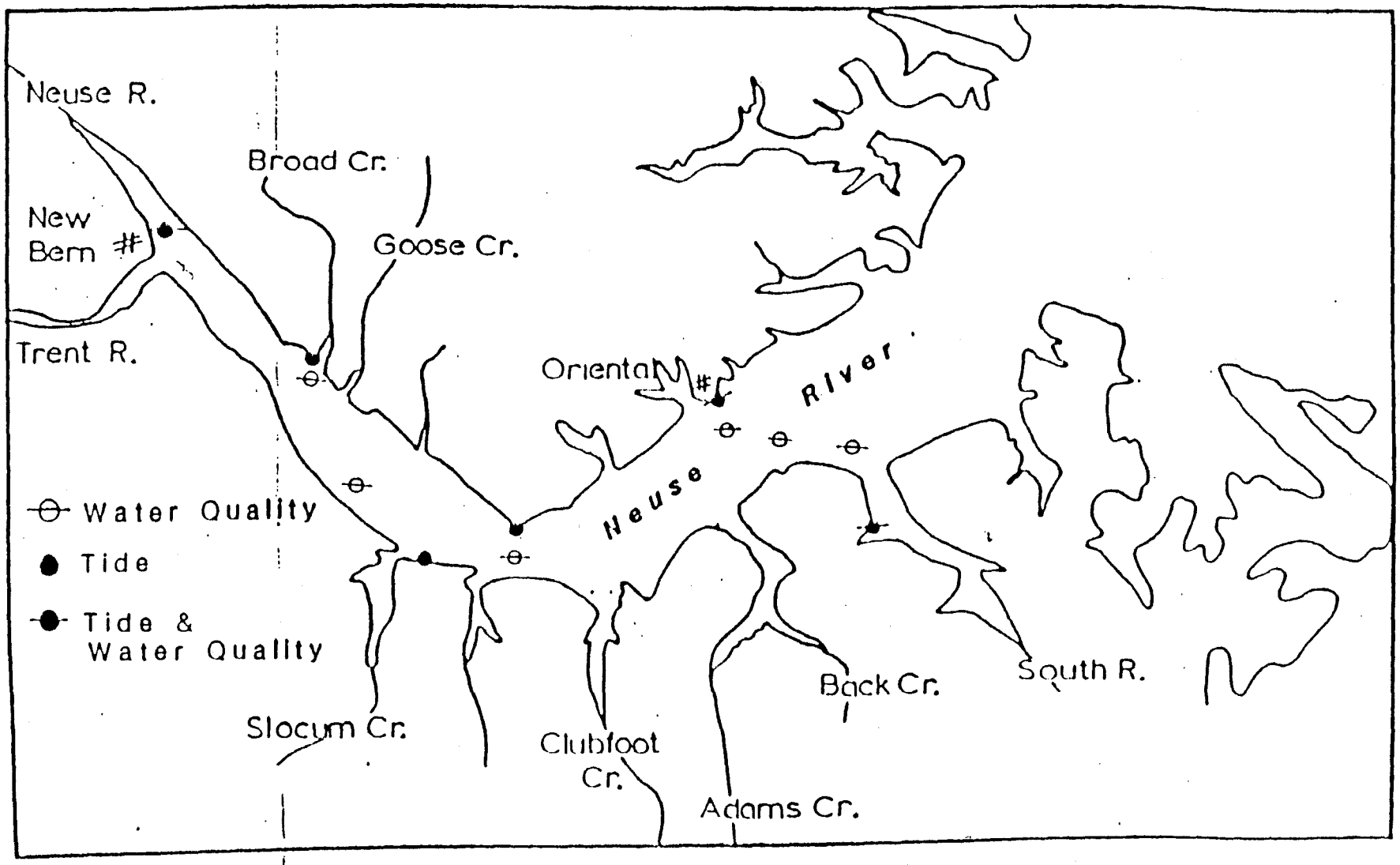
# Albemarle-Pamlico Peninsula

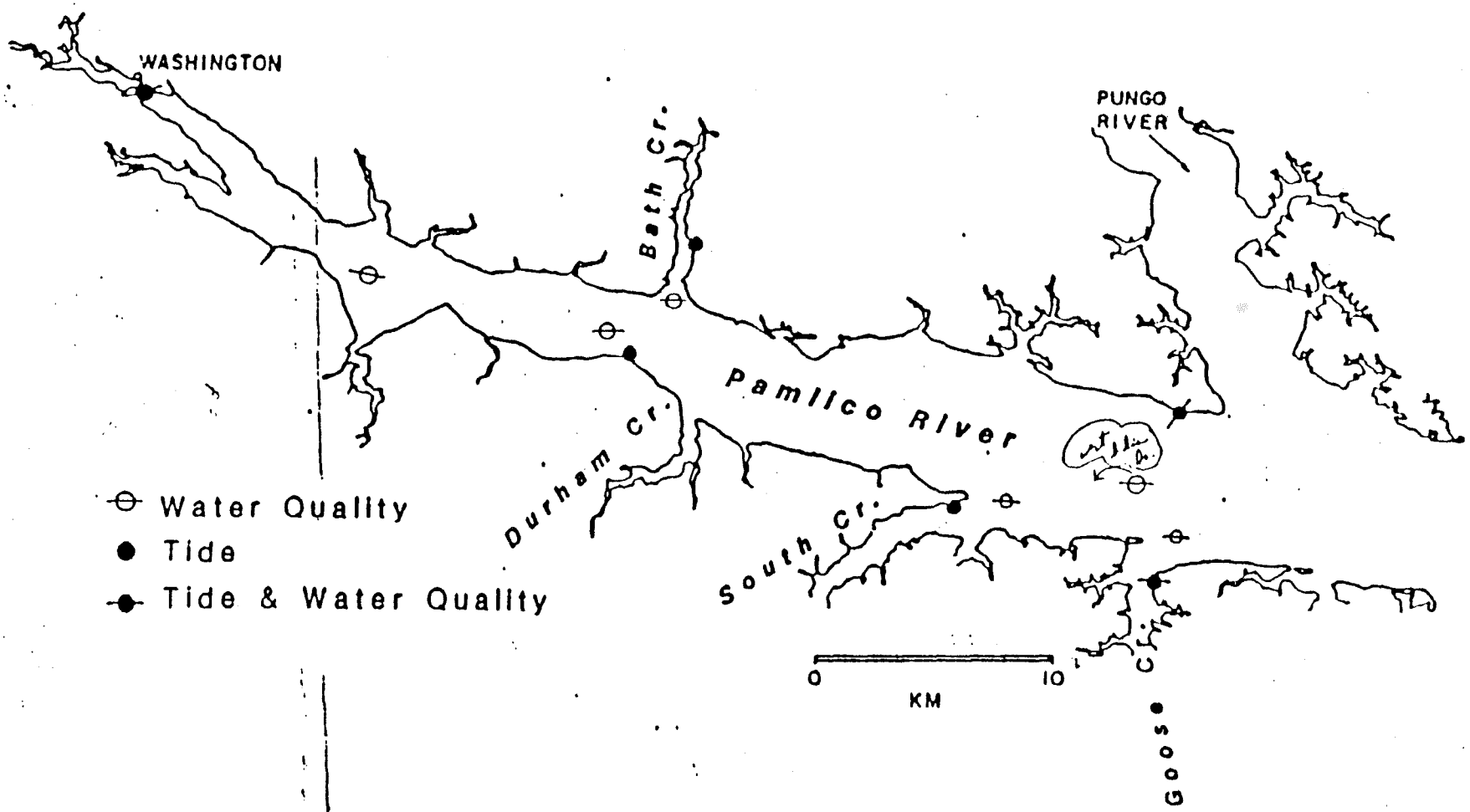
Pamlico and Neuse River Tide Gage Locations

Agricultural-Drainage Study Sites



## Neuse River Estuary Tide and Water Quality Stations






Pamlico River Estuary Tide and Water Quality Stations

# PRIMARY NURSERY AREA PROTECTION

Where: The lowlands of Hyde County possess some of the nation's most precious resources; Lake Mattamuskeet National Wildlife Refuge, highly productive farm and forest lands, and the invaluable primary nursery areas of the estuarine system. The close contact and interrelationship of these resources often result in conflict. Waupoppin Canal is a prime location for demonstrating large scale water management.

Why: Water, in terms of both quantity and quality, is the determining factor in these systems. Water management in Lake Mattamuskeet is essential for preserving it as a freshwater system manageable for waterfowl and other resources. The protection of certain salinity regimes in the estuarine waters is vital for the production of fin and shellfish.

Four large canals control the discharge of water from the lake and tens of thousands of acres of adjacent farmland. These empty into highly productive estuarine nursery areas. This proposal is to provide water management on one of these canals to demonstrate a means of protecting the resources of the area. The goals of this project are to implement on Waupoppin Canal, practices which will:

1. Protect the integrity of the freshwater system of the Lake Mattamuskeet National Wildlife Refuge from saltwater intrusion.
2. Reduce the pollutant loading of the estuarines from non-point sources.
3. Eliminate the freshwater flushing effect on the estuarine nurseries from unregulated drainage canals; and
4. Demonstrate water management techniques which are applicable in many of the Southeastern States for resource protection and enhancement.

What: To achieve these goals, tidegates will be installed on Waupoppin canal. Water management structures including flashboard risers will be utilized as needed in the major and tributary canals. The installation of a systems approach to water management will control the rate and timing of freshwater discharges as well as protect from saltwater intrusion.

Who: The following agencies have been contacted and have expressed interest in the further development of this concept.

Hyde County Soil and Water District Supervisors
NC Division of Soil and Water Conservation
USDA - Soil Conservation Service
NC Division of Marine Fisheries
UNC Sea Grant
NC Department of Agriculture

How: This will be an interagency cooperative effort relying on local sponsorship by the Hyde County Soil and Water Conservation District Supervisors. Construction should be complete within two years. Monitoring will include flows, nutrients and biological stations. The estimated cost is $200,000.

# LAKE MATTAMUSKETT - HYDE COUNTY WATER MANAGEMENT

The lowlands of Hyde County possess some of the nation's most precious resources; Lake Mattamuskeet National Wildlife Refuge, highly productive farm and forest lands, and the invaluable primary nursery areas of the estuarine system. The close contact and interrelationship of these resources often result in conflict.

Water, in terms of both quantity and quality, is the determining factor in these systems. Water management in Lake Mattamuskeet is essential for preserving it as a freshwater system manageable for waterfowl and other resources. The protection of certain salinity regimes in the estuarine waters is vital for the production of fin and shellfish. Agriculture relies on water for production but faces flooding by excessive rainfall and the potential for destroying the productive potential of the land from salt water intrusion.

Four large canals control the discharge of water from the lake and tens of thousands of acres of adjacent farmland. These empty into highly productive estuarine nursery areas. This proposal is to provide water management on these canals to protect the resources of the area. The goals of this project are to:

1. Protect the integrity of the freshwater system of the Lake Mattamuskeet National Wildlife Refuge from saltwater intrusion.
2. Eliminate saltwater intrusion onto crop land from wind tides and the backing of brackish waters into canals during periods of reduced freshwater flows.
3. Reduce the pollutant loading of the estuarines from non-point sources.
4. Eliminate the freshwater flushing effect on the estuarine nurseries from unregulated drainage canals; and
5. Demonstrate water management techniques which are applicable in many of the Southeastern States for resource protection and enhancement.

To achieve these goals, tidegates will be installed on the four major canals. Water management structures including flashboard risers will be utilized as needed in the major and tributary canals. The installation of a systems approach to water management will control the rate and timing of freshwater discharges as well as protect from saltwater intrusion.

Benefits to farming, fisheries, forestry and wildlife are anticipated upon completion. The cost of adequately addressing this opportunity is estimated to be $500,000.

The following agencies have been contacted and have expressed interest in the further development of this concept.

Hyde County Soil and Water District Supervisors
NC Division of Soil and Water Conservation
USDA - Soil Conservation Service
NC Division of Marine Fisheries
UNC Sea Grant
NC Department of Agriculture

The US Fish and Wildlife Service has been unavailable for comment thusfar.

# MERCHANTS MILLPOND STATE PARK: INSTALLATION OF AGRICULTURAL BEST MANAGEMENT PRACTICES (BMPs)

**WHY:** Merchants Millpond is a state park in northeastern North Carolina in the Albemarle - Pamlico Estuarine area (APES). The park receives heavy recreational use throughout the year. In the past several years, excessive aquatic macrophytes have severely impaired fishing and canoeing. The millpond receives excessive nutrients from agricultural land use. The millpond drains to the Chowan River whose watershed has been declared Nutrient Sensitive Waters by North Carolina and is proposed for a similar designation by Virginia. The millpond's watershed has also been nominated as a targeted nonpoint source watershed for the state nonpoint source (Section 319) program. North Carolina has an active Agricultural Cost Share Program which provides matching funds for voluntary installation and maintenance of agricultural BMPs - some work has been done in the watershed but funds are limited. This project would greatly expand the ongoing effort to control agricultural nutrients in the watershed. A total of $500,000 is requested over three years. An existing master plan for the park and other state and federal reports for the area (including the "Governor's Coastal Water Management Task Force Final Report [1982]") will be used for the management plan.

**WHO:** The Gates County Soil and Water Conservation District, local U.S. Soil Conservation Service and N.C. Divisions of Environmental Management (DEM), Soil and Water Conservation and Parks and Recreation would hire one person to administer the program and then use funds to install agricultural BMPs at suitable locations. A steering committee of APES and the above named agencies would oversee the program.

**WHAT:** The specific environmental objective is to reduce the loss of nutrients from agricultural fields and animal operations in the watershed. DEM plans intensive monitoring of nutrients, macrophytes and phytoplankton in the pond this spring. These data can be used to measure the success of the project. Also, the number (or acreage) of agricultural BMPs which are installed in the watershed will be readily determined.

**WHERE:** The project will be carried out throughout the watershed (about 79 square miles) at strategic locations determined to be important in terms of nutrient loss.

**WHEN:** After project approval, the project administrator will determine locations for BMP installation and then allocate appropriate funds. The State Ag Cost Share Program operates under a 75:25 cost sharing; the same ratio would be utilized. The entire process should take no more than 3 years. DEM will monitor the millpond.

**HOW:** The project coordinator will establish contacts with relevant government agencies (local, State and Federal), identify which agricultural BMPs are needed for individual sites, contact specific individuals and oversee the installation of the BMPs.

# CONTAMINATION OF SHELLFISHING AREAS BY FAILING SEPTIC TANKS:A SITE CLEANUP

**WHY:** A large number of estuarine areas are closed for shellfishing along Pamlico Sound due to failing septic tanks (or the lack thereof) in small coastal communities. These areas are usually small, poor fishing villages on wet, low-lying sites. For example, in the village of Stumpy Point (pop. 291), many of the homes have straight pipes which lead to a canal parallel to Stumpy Point Bay (closed for shellfishing). This project would select a small, coastal village with this problem and install either: 1) a community septic system or land application system, or 2) renovate or install septic systems for single family homes. This problem is discussed in the "Governor's Coastal Water Management Task Force (1982)" and in various Sanitary Survey reports done by the N.C. Shellfish Sanitation Branch.

**WHO:** The APES program would work with the N.C. Divisions of Environmental Management and Health Services as well as and local planning and health departments to select a site, determine what types of systems are needed and then install the facilities.

**WHAT:** The specific environmental objective is to reduce the input of poorly treated human waste into closed shellfish areas. Success of the project will be monitored by the reduction in coliform bacteria in the closed shellfish area and the number and type of facilities installed.

**WHERE:** The site selected will be in the APES area along Pamlico Sound. Site selection will use the N.C. Sanitary Surveys as the primary date source. Possible sites include Stumpy Point and Englehard. Selection of the site will require site visits and meetings with local planners and health officials.

**WHEN:** After project approval, the project coordinator will select the site, determine the necessary facilities and install them. This process should take about a year and cost about $500,000.

SCUPPERNONG RIVER: INSTALLATION OF AGRICULTURAL BEST MANAGEMENT PRACTICES (BMPs)

**WHY:** Scuppernong River is a relatively small, coastal river in northeastern North Carolina with a watershed of about 205 square miles. It drains directly into Albemarle Sound near Columbia, N.C. from Phelps Lake. The river has experienced excessive algal blooms and aquatic macrophytes for several years primarily in response to excessive nutrients from upstream agricultural fields and animal operations. North Carolina has an active Agricultural Cost Share Program which provides matching funds for voluntary installation and maintenance of agricultural BMPs. Some work has been already done in the watershed but funds are limited. This project would greatly expand the ongoing effort to control agricultural nutrients in the watershed. A total of $500,000 is requested over three years. Activities similar to these are referenced in the "Governor's Coastal Water Management Task Force Final Report (1982)" and other state and federal reports for the area including a N.C. Heritage Program Survey which identified the area as high, county significance.

**WHO:** A steering committee of APES and The Tyrrell and Washington County Soil and Water Conservation Districts, local U.S. Soil Conservation Service and N.C. Divisions of Environmental Management (DEM) and Soil and Water Conservation would oversee the program. One person would be hired to administer the program and then use funds to install agricultural BMPs at suitable locations

**WHAT:** The specific environmental objective is to reduce the loss of nutrients from agricultural fields and animal operations in the watershed. DEM has collected some data on algae growth in the river. These data can be used to measure the success of the project. Also, the number (or acreage) of agricultural BMPs which are installed in the watershed will be readily determined.

**WHERE:** The project will be implemented throughout the watershed at strategic locations determined to be important in terms of nutrient loss.

**WHEN:** After project approval, the project administrator will determine locations for BMP installation and then allocate appropriate funds. The State Ag Cost Share Program operates under a 75:25 cost sharing: the same ratio would be utilized. The entire process should take no more than 3 years. DEM will monitor the river.

**HOW:** The project coordinator will establish contacts with relevant government agencies (local, State and Federal), identify which agricultural BMPs are needed for individual sites, contact specific individuals and oversee the installation of the BMPs.

# OYSTER BED REHABILITATION AND RELOCATION IN THE ALBEMARLE-PAMLICO SOUNDS

**WHY:** North Carolina Department of Natural Resources and Community Development, Marine Fisheries Division has an active program of oyster bed rehabilitation and relocation. The red tide which affected the North Carolina coast last year had little direct impact on the Albemarle and Pamlico Sounds but closure of shellfish beds in the red tide area lead to very intense pressure on shellfish beds in the Sounds. The ongoing Oyster Bed Rehabilitation Program requests funds to expand the program in the APES area to restore and reestablish oyster beds.

**WHO:** The Development Section, Division of Marine Fisheries administers the existing program and would also administer the expanded funds. Considerable public input occurred in a series of public meetings this spring to determine planting locations. Plantings will be done by private individuals and public agencies as necessary. The full $500,000 (or a lesser amount) could be utilized for this purpose.

**WHAT:** The environmental objective is to increase the number and quality of oyster beds in the APES area. The increased acreage of oyster beds as a result of this project will be readily determined.

**WHERE:** Oyster beds throughout the APES area will be rehabilitated with emphasis on Pamlico Sound where greatly increased fishing pressure occurred last year.

**WHEN:** Locations have already been chosen through a public hearing process. Planting can begin as soon as monies are available and would take about one year.

**HOW:** Empty oyster shells are loaded onto boats and placed on the estuary bottom in suitable locations. These provide a substrate for oyster growth. Planting or relocation will be done by private contractors and state-owned vessels.