# *RESOURCE MANAGEMENT OPTIONS FOR THE SOUNDS*

## A Summary of the User Group Workshops

## February 1992


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**Funded by:**
**The Albemarle-Pamlico Estuarine Study through**
**The North Carolina Department of Environment,**
**Health, and Natural Resources**

**and**

**The National Estuary Program,**
**U.S. Environmental Protection Agency**

## ACKNOWLEDGEMENTS

The Author would like to express his gratitude to the following people for their invaluable assistance with this project: Joan Giordano for her help with logistics, room arrangements, invitation lists, developing the workshop format, suggestions, tape machines, and above all, her patience; Randy Waite, for his help with developing the workshop format, the invitations, and arrangements with the facilitators; Karen Donnelly for her help with the mailings and invitations; Jennifer Steel, Meg Scully and Kristin Rowles for their help with drafting the executive summaries and questionnaires, lugging the projectors, screens, chairs, etc., and editing the text; Bitsy Waters and Ginger Webster for their help with developing the workshops format, and facilitating the workshops; and finally, to all those who took time out of their busy schedules to share their opinions and insights with the staff.

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## INTRODUCTION

The Albemarle-Pamlico Study Estuarine Study (A/P Study) established in 1987, is co-sponsored by the Environmental Protection Agency (EPA), through the Office of Marine and Estuarine Protection (OMEP) and Region IV, and the N.C. Department of Environment, Health, and Natural Resources (DEHNR). The A/P Study's goal is to identify environmental problems in the Albemarle and Pamlico estuary systems and develop resource management plans to protect these valuable areas.

The five year study, a partnership between academia, government agencies, and the public has identified environmental problems in four major categories: water quality, critical areas, fisheries and the human environment. The study will end in December, 1992 with the completion of the Comprehensive, Conservation and Management Plan, or CCMP. The plan, based on data collection and research funded by the A/P Study, will include management recommendations designed to address the environmental problems outlined in the *Status and Trends Report of the Albemarle-Pamlico Estuarine Study*.

As part of the CCMP development process, the North Carolina Coastal Federation (NCCF), funded by an A/P Study grant, organized a series of seven workshops to document the initial reactions to a group of proposed resource management options. The meetings, entitled "User Group" workshops, were held in several communities during February, 1992.

This report, written by NCCF staff member Neil Armingeon, is a brief summary of those meetings, including the different user groups' reactions to the proposed management options .

## DEVELOPMENT OF THE MANAGEMENT OPTIONS

Although the workshops were held in the winter of 1992, the sessions were the culmination of a series of events that began two years prior to their occurrence.

The management options presented to the participants were the end product of a process that began in May, 1990, when the two Citizen Advisory Committees (CAC) convened a workshop in Washington, North Carolina to develop a group of resource management suggestions for the CCMP. The CAC's recommendations are contained in an A/P publication entitled, *Blueprint for Action* (A/P Project 90-26). That document, and subsequent meetings with state and federal resource managers, were the foundation for the A/P Study Environmental Goals and Objectives.

The draft list of goals and objectives were developed by the staff of the A/P Study under the direction of the Policy, Technical, and two Citizens' Advisory Committees. The committees reviewed the lists and their comments were then incorporated into the final group of goals and objectives.

Based upon the stated goals and objectives, the staff then developed four action plans that

will serve as the major components of the CCMP. The action plans presented the following for each area of concern: the environmental concern; its status, trends, and likely causes; an evaluation of the pertinent programs; the environmental goals and objectives; management options to address the concerns; additional information needs; and, if available, estimated costs of the management options.

The initial group of resource management options was obtained from the *Blueprint*, suggested options from funded research projects, and management options that were drawn from the development of the *Status and Trends Report*. These management options, included in the draft action plans, were the central topic for a series of workgroups that were held during December, 1991. The workgroups, composed of committee members and invited resource managers and experts, focused on various environmental issues which included:

(1) **water quality**: turbidity, salinity, bacteria;
(2) **water quality**: dissolved oxygen, nutrients;
(3) **water quality**: biological integrity, toxics;
(4) **human environment**: population growth;
(5) **human environment**: cultural integrity, public involvement and education;
(6) **critical areas**: submerged aquatic vegetation, fish habitat;
(7) **critical areas**: wetlands;
(8) **critical areas**: essential and unique habitat (threatened/endangered species);
(9) **fisheries**: productivity; and
(10) **fisheries**: diseases (ulcerative mycosis, crab, oyster).

The A/P staff, utilizing the comments from these meetings, further defined the action plans, including the management options. In some cases, the draft options were reworded or combined with other options. There were instances in which the proposed options were deemed unnecessary because a similar option was currently in place or would be by the completion of the CCMP. The management options that advanced from this process were the alternatives that were discussed at the seven workshops.

## FORMAT OF THE USER GROUP WORKSHOPS

The purpose of the workshops was to open a dialogue between the A/P staff and representatives from groups that will be the most impacted by the implementation of the management plan. The groups included, (1) those parties who directly use the resources, or (2) those parties whose activities directly affect the resources. The major premise of the workshops was that all of the groups that were invited affect the environmental stability of the area and will be necessary partners in the overall management effort.

Nine groups were identified and representatives from these groups were invited to participate in the workshops. The workshops included:

(1) elected officials, (southern portion of the study area);
(2) elected officials (northern portion of the study area, including S.E. Virginia);
(3) agriculture and forestry (concurrent);
(4) commercial and recreational fishermen (concurrent);
(5) NPDES (pipe) dischargers (industrial and municipal);
(6) developers and marina owner/operators (concurrent); and
(7) environmental activists.

Clearly, there are hundreds of representatives for each of the user groups in an area as large as the A/P Study area (over 50 counties in two states); however, to facilitate discussion, the attendance was limited to approximately 20-25 people. Participants were selected in an attempt to represent a diverse group within each segment. In many cases, those invited represented a larger group, i.e., North Carolina Farm Bureau (agriculture), the Economic Alliance (developers) or the North Carolina Fisheries Association (commercial fishermen).

Due to a limited timeline, and because some of the management recommendations for certain user groups were similar, several of the workshops included two user groups, e.g., agriculture and forestry, and pipe dischargers, both industrial and municipal.

The meetings were designed to provide the A/P staff an opportunity to listen to the participants' responses and comments. To achieve that goal, two professional facilitators were retained to direct the sessions. The staff met with each facilitator to discuss the agenda, the staff's expectations for the workshops, and the materials the participants would need to prepare for the workshops.

Prior to the date of the workshops, the participants were provided an information packet to prepare them for the session. A major component of the packets was an executive summary that was developed for each specific user group. The summary, prepared by the A/P staff, contained a brief synopsis of the environmental problem associated with his/her group's activities, the proposed management options, and information needs that would be required to implement some of the options. For the readers information, the executive summaries that were sent to the groups are included in **APPENDIX A.**

For some in attendance, these workshops were their first introduction to the CCMP process. The staff and facilitator wanted the attendees to have a similar level of understanding about the A/P program; so after participant introductions, the A/P Study Director provided an overview of the program and the timetable for the development of the CCMP. Next, an A/P staff member reviewed the proposed management options. These presentations were for clarification purposes only; discussions on the actual recommendations followed this exercise. Following the staff presentation of the options, the participants "voted" on the options (see below) and the facilitator began open, informal discussions with those in attendance.

The major intent of the workshops was to gather reactions, both positive and negative, to the proposed management options. To accomplish this, a questionnaire was developed for

each specific group that contained an abbreviated, numbered list of the management options. For the readers information, copies of the questionnaires are included in **APPENDIX B.**

The participants were asked to spend a few minutes reviewing the list of options and to respond to the following questions:

1. **If it is determined additional action is needed to protect water quality or critical habitat in the region, which five management options would you be most inclined to support? List the numbers below;**

2. **Which five options do you believe would be the most controversial? List the numbers below;**

3. **Are there options you can think of that you believe would help, but are not listed on the attached sheet? Briefly describe them below.**

The responses were then collected, tallied and recorded so that all the participants could see the results. The purpose of the "voting" exercise was to provide a tool that would enhance discussion of the options.

The term "controversial" was a subjective decision for each participant. For example, the elected officials might have supported a specific option; however, their constituents might oppose it because it would require additional taxes. Therefore, in the elected officials minds, the option was controversial, nonetheless, if implemented, it would provide desirable environmental results. "Controversial" also included those options that were not supported by the representatives.

Following the same logic, the participants were then asked to discuss the most "favorable" options, or options that would be supported by his/her specific user group. The term "favorable", like "controversial", was a subjective determination. In many cases, a "favorable" designation might hinge on the fact that funds would be available to implement the management option.

One final point about straw poll on the options: as noted earlier, the process was totally subjective. These responses were to provide the participants, and the A/P staff, a take-off point for further discussion. One group might support an option while another would view the same option as unfavorable to his/her group. As the reader reviews the results, please note that in many cases, the most favorable option was also the most controversial option.

In addition to the ranking and discussing the options, the workshops often included discussion addressing how to fund the implementation of the management options. Participants were asked to respond to some preliminary options for funding sources or suggest funding sources they considered feasible. Also included was a discussion of education needs. The meetings ended with an open exchange on any topic related to the A/P Study.

Following is a summary of the seven workshops. The format for the summaries consists of: a narrative about the attendees; a list of the "favorable options, followed by a brief

discussion of the options and; a list of the "controversial" options, followed by a brief discussion of the options. The conclusion includes a table that summarizes the results of the straw polls.

## SOUTHERN STUDY AREA ELECTED OFFICIALS
**February 11, 1992**
**Greenville, North Carolina**

This workshop, held at the Ramada Inn, was attended by 18 participants. This group included elected officials, planners, county managers, county engineers, representatives from councils of government, A/P staff members and visitors. **(A list of invitees is included in APPENDIX C)**

### MOST FAVORABLE OPTIONS
(In order of total votes)
21 options presented

1. Require and fund development of local comprehensive land use plans.

2. Strengthen enforcement of existing regulatory programs.

3. Require a local comprehensive plan element to protect wetlands, essential habitat, and rare and natural communities.

4. Require vegetated buffer strips and restoration of flood plain vegetation adjacent to shorelines.

5. Develop a state wetlands protection policy with the goal of avoiding, minimizing and compensating for adverse impacts on wetlands.

6. Promote public education and involvement in estuarine resource management policy making and program implementation.

7. Mandate the use of water conserving plumbing fixtures in new construction and develop incentives to promote water conservation in existing structures and operations including residential, agricultural, commercial and industrial uses.

8. Require post-development stormwater regulations to be equal to or less than pre-development runoff.

9. Promote alternatives to sewage treatment outfalls and stormwater treatment systems.

10. Require proper management and maintenance of package sewage treatment plants.

11. Expand private land protection incentives and strategies for critical areas including wetlands, rare and natural communities and endangered species habitat.

12. Expand public acquisition programs for critical areas.

## Discussion

Requiring and funding land use plans was the most attractive choice (#1). There was, however, a strong caveat attached to the vocal support given this proposal. To succeed, funding for this type of planning must be made available to local governments. Most believed that local governments would be unable to bear the additional costs of this level of planning.

Participants noted that one of the major problems with mandating any type of land use planning is the cultural differences found in many of the A/P counties. There is more acceptance of planning in the urbanized counties, while in the more rural counties, there is opposition to comprehensive planning, especially from the agriculture community.

There were other salient points made about planning efforts. The current design of the Coastal Area Management Act (CAMA) comprehensive land use plans needs to be revisited. The plans contain four key elements: 1) Summary of data collection and analysis, 2) Existing land use maps, 3) policy statements, and 4) land classification maps. Some in attendance believed that the land use plans contained a large segment of "canned" information that don't adequately address these four elements. Others believed that the planning process needed better coordination between state agencies, i.e, Divisions of Community Planning and Assistance and Coastal Management. Finally, there was support for the creation of environmental task forces, comprised of local citizens, to develop and amend land use plans. Several communities that were represented already have such task forces.

One major point was emphasized in the discussion of requiring planning. This type of mandate must come from the state rather than from local governments. A state-wide directive makes it easier to "sell" planning to local residents.

The support expressed for recommendation number three, which requires a land use planning element to protect critical areas, folded into the land use planning proposal, and for that reason, it received a large degree of support.

There was a large degree of support for strengthening the enforcement of current regulations (#2). The participants were asked which programs they believed were not being adequately addressed; the programs that were mentioned were: sediment and erosion control, Section 404 permit program, the septic tank inspection programs and HUD floodplain violations (construction in flood-prone areas). Participants expressed a level of frustration with the state regulatory agencies' apparent lack of enforcement, or what they believed was uneven enforcement of regulations.

The buffer strip option also received a significant number of votes (#4). The group supported the assertion that buffer strips protect water quality. Representatives from Greenville and Rocky Mount noted that their communities currently had buffer strip requirements, but would welcome additional technical assistance as to what additional steps were needed.

There was a notable show of support for increasing public education about land use and environmental issues (#6). One of the participants noted, "The cheapest, most cost-effective way to regulate is to educate the public." Those in attendance asked that the proposed education programs be directed toward specific topics such as land use plans. A planner suggested that education programs be developed to instruct the public about the value of land use planning.

When asked why some education programs are not successful, the group responded by saying that most programs do not reach the general public. The group believed that education efforts must be directed toward the entire community. There was support expressed for the creation of some type of non-profit foundation to oversee education efforts.

Group members supported the use of water conservation devices (#7); however, they believed that these mechanisms should be a component of an overall water conservation program rather than the main focus.

The issue of additional stormwater controls received numerous "favorable" votes (#8). In fact, some communities in this study area have already initiated stormwater controls such as those mentioned in option eight. Some noted that this option will be very expensive to implement. Several voiced the opinion that this type of regulation should be mandated at the state level rather than at a local level of government to make it easier for local officials to garner support.

## MOST CONTROVERSIAL OPTIONS

(In order of total votes)
21 options presented

1. Institute more stringent septic tank regulations and use of alternative septic systems.

2. Expand the current coastal stormwater regulations to the entire Albemarle-Pamlico Region.

3. Develop a state wetland protection policy with the goal of avoiding, minimizing and compensating for adverse impacts on wetlands.

4. Require and fund water use and supply planning at the local level.

5. Promote alternatives to sewage treatment outfalls and stormwater treatment systems.

6. Require a local comprehensive plan to protect wetlands, essential habitat, and rare and natural communities.

7. Expand public acquisition programs for critical areas.

8. Require and fund development of local comprehensive land use plans.

9. Require post-development stormwater runoff to be equal to or less than the pre-development runoff.

10. Expand areas considered "Areas of Environmental Concern" (AECs) under CAMA.

11. Tighten regulatory requirements on marinas.

## Discussion

The increased regulation of septic systems was this group's most controversial option (#1). The majority of those present noted that this type of regulation seriously reduces potential homesites, thereby limiting increases to the tax base. Leaders also expressed concerns that there are current problems with the septic tank regulations, e.g., siting problems, outdated systems, etc.. Many officials believed that additional controls would make this situation worse. Other issues that were discussed included: cost of additional staff to oversee the programs, difficulty in siting septic systems in coastal counties and local opposition to mandatory pump-out regulations.

In regards to alternative systems, many believed that the alternatives to septic systems are cost prohibitive and their additional costs precluded affordable housing. If the A/P study is pressing for increased usage of alternative systems, then the study should provide local sanitarians and governments with information about these systems.

Stormwater regulations were also deemed a very contentious issue (#2,9). Some believed that stormwater in inland counties is not as serious water quality problem as it is in coastal counties. Most of the participants expressed the fact that the small, rural counties simply do no have the technical expertise, i.e., engineers, to address this problem. Others thought that stormwater regulations do not deal with the real source of the problem, agriculture. One participant added that while stormwater regulations are controversial, "Additional refinement of the regulations would lead to a consistent policy in the study area."

As could be expected, a state wetlands policy were also viewed as controversial (#3). The overall feeling was that if the federal government cannot agree on a wetlands policy, how could the state do any better?

There was some frustration with the lack of communication between the Division of Environmental Management (DEM) staff and local governments in regards to the state's proposed wetland rating system. There was support for the development of a functional rating system rather than the current delineation system. The "takings" issue was one that has caused a great deal of concern for local governments, especially in relation to wetlands, and some official questioned whether the proposed policy would address this issue.

The group was also concerned with the water use planning option (#4). "Turf issues" were the most discussed topic; whose water is it? Also, there is no apparent framework to deal

with these types of regulations. Water use disputes stem from the fact that there are many conflicting use questions that cannot be addressed with the current regulations. Many believed that water use issues should be addressed within the land use planning process.

The final major point of debate involved wastewater issues (#5), specifically disposal of sewage effluent. Many communities have invested millions of dollars to upgrade their wastewater treatment (WWT) systems. If new regulations are passed that require additional treatment methods, the cost factor is of utmost importance to local governments. Many expressed a reluctance to spend additional monies on new, untested alternative systems. Some mangers expressed a level of frustration with the state's practice of changing WWT regulations. WWT systems represent long-term investment in a community's future and changing the regulations complicates the planning process.

Other issues labeled as controversial included, marinas siting, the purchase of additional public lands, lack of public access, and general funding questions.

The workshop ended with a brief discussion of how to fund the proposed options. Some suggestions that received support were: user fees for use of public lands, a pollution tax to generate funds for enforcement or restoration efforts, tax incentives for pollution reduction, reappropriation of environmental fines to pay for public education programs, and a property surtax that would go toward a "clean water fund".

## NORTHERN STUDY AREA ELECTED OFFICIALS
**February 12, 1992**
**Edenton, North Carolina**

This workshop, held at the American Legion Hall, was attended by 20 participants. This group included: elected officials, county planners, county managers, representatives from public utilities, A/P staff members and visitors. **(A list of invitees is included in APPENDIX C.)**

### MOST FAVORABLE OPTIONS
(In order of total votes)
21 options presented

1. Require and fund development of local comprehensive land use plans.

2. Expand private land protection incentives and strategies for critical areas including wetlands, rare and natural communities and endangered species habitat.

3. Strengthen enforcement of existing regulatory programs.

4. Require post-development stormwater runoff to be equal to or less than the pre-development runoff.

5. Require vegetated buffer strips and restoration of flood plain vegetation adjacent to shorelines.

6. Require and fund water use and supply planning at the local level.

7. Develop basin-wide resource management plans.

8. Develop a central database to serve as a basis for local and state planning in the watershed.

9. Promote public education and involvement in estuarine resource management policy making and program implementation.

10. Expand the current coastal stormwater regulations to the entire Albemarle-Pamlico Region.

11. Promote alternatives to sewage treatment outfalls and stormwater treatment systems.

### Discussion

The option that received the most support was the call for comprehensive land use planning (#1). As was the case with the southern elected officials, the support was contingent

upon a funding commitment.

Many of the counties in north eastern portion of the state are regulated by the Coastal Area Management Act (CAMA); therefore several of the comments expressed were based upon experiences with this regulatory and planning framework. County managers and planners voiced support for the CAMA plans, noting that these plans create a "thought process" within the community that leads to general endorsement of the plan. Most believed that a good land use plan can provide guidance for local planning boards.

One point was expressed by several of the participants. For a land use plan to succeed on any level, local or county-wide, it must be developed by those that are going to "live with the plan", i.e., members of the affected community.

Although there was a great degree of support for land use planning, several suggestions were directed toward improving the current framework. Some expressed the belief that a stronger implementation process was needed. In other words, the state needs to follow-up after the plans are completed. Suggestions included a monitoring component to make sure that the plan is being followed. The monitoring should include notification of violations. As one speaker noted, "For a plan to be effective, it must contain an enforcement component."

There was also support for increasing private land protection incentives (#2). Tax incentives were viewed as an attractive inducement if they contained "hold harmless provisions." Speakers suggested that these types of programs should be revenue neutral. Incentive programs were viewed as very important in areas where increasing taxes are forcing people to develop land. Others recommended looking at the federal and state approaches to targeting critical areas.

There were numerous comments that addressed the lack of enforcement of current environmental regulations (#3). One speaker noted, "Regulatory agencies are not responsive to local officials." All agreed that the state must be more responsive when contacted about violations. This idea was sounded by other speakers who pointed out that because of their roles in the building process, county governments are often blamed for permit delays. Some believed that regulatory agencies placed more effort into the permitting process than they do in the enforcement aspect. One speaker suggested that Council of Governments (COGs) could coordinate local and statewide permitting efforts. The COGs meet regularly with elected officials; therefore, the communication framework is already functioning and acceptable.

The stormwater options received support; however, the readers should recognize that the stormwater regulations were also some of the most controversial ideas (#4,10). The participants noted that there is no question that buffers improve water quality. A speaker from Virginia stated that her community has such a plan currently in effect, and the plan has not met with a great deal opposition. Several speakers addressed the fact that it is very difficult to develop a stormwater management program that is appropriate for the varied terrain encompassed by the study area boundaries.

There was support for vegetated buffer strips, acknowledged to be low-cost and highly effective at filtering pollutants (#5). Although there was support for the program, the participants suggested that flexibility be "built in" to any new regulations. The staff should take care that new buffer regulations will not discourage the agriculture community from supporting, and utilizing these practices.

The suggestion for water use planning received backing from some of those in attendance. Historically speaking, water use has been a very contentious issue between Virginia and North Carolina (Lake Gaston issue). All in attendance agreed that water use must be addressed, and the A/P Study might be the vehicle to further discussion between the states. One speaker suggested the creation of "sanitary districts" that would consider water use and waste disposal issues.

Basin-wide planning is an issue that parallels water use and planning (#7). Many of the watersheds in the northeastern study area are shared between the two states. At one time there was a bi-state commission that addressed this type of planning, however, political issues led to its downfall. All agreed that there is a need for regulatory consistency between the states, and there must be better communications between the states' regulatory agencies.

As was the case with the southern study area elected officials, there was a great deal of support for public education programs. One participant stressed the importance of an environmental curriculum that could be integrated into regular academic programs. Another idea that surfaced at this session was an education programs directed at elected officials. (Note: there is an A/P Study program just for this purpose). The speaker suggested that multi-county groups be set-up to address major issues. A series of meetings of such groups should be scheduled before the completion of the CCMP. The subject of the meetings must translate region-wide issues into "backyard" issues.

## MOST CONTROVERSIAL OPTIONS

(In order of total votes)
21 options presented

1. Require post-development stormwater runoff to be equal to or less than the pre-development runoff.

2. Mandate the use of water conserving plumbing fixtures in new construction and develop new incentives to promote water conservation in existing structures and operations including residential, agricultural, commercial and industrial uses.

3. Institute more stringent septic tank regulations and use of alternative septic systems.

4. Restrict the uses of bulkheads, groins, and other "hard" stabilization methods along estuarine shorelines.

5. Require local comprehensive plans to protect wetlands, essential habitat, and rare and natural communities.

6. Develop a state wetland protection policy with the goal of avoiding, minimizing and compensating for adverse impacts on wetlands.

7. Require and fund development of local comprehensive land use plans.

8. Expand the current coastal stormwater regulations to the entire Albemarle-Pamlico Region.

9. Promote alternatives to sewage treatment outfalls and stormwater treatment systems.

10. Expand public acquisition programs for critical areas.

11. Strengthen enforcement of existing regulatory programs.

**Discussion**

The most controversial options were those that dealt with redesign of the stormwater regulations (#1,8). The rationale was similar to that expressed at the previous day's session. As mentioned before, much of this area is rural, and residents resent being told how to develop their properties. In addition, the cost associated with this type of engineering make the designs cost-prohibitive for small developers. Many speakers noted that there was no county-level expertise to design these systems and no manpower to monitor their construction and/or maintenance.

Other reasons for opposing this option included: landowners do not associate water quality problems with stormwater, therefore, they see little value in stormwater controls; landowners perceive this type of regulation as a "taking"; many of the subdivisions are small and do not need this type of regulations and finally, some expressed the belief that stormwater holding ponds can contaminate groundwater supplies.

The water conservation option was also controversial to this group (#2). When asked why, some pointed out this type of regulation pertained to something that was contained in a person's house rather than the public domain, and therefore, would meet with resistance. Some suggested that this option as written, for new or renovative construction would be acceptable. One speaker noted that this requirement has recently been established in state-wide building codes and was unnecessary. Some questioned how the installation of these devices would affect the wastewater treatment systems, i.e., could it lead to "stronger" concentrations of pollutants in effluent?

Changes to the septic tank regulations were as controversial as the two previous options, and prompted a great deal of discussion (#3). There were several who asserted that there are

already "interpretation" problems with current regulations; why add more problems? Others expressed sentiments that the public does not understand the septic permitting system. In other words, a common question by the public is, "Why are some permits awarded while others in close proximity are denied?"

The mandatory pump-out requirements for septic systems also drew comments (#3). The problems with this option included: it would be cost-prohibitive; it would be perceived as government mandating action involving private property; and the public does not view septic systems as a water quality problem. One other point that was discussed had relevance to this issue: many rural counties do not have adequate records addressing septic systems, i.e., how many, where, etc. Given this fact, how could a mandatory pump-out program be effective?

As part of the discussion about septic systems, participants were asked their thoughts about alternative systems. Many felt the systems were cost-prohibitive, and there was little technical expertise on these systems at the local level. The state needs to take the leadership role if alternative systems are to become a viable choice to septic systems.

The restriction of bulkheads, and other "hard" structures on estuarine shorelines was not very well received (#4). This region of the study area contains hundreds of miles of estuarine shoreline. These areas, while restricted, can receive a CAMA permit for certain types of bulkheads. One speaker addressing the option said, "It's hard to tell a homeowner whose house is falling into the sound that there's nothing he can do about it." Most voiced the opinion that erosion along estuarine shoreline is a real problem, and there are no cost-effective alternatives to bulkheading. The participants voiced little support or skepticism for plans to utilize vegetation to protect shorelines.

The final options that met with little support involved wetland planning and wetland protection (#5,6). As with the elected officials from the previous day's session, wetland policies are very controversial. Most expressed frustration at the current state of affairs. One participant viewed wetland policy as, "Government gone crazy."

The confusion in the federal wetland program is reeking havoc with local officials. Since a large amount of this area is wetlands, most believed that further restrictions would seriously damage the tax base. Some wanted to see a "realistic" value placed on wetlands. If the state is going to require additional wetland planning, then it must be prepared to furnish the additional funding to pay for it. The final issue that was addressed involved the "takings" issue. One official noted that if the state is going to prevent a property owner from developing wetlands then he or she must be compensated.

Funding was briefly addressed at the session. Some suggestions that were proposed included saltwater fishing licenses, ad valorem taxes, and revenue sharing (local and national). All agreed that local funding is very tight, and any program should be pro-active rather than reactive.

## AGRICULTURE AND FORESTRY
## February 13, 1991
## Rocky Mount, North Carolina

This workshop, held at the Ramada Inn, was attended by 26 participants. The group included: farmers (land and animal operations), forest consultants, representatives from the forest products industry, representatives from timber and agriculture trade association, Soil Conservation Service staff members, agricultural consultants, representatives from Soil and Water Conservation Districts, A/P staff members and visitors. **(A list of invitees is included in APPENDIX C.)**

### MOST FAVORABLE OPTIONS
(In order of total votes)
18 options presented

1. Improve the Agriculture Cost Share Program by providing more money to target, monitor and enforce the program.

2. Sponsor a study that will examine the "property rights" issue and how it could affect the A/P Study management options.

3. Promote water conservation in existing structures and operations including residential, agricultural, industrial and commercial.

4. Increase the use of Integrated Crop/Pest Management.

5. Require the use of vegetated buffer strips and restoration of flood plain vegetation adjacent to shorelines and tributary streams.

6. Expand private land protection incentives and strategies such as conservation easements, and use value taxation to protect critical areas including wetlands, rare and natural communities and threatened and endangered species.

7. Promote public education and involvement in estuarine resources management program implementation.

8. Develop nutrient reduction targets for some or all basins in the Albemarle-Pamlico Region.

9. Expand public acquisition programs to protect critical areas.

10. Require and fund development of local comprehensive land use plans.

11. Require modification of drainage ditches to protect primary nursery areas and control

sediment and nutrient loading.

**Discussion**

There was unanimous support for increased funding to the Agriculture Cost Share program (#1). The agriculture community has recognized that these programs have a direct correlation with improved water quality. Members of the forestry community pointed out that the forest stewardship program, similar to the agriculture programs, is also quite successful and could be integrated with current cost-share programs.

The agriculture representatives noted that the current 75/25 match is acceptable to those who are participating in the cost-share program. While there are some "bad apples" in the program, i.e., (those who take coast share monies and do not install or maintain the structures), the majority of farmers participate in the program honestly. One speaker suggested that there needs to be a re-evaluation of the follow-up and maintenance schedules.

There were several suggestions to improve the BMP program's effectiveness. Many speakers asked that the A/P Study recommend more technical expertise at the local level. The technicians who oversee the programs are overworked and cover a large area. Some believed that increasing the local match for technicians could address this critical shortage. Some of those involved with animal operations asked that more assistance be directed toward animal operations. One speaker advised that local governments could direct funding to cost-share programs to aid in local waste disposal issues.

The proposal to examine the "takings" issue also enjoyed near unanimous support (#2). This recommendations was not on the original list of options presented to the participants, but was suggested by one of the participants. The support for this idea stemmed from the fact that most of those in attendance believed that none of the current regulatory programs consider landowners rights. One of those in attendance noted that, "There are cases pending before the Supreme Court that have the potential to make the state of North Carolina liable to landowners for billions of dollars."

There was support for water conservation measures (#3). All agreed that agriculture practices need ways to hold water until it can be used. One participant noted that in some cases, water needs to be removed from fields/pastures, therefore, there are times when conserving water and removing water are in direct conflict with each other. Some speakers noted that water conservation practices are occurring as part of the irrigation programs. The registration of large water users received support.

Although there was backing for the program, some problems with conservation measures were discussed. Water conservation can be expensive; where will the funding for these practices come from? In the coastal plain there are hundreds of miles of drainage ditches, and the management of these ditches can be contentious. The proximity of saltwater bodies to agriculture operations is a problem that arises in the coastal plain. Despite state-wide water

conservation policies, there have been problems constructing retention ponds adjacent to saline systems.

The use of integrated pest management (IPM) programs also received numerous votes (#4). The major factor behind this support was that the majority of those in attendance believed that IPM programs produce tangible results. The program's success, however, has caused some problems. Because of the increased usage of these programs there is a shortage of laboratory space for the analysis. The program needs to be expanded financially and also in support facilities such as laboratory analysis space.

One of the speakers noted that, "The IPM program will need constant research dollars if it is to stay abreast of changes within the agricultural and forestry industries." Some farmers pointed out that as pesticides and herbicides are removed from the market, new products or techniques must replace them.

The buffer strip option received a mixed review (#5). Although the majority of the participants recognized that buffer strips can lead to improved water quality, there are some issues that need to be resolved before the group would support the increased use of them. Some believed that Best Management Practices (BMPs) already address this issue, and questioned if we need additional regulations. There was a discussion about the types of vegetation that would be required. Many speakers noted that buffers provide long-term benefits rather than short-term fixes. Others pointed out that there is a big enforcement burden associated with BMP practices; what would be the source of funding for additional manpower?

One other issue relating to buffer strips arose during the discussion. Some believed that the use of buffer strips should only be required for perennial streams, not intermittent flowing (seasonal) streams. Some expressed the belief that trying to restore timber and agricultural floodplain operations to vegetative cover is "unrealistic."

The support for expanding land acquisition programs was closely related to the private property rights issue (#6). As one speaker stated, "Compensation makes sense if certain uses are being lost, but the definition of lost is open to debate." One of the problems with land acquisition is the assignment of use value; it varies from jurisdiction to jurisdiction. A forestry representative added that no corporate forestry operation is eligible for preferential assessment from use value.

Other speakers added that easements and related restrictions with benefits should not necessarily carry public access rights. One closing suggestion received notable support, "Public acquisition programs should be voluntary, not based on condemnation."

Increasing public education programs also received wide support (#7). All those in attendance believed that agriculture and forestry need to do a better job at publicizing "good" programs and their results. Currently, there are numerous education programs that are successful. The Soil and Water Conservation Districts reached over 178,000 school children

through their education programs. The forestry representatives noted that the State Forests program is also very popular and an excellent educational tool.

Despite these accomplishments, there is a need to develop additional education programs. Some suggested that courses be developed for teachers as part of teacher recertification process. Press tours need to be developed that will publicize the new practices being utilized by agriculture and forestry.

An individual raised a final point about public education. The agriculture and forestry communities needed to expand communication not only to the public, but to groups that often espouse different views, i.e., environmental groups. One example he presented was a press tour that was organized in the Pamlico region that involved the Pamlico-Tar River Foundation. He added, "We need to stop singing to the choir and reach a new audience."

## MOST CONTROVERSIAL OPTIONS

(In order of total votes)
18 options presented

1. Phase out agricultural and silvicultural exemptions for CAMA permits and the Sedimentation Pollution Control Act.

2. Develop state wetland protection policy with the goals of avoiding, minimizing and compensating for adverse impacts on wetlands.

3. Phase out agricultural and silvicultural exemptions for 404 permits.

4. Expand public acquisition programs to protect critical areas.

5. Develop new water quality standards in order to address non-point sources of pollution.

6. Require the use of vegetated buffer strips and restoration of flood plain vegetation adjacent to shorelines and tributary streams.

7. Increase enforcement of Sodbuster program.

8. Identify valuable shellfish, nursery and spawning areas and require more stringent land management practices in areas adjacent to them.

9. Require modifications of drainage ditches to protect primary nursery areas and control sediment and nutrient loading.

10. Require and fund development of local comprehensive land use plans.

11. Develop nutrient reduction targets for some or all basins in the Albemarle-Pamlico Region.

**Discussion**

The most controversial options related to the removal of permit exemptions for agriculture and silviculture operations (#1,3). Although the options describe two different permit programs, they were discussed concurrently.

The majority of the speakers asserted that there was a great misunderstanding about the exemptions and their repercussions. There are currently a large number of permits required for both forestry and agricultural activities. If, however, the Study chose to enact these options, the speakers said it would be impossible to enforce them.

Numerous speakers pointed out that there is a lack of practical considerations during the permitting process. Agriculture and silviculture are driven by many factors including crop growth, equipment availability, weather, etc. Permit delays are often impractical and have become a real problem for these industries. Some questioned if regulatory agencies understand the unique needs of these industries and considered them during the development of regulatory process.

Other points discussed included the uncertainties of the regulatory programs and the results of changing jurisdictions. i.e., wetland protection authority. Many believed that rather than create new regulations, agencies should just enforce what is on the books.

Many spoke about the public's misinformation about farming and timber management. Others believed that there was not enough recognition given to landowners' dedication to good land stewardship. Some speakers expressed the belief that farmers and woodland managers have an ethical responsibility to promote land conservation and that the environmental problems related to farming and forestry were overstated. One speaker noted that, "The problems associated with these activities are marginal at best, while the local economic impacts of these proposals would be devastating."

The discussion of strengthening wetland regulations (#2) was also an option that generated a great deal of discussion. The first issue raised addressed the confusion that is being caused by the wetland definition debate. More specifically, how this lack of clarity has had a significant impact on the farming and forest products industries. Most supported reverting back to a "true" definition of wetlands.

Many in attendance believed that current regulations (Federal 404, state 401 certification) are adequate to protect these areas. One speaker noted, "Wetlands are totally regulated, why would you want to add another layer of government to the mess we're already in?

Another issue that was discussed in great lengths was the current debate concerning

wetland loss. Many espoused the belief that wetland alteration may not lead to loss of function and that current data indicates land conversion has not increased since the 1980s. Others suggested that the A/P Study should focus on two issues: (1) what is the true value of wetlands in North Carolina, and (2) determine an "accurate" estimate of wetland acreage that has been lost. Some believed that the estimates concerning wetland acreage that has been destroyed by agriculture and forestry have been overestimated.

Other comments pertaining to wetlands included resolving how created wetlands could improve water quality, rethinking the sequencing of goals in management option number two, and providing the public with accurate information about wetlands issues.

The option relating to public acquisition also sparked a debate (#4). One of the first speakers questioned, "How much more land do private citizens want the government to own? They already own 40% of the land in the coastal region." Others thought that governments are not good land managers.

As was the case with the elected officials, many believed that tying up land in public ownership reduces the tax base causing additional hardship to those already paying property taxes. In addition to lost revenues, some speakers raised the public access issue. One sportsman noted that many of these land are "locked up", and the public cannot really use it. If public acquisition could include public access rights, then many in attendance would be more willing to support the idea. A similar feeling was expressed about the condemnation of land. If the proposed acquisition programs will entail condemnation proceedings rather than fair market value purchase, the programs will be very controversial.

The option suggesting the development of new water quality standards was also controversial (#5). Most in attendance believed that current regulations adequately addressed nonpoint source pollution, and did not believe there is a need for another layer of regulation. There were also questions relating to what types of waters were being addressed here saltwater, or freshwater? One speaker believed that new regulations would be "too easy to abuse" and would lead to stronger regulations, e.g., additional Outstanding Resource Waters (ORWs). Others questioned if the A/P Study had the data to develop new standards. When developing non-point discharge water standards the question arises, who is the culprit? How does the A/P study propose to answer this question? Some added that natural sources add pollution to the systems; agriculture is not the only problem.

One speaker believed that the entire water quality problem has been blown out of proportion. After reviewing current data, he suggested, "The improvement to North Carolina's water quality is the greatest success story on the east coast."

## COMMERCIAL/RECREATIONAL FISHING
**February 19, 1991**
**New Bern, North Carolina**

This workshop, held at the Ramada Inn, was attended by 23 participants. The group included: commercial fishermen (finfish, crab and shellfish), fish house owners, a representative from a recreational fishing trade association, representatives from a commercial fishing trade association, representatives from the Wildlife Resources Commission and Division of Marine Fisheries, A/P staff members, and visitors. **(A list of invitees is included in APPENDIX C.)**

### MOST FAVORABLE OPTIONS
(In order of total votes)
22 options presented

1. Develop and implement management strategies to minimize human activities which are found to contribute to finfish and shellfish kills and diseases.

2. Adopt appropriate water quality standards and implementing regulations to protect designated critical habitats.

3. Implement a cost-share program to encourage the use of by-catch reduction gear.

4. Phase out permit exemptions for agriculture and forestry practices.

5. Develop a comprehensive water management plan to meet water quantity or flow needs of designated critical habitats.

6. Strengthen the enforcement of existing programs.

7. Identify and designate, including buffer areas, the following critical habitats for protection: submerged aquatic vegetation (SAV) beds, shellfish beds, spawning areas, and other nursery areas.

8. Expand public acquisition programs for lands associated with designated critical habitat.

9. Restore, where feasible, finfish and shellfish critical habitats.

10. Establish and maintain an information database on finfish and shellfish kills and diseases to help determine causes of kills and diseases.

11. Provide authority to the Marine Fisheries Commission to limit entry to fisheries.

## Discussion

The fishermen asked that three additional options be added to the list before the straw poll was taken. One of them received numerous votes and will be discussed below.

The option that received the most support was the call to develop management strategies to minimize human activities that are contributing to fisheries' mortality and diseases (#1). As one participant noted, "We are all part of the problem, but I am the one who suffers because of the growth occurring in the sounds."

Many expressed the opinion that more water quality management must occur in the inland areas since they are major contributors to the overall decline of water quality in the coastal areas. While most agreed that land based activities were the major culprits in the continuing loss of habitat, one spokesman believed that the effects of physical disturbance, both landward and in the water, are not fully understood. Therefore, he added, "There is a reluctance for regulatory agencies to point their fingers at one particular group."

Many believed that the A/P Study's mapping of primary nursery areas and critical habitat should help determine human activity management options. One fisherman believed that more attention should be directed toward mapping and protection of secondary nursery areas, not just primary areas.

The second most popular option, strengthening water quality standards, paralleled the previous suggestion (#2). Both options dealt with additional protection for critical habitat. One fisherman thought that there was not enough "landward" regulations to protect critical habitat. He pointed to the estuarine shoreline as an example. "Shoreline is an important component of the estuarine system." He questioned, "Why buy a Mercedes and take off the oil filter?"

Other comments relating to this option included: increased buffer requirements for forestry operations, more enforcement of the Agriculture BMP programs (monitoring), and increased regulation involving farm runoff (freshwater) to saline systems. Some believed that agricultural ditches should require an NPDES Permit.

Although there was not consensus regarding the effects of by-catch on the health of fish-stocks, there was broad based support for implementing cost-share programs to reduce its impacts (#3). One fishermen noted that if by-catch is a problem then fishermen should enjoy the same type of programs as farmers do with BMPs. Although there was backing for the option some expressed skepticism as to how such a program could be successfully implemented.

Option number four, elimination of permit exemptions for agriculture and forestry, received support. This option was added to the list by the participants. Many of the watermen related examples of wetland violations, both draining and filling, occurring through agriculture and forestry practices. The discussion also touched on the strengthening of enforcement actions (#6). Most of the participants believed that regulatory agencies are not adequately enforcing

current programs.

Other options that received support included the development of comprehensive plans to meet flow needs of critical areas and improving public education programs that specifically address fishing issues. Some believed that data collection efforts and additional mapping of critical areas should be a priority. There was limited support for regional wastewater treatment systems rather than septic systems where they are appropriate.

## CONTROVERSIAL OPTIONS

(In order of total votes)
22 options presented

1. Provide authority to the Marine Fisheries Commission to limit entry to fisheries.

2. Develop regulatory restrictions to reduce excessive harvesting, including size limits, gear restrictions, season and area closures, and quotas where necessary.

3. Phase out permit exemptions for agriculture and forestry practices.

4. Expand efforts to develop by-catch reduction gear and require use of this gear as it is demonstrated to be practical.

5. Identify and designate, including buffer areas, the following critical habitats for protection: submerged aquatic vegetation (SAV) beds, shellfish beds, spawning areas, and additional nursery areas.

6. Develop and implement state management plans to eliminate overfishing for species important to recreational and commercial fishermen.

7. Restrict by-catch on an areal and seasonal basis.

### Discussion

The question of limited entry sparked a vigorous debate (#1). This proposed option was deemed controversial by almost everyone in attendance. The first speaker pointed out that there was danger in giving one entity too much authority in this type of program. One of the speakers had done a great deal of research into limited entry programs, including speaking to commercial fishermen from areas where these programs are in place. He pointed out a number of problems associated with the current approaches. These included: (1) wealthy parties (single entities) ended up with all the quotas; (2) limited entry had divided the fishing community; (3) the programs brought in powerful investors, often from out of the country; (4) eliminated small family operations; (5) difficult to enforce, i.e., "cross state" problems; and (6) the program limited the political strengths in the fishing industry. One speaker noted that Rutgers University has conducted research into the limited entry question and suggested that the A/P staff obtain

the results of studies.

Although there was no support for the limited entry programs, there was some support for a delayed entry programs, especially from those representing the crabbing industry. One participant noted that the Marine Fisheries Commission does not currently have the authority to implement such a program.

The option that addressed gear restrictions also generated a great deal of discussion. The major point of contention did not center on the option, but rather the question of whether or not over-harvesting is really a problem (#2). One fishermen noted, "As water pollution has increased, so have the cries of overfishing. Remember, if you can't hatch 'em, you can't catch 'em."

A speaker, representing the recreational fishing community, cautioned the others that despite their assessment of the overharvesting problem, "Many people in the state believe that the declines in fish stocks is caused by overharvesting, and the state is not doing enough to address the problem." He added, "If we leave this meeting having only discussed water quality problems and not our part in the problem, then we have done the public a great disservice."

Some believed that gear restrictions were good management strategies, but questioned if resource managers realized the costs involved with gear changeover. Mandated gear restrictions can cost fishermen, and equipment suppliers, a great deal of money. The regulatory process is often too "fast-tracked", leaving fishermen with gear they can no longer use. If these types of programs are utilized, then there must be a "phasing-in" period to allow fishermen to plan for long term considerations. This could include gear "buy backs". Some believed that state, rather than federal, agencies were better able to deal with these types of programs.

The by-catch issue was also deemed very controversial in the fishing community. In fact, there was some contention among those in attendance (#4,7). As with the overharvesting issue, some questioned if by-catch is really a problem. Some believed that by-catch is hurting the fish stocks, especially juveniles. One questioned the true cost of by-catch; has anybody really considered the dollar value in an unbiased approach. One fisherman believed that much of the by-catch is utilized as bait, and therefore, was really not an economic drain but rather a positive cost-cutting measure.

One fisherman noted that, "There is a public perception that trawling is destroying the fisheries, and that is a problem we must deal with." One suggestion was that research into the issue be site specific and also seasonal. Most felt that the effects of trawling on fish stocks differs between locales. Others stressed that the by-catch issue varies from fishery to fishery, i.e., by-catch is not a problem with gill nets. Therefore, gill net size will not address the question.

As was the case with the overharvesting issue, a representative from the recreational fishing community expressed a different opinion. "In our minds", he stated, "By-catch is a

serious problems and must be addressed by this study or the Marine Fisheries Commission immediately."

Although the use of new gear to reduce by-catch garnered some support, others found it to be controversial believing that these types of efforts will not solve the problem. One questioned if cost-share programs were only being considered to "soften the blow" of the loss of the fisheries (#4).

Many of the fishermen believed that the removal of exemptions for agriculture and forestry would be extremely controversial, not in the fishing community, but rather in the agricultural and silvicultural communities (#3).

Funding was the final point that was discussed. There was general support of "pollution fees" if the monies were directed toward pollution clean-up, not the state's general treasury. There was general support for saltwater fishing licenses, but again only if the monies would be directed toward fisheries needs, not to the general treasury.

## PIPE DISCHARGERS (NPDES PERMITS)
## February 20, 1991
## Greenville, NC

This meeting, held at the Ramada Inn, was attended by 27 participants. The group included: representatives from several industries that discharge wastewater to the sounds; representatives from municipalities that discharge wastewater into the sounds, representatives from trade associations, members of then A/P Study staff, and visitors. **(A list of invitees is included in APPENDIX C.)**

### MOST FAVORABLE OPTIONS
(In order of total votes)
18 options presented

1. Provide dischargers with increased financial incentives and flexibility in the NPDES permit process as part of the basin-wide planning effort.

2. Develop a standardized system of violations and associated penalties and enforce them in a consistent manner.

3. Identify and reduce toxicants found in wastestreams and nonpoint source runoff.

4. Strengthen wastewater treatment technology requirements to reflect improvements in technology.

5. Require more stringent nutrient reduction measures for new and expanding wastewater treatment plants, especially in areas of high population density and high growth.

6. Provide technical/engineering assistance to improve treatment plant operations.

7. Create sanitary districts to improve the long-range planning for, and management of, domestic wastewater.

8. Adopt new or strengthen existing water quality standards for total suspended solids (TSS), transparency (PAR), nitrate, total nitrogen, total phosphorus, BOD, chorine, submerged aquatic vegetation (SAV), and shellfish classifications.

9. Adopt an improved indicator species or test for human pathogens to better detect the potential for contaminated shellfish or finfish.

10. Establish pollutant loading fee (pollutant/lbs.) to provide resources for environmental improvements.

## Discussion

The option to increased financial incentives and flexibility in the NPDES process received near unanimous support (#1). Tax incentives were the financial inducement of choice. One speaker noted, "There is very little incentive for a discharger to utilize technology that would produce results below permit limits. If you want lower discharge limits then you're going to have to increase financial incentives." Others suggested that there be increased flexibility in pollution trading schemes.

There was a great deal of support for a standardized system of violations and penalties (#2). Many from the industrial communities believed that there is an uneven levying of pollution fines. One speaker noted that, "Municipalities regularly violate SOC's and are rarely fined, while if we violate one segment of the permit we are fined thousands of dollars." Others felt that the state was reluctant to "shutdown" a municipal plant while it showed no such hesitation when dealing with an industrial discharger.

Although those representing municipalities supported the call for standardized violations and penalties, several voiced the opinion that because of the nature of municipal wastewater treatment plants they cannot respond to a need to improve technology as rapidly as large corporations. One representative stated that his community has recently addressed a discharge permit violation but only after a bond referendum was passed to finance the necessary plant improvements. Another municipal official added, "Given the economic uncertainties facing small communities, upgrading outdated wastewater treatment plants will be a real problem."

There was unanimous support for the idea that environmental fines should go toward localized environmental clean-up rather than to the general treasury. One speaker believed that environmental fines should go in a dedicated fund to provide low interest loans to help municipalities finance treatment plant improvements. One speaker noted that if such a system is created, much thought should be given to the criteria used for qualifying for such a loan.

In addressing the call to identify and reduce toxicants in waste streams and non-point runoff, most believed that the majority of the water quality problems are being caused by non-point discharges (#3). Many thought that the state is unable to address adequately non-point pollution. One speaker noted, "I know exactly what is coming out of my pipe and how to treat it, unfortunately my discharge is just a small percentage of the total load." All agreed that much more research is needed to support more stringent non-point discharge regulations.

Although it was supported by many in attendance, there was little comment on the improved wastewater treatment technology (#4). Some felt that the EPA's treatment standards are based upon outdated technologies. Most agreed that Best Available Technology (BAT) is now tertiary rather than secondary treatment. Many stressed the importance of a balanced approach to pollution control. Regulatory agencies cannot continue to only address point source dischargers and hope to improve water quality.

The idea to create sanitary districts garnered support, but most cautioned that it must include groundwater quantity and quality (#7). Many believed that the state's groundwater permitting process is nothing more than a record keeping system. One speaker noted that groundwater withdrawals, especially industrial, are growing at a tremendous rate, yet the state has no plan or policy to deal with the issue. Others who supported the idea expressed that such a plan would be a "political nightmare".

The next discussion involved an option that was suggested by the participants. The option was to provide added technical expertise to improve treatment plant operations (#6). Many felt that this is a low cost way to obtain results. Those representing small municipal systems voiced support for this option, adding that in their experience this is one issue that receives too little attention.

The final topic discussed was the adoption of new, or strengthened,water quality standards (#8). There were several points raised during the dialogue. Citing DEM's recent 305-b Report, some questioned if the proposed option was even necessary. Several speakers asked if the A/P Study had the data to substantiate the changes. If the data existed, then many in attendance would support more stringent standards; however, some questioned if applying new standards would truly address the causes of water quality problems in the study area. One speaker expressed the opinion that new water quality standards would not address the pollution associated with nonpoint discharges.

## MOST CONTROVERSIAL OPTIONS

(In order of total votes)
18 options presented

1. Establish pollutant loading fee (pollutant/lbs.) to provide resources for environmental improvements.

2. Adopt new or strengthen existing water quality standards for total suspended solids (TSS), transparency (PAR), nitrate, total nitrogen, total phosphorus, BOD, chorine, submerged aquatic vegetation (SAV), and shellfish classifications.

3. Identify and reduce toxicants found in wastestreams and nonpoint source runoff.

4. Expand nutrient management and reduction plans to target and address sources of airborne nutrients.

5. Require more stringent nutrient reduction measures for new and expanding wastewater treatment plants, especially in areas of high population density and high growth.

6. Conduct remediation activities at contaminated sediment sites, where feasible.

7. Require new or expanding dischargers to submit information to the State, in conjunction

with the permit application, on the environmental safety and economic benefit of the proposed discharge.

8. Develop a standardized system of violations and associated penalties and enforce them in a consistent manner.

9. Increase field inspections and appropriate enforcement actions.

10. Reduce incentives for discharges to larger bodies of water, through such actions as more stringent mixing zones and outlet siting requirements.

11. Review and revise the classification of waters to reflect approval status for the harvest of shellfish.

**Discussion**

A discussion of long-term environmental planning prefaced the discussion of the management options. Many of the industrial representatives addressed the fact that studies, such as the A/P Study, do not consider the long term planning needs of the industrial community. As one spokesman indicated, "You people need to ask yourselves within a 10-15 year planning cycle, how stringent do we want to make the water quality regulations?" Another follow-up speaker noted, "You are proposing these changes based upon a relatively short span (5 years) without even knowing what the effects of the changes we were required to make a few years ago."

The most controversial option(s) were those that addressed pollutant loading fees and more stringent water quality standards (#1,2). The pollutant fee option was proposed by the participants, yet it was perceived as the most controversial subject. One participant noted, "Why not call it what it really is, a tax." Others added that an NPDES Permit is based on maintaining water quality, why add additional costs to dischargers if they are meeting their permit?

One spokesman questioned what type of entity would set the pollution fees and if the fees would be the same for municipal and industrial dischargers. Others questioned where the fees would go. One spokesman, whose company's products are sold on the world market, warned that additional fees would be an unfair economic burden. A final comment noted that in pollutant loading fee schemes, agriculture is often overlooked or not monitored as closely as dischargers.

The call for stricter water quality standards (#2) was just as controversial as the loading fee option. One representative pointed out that water quality standards were "just upped" three years ago, and the results of that action have not been fully evaluated yet. Others questioned the need for new regulations when the current ones were not being enforced. Some believed greater results would be realized from directing the costs for this type of regulation to BMP programs. The majority of the comments relating to this topic questioned whether the "science"

was there to support stricter standards. One participant stated, "This option would be more palatable if the end results were known." On the question of adequate scientific support, a speaker expressing frustration with the regulatory process, added, "If the science is there fine, but I will not be regulated by public opinion."

Similar issues arose during the discussion of toxic substance reduction and identification (#3). Many questioned the idea of what is a toxicant, noting that some "toxic" substances can pass through organisms, while others pointed out that there are no standard indicators for toxicity. The problem with toxicants can be particularly burdensome for municipal treatment plants since some industries pass their wastestreams through them. Others questioned if toxics removal is cost-effective. Does the tremendous capital outlay necessary to remove some of these substances equate with measurable environmental results?

On the question of airborne nutrients (#4), one speaker asked, "Are we killing an ant with a sledgehammer?" Many asked how the study proposed to control airborne substances from outside the study area. One speaker indicated that 30 percent of the airborne nitrogen comes from outside North Carolina. Given that fact, should in-state industries be expected to pay the clean-up costs?

Although all supported the call for further reduction in nutrients, many questioned the source of the additional monies needed for the reductions (#5). The representatives from small municipalities were especially concerned about the funding question.

The option that dealt with contaminated sediments also caused debate about "who pays?" (#6). Most believed that this was outside the scope of the A/P Study's goals, and hazardous waste/materials are already regulated under federal programs. If a site is "bad enough" then it will qualify for "Super Fund" status. This option was not deemed a new idea, and therefore received little support.

The call for additional information to be included in permit application or renewal process was also controversial (#7). The majority of the participants felt like this was additional paperwork and would result in further delays for the permittee. Others thought that these issues are already covered in the permit process; why duplicate it? One candid spokesman noted, "If we included this information in the permit application, who would believe it? We are viewed as biased parties by the public."

The final discussion addressed the call for increased field inspections and enforcement actions (#9). The option, suggested by the participants, was debated from the fairness consideration. Many believed that any call for increased inspection was usually directed at dischargers. Some stated that they could support the option if it was applied with an even hand, i.e., at <u>all</u> the parties who affect water quality. Again, many participants expressed the opinion that agriculture was not being regulated as stringently as their industries.

## DEVELOPERS AND MARINA OWNER/OPERATORS
**February 21, 1992**
**Rocky Mount, NC**

This meeting, held at the Ramada Inn, was attended by 16 participants. The group included: representatives from development corporations, representatives from environmental consultant firms, an attorney, representatives from trade associations, a marina owner, members of the A/P Study staff and visitors. **(A list of invitees is included in APPENDIX C.)**

### MOST FAVORABLE OPTIONS
(In order of total votes)
27 options presented

1. Expand private land protection incentives and strategies for critical areas including wetlands, rare and natural communities, and endangered species habitat.

2. Expand public acquisition programs for critical areas including wetlands, rare and natural communities, and endangered species habitat.

3. Mandate use of water conserving plumbing fixture in new construction and develop incentives to promote water conservation in existing structures and operations including residential, agricultural, commercial and industrial use.

4. Develop basin-wide resource management plans.

5. Promote alternatives to standard septic tank systems, sewage treatment outfalls and stormwater treatment systems.

6. Require proper management and maintenance of package treatment plants.

7. Develop and maintain a central database to serve as a basis for local and state planning in the watershed.

8. Promote public education and involvement in estuarine resource management policy making and program implementation.

9. Reduce the number of slips at marinas.

10. Evaluate and expand, if appropriate, areas considered "Areas of Environmental Concern" (AECs) under CAMA.

11. Institute more stringent septic tank regulations.

## Discussion

As was the case with many of the other groups, the "takings" issue was discussed at great length. It was not surprising then, that the two options that received the most support were those that addressed increased private land protection incentives and public lands acquisition (#1,2). Many expressed the opinion that incentives are the most cost-effective method to protect critical areas that are now in private ownership. However, the incentives must be targeted and appropriate. One speaker noted that given the current debate about wetland definition, and more importantly, the true dollar value of wetlands, it is very difficult to design protection incentives to entice landowners to participate in land protection programs.

In regards to public acquisition, one participant stated, "I'm in favor of public access and acquiring additional public lands, but how much more public lands can we stand? In some counties the most valuable lands are already owned by the public and it is breaking backs of local governments."

There was general support for the water conservation option, but many in attendance noted that the state-wide building code is undergoing a change that will incorporate water saving devices into new construction, both commercial and residential (#3). They stressed that the option should still target agriculture and industrial water users.

The basin-wide resource management plan option (#4) also received support as did the call for a centralized data base to aid in local planning efforts (#7). All believed that this type of planning would be valuable to all those involved in long-term economic planning.

There was some support for the promotion of alternative sewage treatment systems. Some questioned the cost-benefit of these types of systems and whether they would really surpass current practices. If the Study is in favor of these systems, then it must provide financial incentives to begin the process. While there was a call for additional financial incentives, some believed that to deter the increased use of on-site systems, there must be a system of financial disincentives.

On the subject of sewage treatment there was broad support for encouraging the use of centralized wastewater treatment systems. One speaker suggested that the 201 Plans could serve as the foundation for improving wastewater treatment in coastal areas.

### MOST CONTROVERSIAL OPTIONS
(In order of total votes)
27 options presented

1. Evaluate and expand, if appropriate, areas considered "Areas of Environmental Concern" (AECs) under CAMA.

2. Develop a state wetlands protection policy with the goal of avoiding, minimizing and

compensating for adverse impacts on wetlands.

3. Expand current coastal stormwater regulations to the entire Albemarle-Pamlico region.

4. Establish user fees for development or use of public trust waters.

5. Amend the CAMA permit process to restrict the use of "hard" stabilization methods along estuarine shorelines, giving preference to 1) vegetative buffer, 2) staggered offshore breakwater, 3) bulkhead, and 4) groins.

6. Require post-development stormwater to be equal to or less than pre-development runoff.

7. Require and fund development of local enforceable land use plans.

8. Reduce the number of slips at marinas.

9. Develop a comprehensive public access plan and public trust legislation through local-state cooperation to promote access and protection of public trust lands.

**Discussion**

The expansion of "Areas of Environmental Concern", or AECs, was the most controversial option. There were many reasons for this broad-based opposition. Many believed that the AEC nomination process has been used to hold up development projects. As one speaker noted, "A small group of individuals has used the AEC nomination process to hold the Coastal Resources Commission hostage. They have made a joke of the process. It's just another way to stop growth in the coastal region."

Other speakers disliked the inclusion of a freshwater wetland AEC. All voiced opposition to this proposal. One speaker stated that in his opinion, "The original intent of the AEC designation has been abused. CAMA should not have any more jurisdiction that it currently oversees." Other speakers reminded the staff that CAMA covers 20 counties, and the proposal would have a tremendous impact on the region because it would extend the AEC regulations to an even larger group of counties. One speaker noted, "The AEC concept is established; people know what to expect. If you change the system, the majority of the living, using folks will oppose this expansion."

Other comments regarding this option included: the need to remove the public from the process, the need to develop a database to support the designation process, the need to shorten the permitting process for the property owner, and the need to alter the AEC nomination process so that the petitioner is responsible for providing the supporting evidence rather than the Division of Coastal Management staff. One speaker said, "Money and staff time are being diverted from pressing issues to the AEC nomination process; something has to be done."

The proposed wetlands protection program was also very contentious (#2). One speaker pointed out that the Environmental Management Commission (EMC) already has the power to regulate wetlands and are required to classify wetlands. Therefore, why create a new program?

Others thought that activities causing wetland loss have subsided and that the estimates of loss have been over-inflated. One speaker noted, "Any estimate of wetlands loss is just a "snapshot". Given this fact, why stretch an overworked regulatory staff to deal with a problem that is no longer an issue." Summing up the consensus of those present, one spokesman ventured, "A program like the one you're suggesting will never be passed in by the General Assembly in my lifetime."

There were other comments addressing the wetland issue. Some believed that most wetland regulations are only directed toward the development community while agriculture and forestry go unregulated. Several speakers believed that most wetland destruction had occurred at the "hands of agriculture", but developers were just an easy target to blame.

The proposed expansion of stormwater regulation also sparked debate (#3,6). The first speaker addressed the staff and asked, "Where is the data that would support such an expansion?" Others believed that current regulations are addressing the problem. Others again expressed the belief that the development community was being unfairly singled out. "If we eliminate the nine percent of pollution caused by development," one spokesman noted, "then we will still have a large problem."

There was support for stringent stormwater regulations near shellfishing waters. There was support for requiring vegetated buffer strips on intermittent and annual flowing streams; however, some questioned if the buffers must include only natural vegetation rather than species that could be introduced for such purposes.

Several participants addressed the call to establish user fees for public trust waters (#4). Most believed that the general publics' response would be not be supportive of this option. One speaker noted that the Coastal Resources Commission (CRC) has debated this question on several occasions and it will be very hesitant to discuss it again. One participant added, "This issue has come up in other states, and private capital is unwilling to take on the risks." Many believed that it would take more to maintain such a program than it would collect in revenues. One marina owner questioned why he should be penalized for providing public access, i.e., boat launching, while the state is unable or unwilling to provide the same service.

The restriction of "hard" stabilization methods along estuarine shorelines was also controversial (#5). Many questioned the need for such a program adding, "CAMA already controls structural installation." Most felt that private landowners will not support this restriction. Many believed that current regulations are protecting habitat, but there was backing for using vegetative means to protect shoreline where appropriate. Finally, all agreed that if a lot can be developed without bulkheading then it should be.

The option to limit the number of slips at marinas was also discussed (#8). Some believed that the environmental impacts of marinas have been overstated. Others noted that currently, it is impossible for a marina operator to enforce water quality regulations. One private marina owner expressed the belief that there are inequities in the marina siting regulations. For him, there is an incentive to maintain water quality in and around his facility, while in large planned developments with slips, but no actual operator, there is very little incentive or interest in improving water quality. He added, "Why is the little guy always being punished?"

The call to develop comprehensive public access plans received little support (#9). One speaker noted that a comprehensive public access plan is inherent in current public access programs; why create a new program?

## ENVIRONMENTAL ACTIVISTS
## February 25, 1992
## Raleigh, NC

This meeting, held at the NCSU Faculty Club, was attended by 19 participants. The activists represented 10 separate groups whose focuses include: water quality, land-use, regulatory reform, agricultural practices, critical area protection and public land acquisition. Also in attendance were the A/P Staff and visitors. **(A list of invitees is included in APPENDIX C.)**

The design for this meeting was somewhat different from the other six. After the A/P Staff completed the overview of the program and review of the proposed options, there was an open discussion dealing with all the management recommendations. Therefore, the workshop did not involve a vote on the options they found favorable or controversial.

The options were listed under the four general areas of interest: human environment, critical habitat, water quality and fisheries. Since there was not a straw poll ranking the options but rather specific comments directed toward the proposed options, the discussion section will vary slightly from the previous format.

### Discussion

The discussion opened with some general comments regarding the *Status and Trends Report* and the format of the CCMP. Some suggested that there was a need to include a clear, concise problem statement. In the same vein, the participants encouraged the staff to personalize each citizens' responsibilities in the management efforts. One spokesman noted, "It will take a personal commitment by the citizens of this state if we are to begin to correct some of these problems."

### Human Environment

1. Require and fund development of local land and water use plans which promote natural area preservation and conservation, consider individual and cumulative environmental impacts of land and water use, and promote development of renewable natural resources.

The majority of those in attendance strongly supported this option. Some commented that land use plans (LUPs) must contain performance based standards to succeed. All believed that specific language must be included in the plans and suggested that the Study include some examples to help counties develop these plans. One speaker noted that LUPs should allow flexibility to "achieve the ends". Others believed that plans should distinguish between short and long term efforts. One speaker added, "Based upon the CAMA LUP experience, a process like you are describing here could take 5 to 20 years."

Other suggestions involving the LUPs included: addition of degraded areas to the AEC system; include groundwater issues during the development of the LUPs; make sure that the LUP maps are detailed, and include an education component in the LUP process.

2. Require runoff after land conversion to be of similar or better quality than runoff prior to conversion.

The participants suggested that the Study use an "holistic approach" to the stormwater runoff problem, i.e., consider the impacts of runoff on surface water, groundwater, critical areas, etc. There was broad based supported for BMPs and other runoff control structures, however, most believed that the maintenance and monitoring of these systems is very poor. One speaker added that the study should develop a maintenance plan for all runoff control devices and stress enforcement of stormwater regulations. Some asked how "grandfathering" would affect the proposed option, suggesting that land undergoing conversion should be regulated under the new program rather than the weaker, older regulations. This approach would not only improve water quality but also prevent an increase in impervious surfaces.

3. Prohibit hard stabilization methods of erosion control from all estuarine shorelines.

There was general support for this option, although many warned about the political difficulties such a program would entail. One suggested that the plan include a prioritization scheme based on standards.

**Critical Areas**

7. Develop a statewide comprehensive wetlands protection policy with a goal of avoiding, minimizing and compensating wetland impacts.

There was broad-based support for this option. Most believed that the state needed to adopt a "no net loss" policy. Others expressed a belief that such a policy must contain a classification scheme coupled with a baseline policy. Others believed the state wetlands policy must deal with site-specific wetlands such as pocosins. One speaker noted, "Local control brings a certain predictability to the process."

The overriding feeling of the participants was that the state must develop its own definition of what constitutes a wetland; the state cannot depend on the federal government to do it. One suggestion was to use the Memorandum of Agreement (MOA) between the Corps and EPA as an example of the correct language. One participant asked that the definition should include buffer zones descriptions.

In regards to created wetlands, most supported the concept but warned against overestimating the ecological value of these systems. One speaker suggested that man-made wetland include a "warranty" or performance bond.

12. Strengthen enforcement (training, surveillance, fines) and protection strategies of existing programs (reevaluate, implement).

All expressed the need for more enforcement of the current regulations. Some expressed the opinion that self monitoring and reporting can work; however, these programs must include a series of checks and balances.

Many expressed frustration when dealing with multi-agency permits. One participant called for a project officer who would oversee large projects. This would make citizen permit monitoring efforts more efficient and also make the permittee's responsibilities better defined. Others thought that the creation of an inter-agency task force would improve the flow of information between agencies during the permit process.

There was a call for all regulatory agencies to install 1-800 numbers (similar to DEM and DMF) to encourage citizens to report polluters. One participant suggested that the Study sponsor additional citizen monitoring education programs. The sessions should address citizen compliance monitoring efforts.

**Water Quality**

Most of the comments expressed during this discussion were general in nature and did not address specific proposals. There were however, some specific options discussed.

The first speaker addressed the water quality problems associated with agriculture. In his opinion many of the current water quality regulations are not adequately addressing toxic substances being used by modern agriculture. He noted, "It is no longer sufficient just to deal with sediment runoff and nutrient enrichment. We must develop regulations that realistically address toxic agricultural chemicals being used every day." One speaker stated that current "fixes" do not address toxic loading. Incentives must be developed to remove these substances from current agricultural practices. Others believed that the Study must develop long and short-term water quality goals for agriculture, and begin to "sell" these goals to the agricultural community.

There was general agreement that the agriculture cost-share programs have merit; all agreed that the BMP funding needs to be expanded, especially in cases where farmers are being asked to radically alter their practices. One speaker noted that if we really want to improve water quality for the long-run, the Study must develop water quality incentives besides BMPs. Some believed that costshare programs must be extended to other user groups, e.g., industry, municipalities, etc.

There was also a discussion that addressed the role of other financial incentives to improve water quality, and most believed that too little emphasis has been placed on these programs. User fees and pollution taxes should be considered as cost incentives. One speaker noted, "The A/P Study is the perfect vehicle to explore creative, non-regulatory ways to deal

with water quality problems." Some believed that any consideration of financial incentives in the coastal regions must include upstream users. Since all upstream pollutants are manifested in coastal waters, much more emphasis must be placed on improving wastestreams in the headwaters of the watersheds.

Other economic incentives that were discussed included greater financial motivation for increasing organic farming practices; mandatory reduction and recycling of wastestreams (air and liquid), and increasing the "Pollution Prevention Pays Program".

There was a great deal of discussion about strengthening septic regulations. All agreed that more stringent regulations addressing siting, maintenance and density of septic systems were needed. Some expressed the opinion that septic tank regulations should be based solely on human health issues rather than water quality.

There was broad based support for the removal of all wastestreams from the estuaries. There was, however, little support for the call to encourage centralized sewage systems. Many believed that in some instances these systems increase growth in areas that are not suitable for development. In areas where growth has already exceeded the capacity of septic and package treatment systems, central sewage systems were deemed appropriate. There was also a call for funding to improve marginal/malfunctioning wastewater treatment plants.

There was general support for strengthening all stormwater regulations. One speaker noted that any plan that addressed stormwater should consider repairing current stormwater systems, i.e., broken or leaking drain pipes.

In regards to the call for developing a new marina definition that addresses cumulative impacts, some believed that the A/P study should consider developing marina siting criteria. Marina siting based on these criteria should clearly and scientifically "redline" the areas where marina location is appropriate.

**Fisheries**

There were a few comments relating to the fisheries recommendations. The main topic of discussion addressed aquaculture. There was support for expanding technical support for aquaculture, however, some expressed the concern that these facilities could have a negative impact on local water quality. Any call for encouraging aquacultural facilities must include consideration of the WQ standards of the proposed site. One speaker noted that in aquaculture, introduction of non-native species to the state's waters should be prevented.

## SUMMARY

There were obvious patterns in the straw polls. Some management options were well received by all the groups. Land use planning and strengthening enforcement of current regulations were examples of such options.

As one would expect, some of the options were deemed not acceptable by specific groups, while some options were considered controversial by all the groups. Some of the more controversial recommendations included: additional wetland regulations, strengthening stormwater programs and more stringent septic tank regulations.

A table summarizing the participants' responses is included. The reader is encouraged to study the following summary and draw his or her own conclusions about how the options were ranked by the participants.

One very positive note emerged from these workshops. All the groups expressed a willingness to alter their current practices, procedures, etc., in order to protect the valuable resources of the Albemarle and Pamlico Sounds.

*Summary of Most Favorable and Controversial Management Options (Based Upon Results of the Straw Poll)*

| USER GROUPS | FAVORABLE OPTIONS | CONTROVERSIAL OPTIONS |
|---|---|---|
| Southern Study Area Elected Officials | 1. Require and fund comprehensive land use plans.<br>2. Strengthen enforcement of existing regulatory programs.<br>3. Require local comprehensive plans to protect critical areas | 1. Institute more stringent septic tank regulations.<br>2. Expand stormwater regs. to the entire A/P Study Area.<br>3. Develop a statewide wetland protection program. |
| Northern Study Area Elected Officials | 1. Require and fund comprehensive land use plans.<br>2. Expand private land protection incentives and strategies.<br>3. Strengthen enforcement of existing regulatory programs. | 1. Require post-development stormwater controls.<br>2. Mandate the use of water conserving devices.<br>3. Institute more stringent septic tank regulations. |
| Agriculture and Forestry | 1. Increase funding to the Ag. Cost Share Program.<br>2. Examine the "takings" issue and how it could affect A/P Study management options.<br>3. Promote water conservation programs. | 1. Phase out agriculture and silviculture CAMA permit exemptions.<br>2. Develop a statewide wetland protection program.<br>3. Phase out agriculture and silviculture 404 permit exemptions. |

*Summary of Most Favorable and Controversial Management Options*
*(Based Upon Results of the Straw Poll)*

| USER GROUPS | FAVORABLE OPTIONS | CONTROVERSIAL OPTIONS |
|---|---|---|
| **Commercial/Recreational Fishermen** | 1. Develop and implement management strategies to minimize destructive human activities.<br>2. Adopt strategies to protect critical habitat.<br>3. Implement a cost-share program to encourage use of by-catch reduction gear. | 1. Provide Marine Fisheries Commission authority to limit entry to fisheries.<br>2. Develop additional regulatory restrictions to reduce excessive harvesting.<br>3. Expand efforts to develop by-catch reduction gear and require the use of this gear. |
| **Pipe Dischargers (NPDES Permits)** | 1. Provide dischargers increased financial incentives and flexibility in the NPDES process.<br>2. Develop a standardized system of violations and penalties.<br>3. Identify and reduce toxicants in wastestreams. | 1. Establish pollutant loading fees.<br>2. Adopt new or strengthen existing water quality standards.<br>3. Identify and reduce toxicants in wastestreams. |
| **Developers and Marina Owner/Operators** | 1. Expand private land protection incentives and strategies for critical areas.<br>2. Expand public acquisition programs for critical areas.<br>3. Mandate use of water conserving devices in new construction. | 1. Expand Areas of Environmental Concern (AECs).<br>2. Develop a state-wide wetland protection program.<br>3. Expand current stormwater regulations to the entire A/P Study area. |
| **Environmental Activists** [1] | 1. Require and fund comprehensive land use plans.<br>2. Require post conversion runoff water quality to be equal to or better than pre-conversion runoff.<br>3. Prohibit hard stabilization methods on all estuarine shorelines. | 1. Encourage central sewage in coastal areas.<br>2. Require and expand current cost-share programs to consider toxic loading.<br>3. Encourage growth of aquaculture facilities. |

1. The format for the Environmental Activists was altered slightly; the group did not conduct a straw poll per se. The designation of the favorable and controversial options was taken from the discussions during the workshop.

**NOTE**

**A.** The management options presented to each "user group" varied. Groups were presented only with the options that the staff believed to be of most interest to that particular group.

**B.** Controversial does not equate to unfavorable.

# APPENDIX A
## Executive Summaries of the Proposed Management Options

## LOCAL OFFICIALS

### I. Introduction

The Albemarle-Pamlico Estuarine Study (APES) was the first National Estuary Program to be designated under the 1987 amendments to the Clean Water Act. It represents a cooperative effort between the Environmental Protection Agency and the State of North Carolina. APES was designed as a 5 year program to combine scientific research, the evaluation of potential management alternatives, and public involvement and education. This effort will determine how serious the environmental problems are in North Carolina's estuaries and how the estuarine systems can be preserved and managed to maintain their environmental integrity and maximize the use and pleasure people derive from them.

The Albemarle-Pamlico region covers 23,500 square miles of the watershed for the Albemarle and Pamlico Sounds. Human activities within the region often contribute to the environmental problems associated with the loss and degradation of the regions' fisheries, water quality, and natural areas. More specifically, these environmental concerns include:

- recent declines in fisheries productivity
- fish kills and fish disease
- loss and degradation of fish and shellfish habitat
- shellfish bed closures
- effects of toxic pollutants on plants and animals
- excessive algal growth from human activities
- loss and degradation of wetlands and essential and unique habitat

The permanent population of the Albemarle-Pamlico region has been continuously increasing over the past decades. In 1990, the permanent population of the region was roughly 2,670,000 and is expected to reach almost 3 million by the year 2000. Several counties, particularly those which border the sounds or ocean, also experience great seasonal population increases. This combined increase in population will promote greater use and, in turn, may negatively impact the estuarine system resources.

Development and related activities including marina development, transportation, and the travel and tourism industry have increased with the population increase and will continue to do so into the future. These human activities have many obvious positive aspects, but may also lead to increased demands for raw materials and waste disposal, the conversion of land in its natural state to other uses, and an overall loss and degradation of habitats within the region.

General water quality degradation often results from improperly sited or improperly functioning septic tanks, contaminated urban stormwater runoff, and various marina activities. All of these can contribute fecal coliform to adjacent waters, and so cause their closure to the harvest of shellfish. Urban stormwater runoff may also contribute significant amounts of sediment to estuarine receiving waters and can contain very high concentrations of nutrients, heavy metals, and other toxicants. Marinas may also increase the amount of heavy metals in estuarine sediment, oil and gas pollution, and loss of public trust waters.

Habitat loss and degradation, including that of wetlands, often result from urban and suburban development in the form of dredge and fill operations, toxic inflows (heavy metals and organics in water) due to runoff, pollution discharge, diversion of surface waters, housing development, transportation infrastructure construction and maintenance, and marina construction.

Recent regulatory changes have helped to reduce losses of coastal wetlands due to development activities, however, significant impacts on, and losses of, nontidal wetlands and other important habitat continue to occur

in the coastal area. These areas will undergo heavy residential and commercial development pressure as seasonal and permanent population increases.

## II. Current Management Strategies

In recent years local and state government has made an effort to reduce the negative impacts of development activities upon the estuarine system. These resource management strategies include local land planning which is often associated with the N.C. Coastal Management Program (CAMA), the Sedimentation and Erosion Control Program, the On-Site Sewage Treatment Program, Coastal Stormwater Runoff Regulations, various marina regulations, and Section 404 and 401 of the Federal Clean Water Act (CWA).

### Local Planning and CAMA

Many cities and counties in the Albemarle-Pamlico region have already implemented land and/or water planning in their jurisdictions in an effort to manage growth and development in an orderly fashion. The Coastal Area Management Act (CAMA) requires land and water planning in the 20 coastal counties of the state. In addition, the Division of Coastal Management (DCM) and local governments under the direction of the North Carolina Coastal Resources Commission (CRC) implement the CAMA permit program for development within Areas of Environment Concern (AECs) in the 20 coastal counties.

### Sedimentation and Erosion Control Program

Under the Sedimentation and Erosion Control Program, a disturbance of one or more contiguous acres requires an approved plan to control sediment pollution up to a 10 year storm's peak runoff. This program is administered by the Division of Land Resources and local officials.

### On-Site Sewage Program

The On-Site Sewage Program oversees small treatment systems which serve one to several residential households or small commercial developments, usually 480 gallons per day or less. Regulations are administered by county sanitarians with oversight and assistance from NC Division of Environmental Health staff.

### Stormwater Runoff Regulations

Current regulations for stormwater runoff are administered by the N.C. Division of Environmental Management (DEM) under the Coastal Stormwater Runoff Regulations to limit the degrading effects of stormwater generated from new developments of more than one acre on coastal waters.

### Marine Sanitation Program and CAMA

Regulations affecting marinas and Marine Sanitation Devices (MSD) include CAMA and the Marine Sanitation Program. Marina construction requires a CAMA permit for development in the estuarine AEC. The Marine Sanitation Program regulates sewage discharge from boats.

### Section 404 of the Clean Water Act (CWA)

Section 404 of the CWA is administered by the US Army Corps of Engineers (COE), with final authority under the US Environmental Protection Agency (EPA). Section 404 regulates the discharge of dredged and fill material into waters of the US including adjacent wetlands.

### Section 401 of the Clean Water Act (CWA)

Section 401 certification is required of any project requiring a Section 404 permit or other federal permit. In North Carolina, the 401 certification process requires official review and approval by the N.C. Division of Environmental Management (DEM), and so provides for the application of the state's water quality standards.

## III. New Management Options

An important goal of the Albemarle-Pamlico Comprehensive Conservation Management Plan (CCMP) is to manage the human population growth and development in the region to allow only minimal adverse impacts upon the estuarine system and its natural resources. Specifically, future land use changes should aim for natural area preservation and conservation (including public trust land and water), no net addition of pollutants to surface and ground waters, and only the sustainable development of renewable natural resources as the economy of the region progresses. A step towards this goal would be to classify current and desired land uses in official regional or local comprehensive conservation plans. These plans should be enforceable and consider all short and long term individual and cumulative environmental impacts of growth.

Several management options have been suggested that will help achieve these objectives. Some of these options have already been implemented in areas within the Albemarle-Pamlico region and may only require an expansion of current activities. Others are new and may require new legislation, additional funding or expanded staffs. Generally, these options include land planning, water planning, and cooperative regional planning. These are discussed below. In addition, financial resource options, data management, and public education and involvement are addressed. Finally, a summary of information required to address the goals and management options is given.

### Land planning

1. Require and fund development of local land use plans.
2. Develop local government protection programs for wetlands, essential habitat, and rare natural communities.
3. Require stormwater runoff to be reduced and require that all runoff from converted land uses to be of a similar or better quality than at pre-conversion.
4. Expand current coastal stormwater runoff regulations to the entire Albemarle-Pamlico region.
5. Promote alternatives to standard septic tanks, sewage treatment outfalls, and stormwater treatment systems.
6. Institute more stringent septic tank regulations.
7. Enforce consistent monitoring and reporting requirements.
8. Prohibit new septic tanks and remove old septic tanks from inappropriate soils.
9. Require package treatment plants run by homeowner associations to be properly maintained or place these facilities under the management of local jurisdictions from the commencement of the project.
10. Require vegetated buffer strips and restoration of floodplain vegetation to protect receiving waters from excessive quantities of pollutants.
11. Prohibit hard stabilization methods from all estuarine shorelines. At a minimum, amend the CAMA permit process to list estuarine shoreline stabilization practices in order of preference: 1st - vegetative buffer, 2nd - staggered offshore breakwater, 3rd - bulkhead, 4th - groin.
12. Reevaluate the natural areas currently covered by CAMA AEC designation to determine if coverage should be extended.
13. Develop a state wetlands protection policy to avoid, minimize, and compensate wetland impacts. Include a state mitigation program of wetlands enhancement, restoration, and creation in the policy.
14. Expand private protection incentives and strategies, and private and public acquisition programs.
15. Strengthen enforcement of existing regulatory programs.

### Water supply and water use planning

1. Require and fund development of local water supply and water use plans.
2. Require a reduction in the amount of wastewater per person and promote water conservation

programs by mandating conservation in new construction and developing incentives for water conservation in existing structures.

3. Develop a "no marina sanitation device (MSD) discharge" requirement at boat marinas, and use stronger incentives and educational materials to promote proper operation and maintenance of MSDs. Redefine the Coastal Resources Commission's term "marina" so that the maximum allowable density of slips is reduced. The current definition of a marina is 10 slips or more.
4. Strengthen enforcement of existing regulatory programs.

Public trust rights

1. Develop a comprehensive public access plan and public trust legislation in cooperation with local governments to recognize and implement public trust rights.

Cooperative regional planning

1. Develop basin-wide resource management plans.
2. Develop sanitary districts to manage water withdrawal and disposal.

Financial resource options

1. Land transfer taxes
2. Use (tax) valuation
3. User fees for all development using public trust waters
4. A nonrenewable resource tax on oil and gas that is pumped in the region
5. Performance bonds for marinas administered by DCM
6. Expand state acquisition of lands or the compensation of private land owners for conservation measures.

Information management

1. Maintain a central state database with information provided by the counties.
2. Utilize the central database for land and water planning analysis.

Public education and involvement

1. Promote public education and involvement as a significant component of any management plan including education on estuarine resources management issues.
2. Increase involvement of greater segments of the public in estuarine resource management policy making and program implementation.

## IV. Information Needs

We recognize that some information required to implement these management options may not be readily available. Additional information needed to facilitate implementation include:

- Determine the size, type, and effectiveness of vegetated buffers and setbacks required to protect adjacent water quality.
- Delineate wetlands and the effectiveness of constructed wetlands as tertiary treatment plants
- Determine the environmental impacts of various development scenarios.
- Determine cumulative and secondary environmental impacts of land use changes.
- Develop an economic model of the different productivity sectors to allow predictions to be made regarding the scale and location of growth and development and their relations to coastal policy.

## AGRICULTURE AND FORESTRY INDUSTRIES

### I. Introduction

The Albemarle-Pamlico Estuarine Study was the first National Estuary Program to be designated under the 1987 amendments to the federal Clean Water Act. It represents a cooperative effort between the Environmental Protection Agency and the State of North Carolina. The Albemarle-Pamlico Estuarine Study was designed as a five-year program to combine scientific research, the evaluation of potential management alternatives, and public involvement and education. This effort will determine how serious the environmental problems are in North Carolina's estuaries and how the estuarine systems can be preserved and managed to maintain their environmental integrity and maximize the use and pleasure people derive from them.

The Albemarle-Pamlico region covers roughly 23,500 square miles of the watershed for the Albemarle and Pamlico Sounds. Human activities within the region have many effects on the environment and some contribute to the environmental problems associated with the loss and degradation of the region's fisheries, water quality, and natural areas. Agriculture and forestry are both important industries which make use of the natural resources of the region. These activities, however, contribute to degradation of the region's resources through nonpoint pollution including sedimentation, habitat and wetlands loss and/or degradation, and alteration of natural drainage patterns.

Nonpoint source pollution results from runoff from urban and rural areas to the surrounding waters. In the river basins of the Albemarle-Pamlico region, agricultural runoff is the dominant source of nonpoint source pollution, and silvicultural runoff contributes as well. Nonpoint runoff results from agricultural and silvicultural practices, such as row cropping, but it can be controlled through the use of agricultural and forestry best management practices (BMPs). Nonpoint runoff can cause the following water quality problems in receiving waters: nutrient loading, particularly from animal operations and fertilized fields, increased peak freshwater flows which may be especially damaging to primary nursery areas, increased sedimentation, increased inputs of fecal coliform from animal operations, and pesticide pollution.

Forestry and agricultural practices, such as clearing, draining, dredging, excavation, and the planting of monocultures, have resulted in the loss or degradation of important flora and fauna habitat. Loss of habitat is often a primary reason for reduction in the number, or compromise in the ecological function and health, of plant and animal species. The majority of historical loss of wetlands has resulted from agricultural and silvicultural practices, including those mentioned above. Wetlands may also be lost, in form or function, by nonpoint source pollution, flooding from impoundments, lowered surface water levels, and dewatering of freshwater wetlands. Most wetland conversion in the region occurred prior to 1980, and recent regulatory changes have reduced losses of wetlands.

Altered drainage basins and modified drainage on agricultural and silvicultural lands causes increased rates of flow of contaminants, turbidity, and freshwater to receiving waters, all of which, if in sufficient quantities, can act as environmentally degrading pollutants. Extensive networks of drainage ditches have altered sedimentation patterns, thereby altering flow patterns, the balance of sediment and water transport, and the amount of sediment in the receiving waters. Sedimentation rates are high, but lower than they were when land clearing was more prevalent. Furthermore, drainage canals and ditches in the region have disrupted natural salinity patterns by serving as conduits for the seaward transport of freshwater and the landward transport of brackish water.

### II. Current Management Activities

NC State Water Quality Standards: Agricultural and silvicultural activities are subject to all of the state's ambient water quality standards.

Agricultural Cost Share Program -- Voluntary BMPs: Nonpoint pollution from agricultural and silvicultural practices are addressed by the Agricultural Cost Share Program through the Division of Soil and Water Conservation and local Soil and Water Conservation Districts and the Silvicultural Best Management Practices Program through the Division of Forest Resources, respectively. These programs are voluntary and provide landowners with technical and financial support for the implementation of best management practices which control nonpoint runoff.

Sedimentation and Erosion Control Program: The goal of this regulatory, permit and performance based program, led by the Division of Land Resources, is to reduce the problems associated with sedimentation and erosion. Agriculture is exempt from the program and silviculture is exempt if land disturbing activities are carried out in accordance with accepted BMPs.

NC Coastal Area Management Act (CAMA): CAMA requires land use planning of every coastal county and regulates, through a permit review process, all development within 75 feet of the coast and within other designated "Areas of Environmental Concern".

Section 404 and 401 of the federal Clean Water Act: No state level program specifically addresses wetlands loss or degradation from agricultural or silvicultural practices. Established and on-going farming and forestry activities are exempted from the US Army Corps of Engineers' 404 permit process, during which all requests to dredge or fill wetlands are reviewed for their potential to cause environmental damage. Activities not classified as established or on-going may, however, be placed under review by the Environmental Protection Agency.

Other federal regulations and incentive programs: Several programs established by the Federal Food Security Act (Farm Bill) of 1985 and the Food, Agriculture, Conservation, and Trade Act of 1990, such as Swampbuster, Conservation Easement, and the Wetlands Reserve Program, create incentives for farmers to conserve wetlands areas. The Sodbuster program, also created by the Farm Bill, encourages conservation, rather than conversion to cropland, of highly erodible land.

## III. Management Options

There are many environmental concerns associated with the use of the Albemarle-Pamlico estuarine system. These include water quality, sustainability of fisheries resources, and critical areas protection. For each of these concerns, management recommendations and research needs will be suggested in the Albemarle-Pamlico Comprehensive Conservation Management Plan (CCMP). The following is a summary of the range of possible management options currently under consideration for inclusion in the CCMP. These options represent possibilities only, and they are presented here for your consideration and comments.

Nonpoint source pollution control:

1. Require the use of vegetated buffer strips and other BMPs as appropriate.
2. Phase out agricultural and silvicultural exemptions for CAMA permits, 404 permits, and the Sedimentation Pollution Control Act.
3. Increase the enforcement of the Sodbuster program.
4. Improve the Agricultural Cost Share Program through increased funding in order to better target needy recipients and better inspect BMP installations.
5. Increase the use of Integrated Crop/Pest Management.
6. Increase the use of fiscal incentives, such as pollution taxes and increased fines, to increase compliance, increase the use of conservation measures, and generate revenues for conservation programs.
7. Utilize land planning on a wider scale to address the control of runoff from agricultural, silvicultural, and urban areas.

Water quality standards:

1. Institute a gravimetric (weight-based) standard for total suspended solids (TSS) to address problems of excessive turbidity and the silting up of receiving waters.
2. Institute a photosynthetically available radiation (PAR) standard for the transparency of receiving waters. This will ensure that submersed aquatic vegetation will receive sufficient sunlight.
3. Develop nutrient reduction targets for all basins within the A/P region.

Drainage:

1. Require the modification of drainage ditches (through the use of flashboard risers, tidegates, and other means) to divert discharge from primary nursery areas and to control sedimentation, nutrient loading, and the discharge of other pollutants.

Habitat and wetlands loss:

1. Officially designate shellfish areas, submersed aquatic vegetation beds, and additional nursery and spawning areas. Develop protective regulations and management plans for these areas.
2. Expand the use of appropriate BMPs and maximum enforcement of environmental programs to ensure that sensitive areas are adequately protected.
3. Implement a state-wide comprehensive wetlands protection policy with the goal of avoiding, minimizing, and compensating for adverse impacts on wetlands.
4. Promote the public acquisition of land and incentives for the private protection of essential habitat, rare natural communities, and wetlands.

## IV. Information needs

To support management decisions which affect agriculture and forestry operations, many information gaps must be filled. Several suggested research needs have been collected and are summarized here.

- The standards discussed need to be developed based on the requirements of estuarine living resources such as shellfish and submersed aquatic vegetation (SAV).
- Setbacks and vegetated buffer strips should be evaluated for their effectiveness and determination of appropriate widths in agricultural and silvicultural areas.
- The following impacts need to be investigated:
  - the effects of salinity on SAV and nursery areas,
  - the effects of drainage canals on receiving waters,
  - the salinity intrusion patterns associated with human-made flow altering structures,
  - the effects of animal growing operations on water quality, and
  - the cumulative and secondary effects of various land uses.
- For wetlands, the following information is needed:
  - further investigation of the functions and productivity levels of isolated wetlands,
  - continuation of the wetlands identification process, and
  - assessment of the potential for wetland restoration and creation is needed.
- The real costs associated with each production sector and the costs and biological and socioeconomic impacts associated with extant and proposed management policies should be evaluated.

## COMMERCIAL AND RECREATIONAL FISHING

### I. Introduction

The Albemarle-Pamlico Estuarine Study (APES) was the first National Estuary Program to be designated under the 1987 amendments to the Clean Water Act. It represents a cooperative effort between the Environmental Protection Agency and the State of North Carolina. APES was designed as a 5 year program to combine scientific research, the evaluation of potential management alternatives, and public involvement and education. This effort will determine how serious the environmental problems are in North Carolina's estuaries and how the natural systems can be preserved and managed to maintain their environmental integrity and maximize the use and pleasure people derive from them.

The Albemarle-Pamlico region covers 23,500 square miles which drain to the Albemarle and Pamlico Sounds. Human activities within the region often contribute to the environmental problems associated with the loss and degradation of the region's fisheries, water quality, and natural areas. More specifically, these environmental concerns include:

- recent declines in fisheries productivity
- fish kills and fish disease
- loss and degradation of fish and shellfish habitat
- shellfish bed closures
- effects of toxic pollutants on plants and animals
- excessive algal growth resulting from human activities
- loss and degradation of wetlands and essential and unique habitat

Commercial and recreational fishing are both important industries in the Albemarle-Pamlico region, and the maintenance of fisheries stocks to support fishermen's activities on a long-term basis is an important goal for the region. In recent years, declines in commercial landings in many fisheries have raised concerns about the status of the region's important stocks. Fisheries landings, however, do not reflect stock size accurately because they fluctuate with regulatory and market influences. Comprehensive stock assessments are necessary to determine the status in the fisheries. There are, however, indications that several fisheries including Atlantic croaker, oysters, red drum, summer flounder, weakfish, and striped bass are severely stressed. Other fisheries, such as blue crabs, shrimp, southern flounder, and king mackerel appear to be quite healthy.

Over 90% of the commercially important and 60% of the recreationally important fish and shellfish caught in North Carolina are dependent on estuarine or wetland habitat during at least a part of their life cycle. The loss and degradation of estuarine habitat through direct physical disturbance or through declining water quality, therefore, has negative effects on the productivity of important fisheries. Loss of critical habitat such as nursery areas, anadromous fish spawning areas, shellfish areas, and beds of submerged aquatic vegetation (SAV) may have especially negative impacts on the species that utilize those habitats.

The loss and degradation of fisheries habitat is a result of many factors. Direct physical disturbance of habitat often results from development activities such as bulkheading, dredging, and marsh filling. Some physical disturbance and loss of fish habitat may arise from fishing practices which disturb the bottom habitat such as clam kicking and trawling.

Changes in water quality also affect fish habitat and may be natural or human-induced. The greatest water quality concerns for fisheries in the Albemarle-Pamlico region are nutrient loading, algal blooms, hypoxia, salinity, pathogens, sedimentation, and toxic substances. Much pollution of the water comes from sources on the land, such as point source discharges and runoff from urban and agricultural areas. Some water quality degradation results from boating-related activities, such as the operation of marinas, the disposal of boat

sewage, and the possible toxic effects of boat hull paints. Water quality degradation may also result from fishing practices which disturb the bottom and increase turbidity.

In addition to the negative effects of water qulaity degradation and habitat loss caused by external factors, the activities of fishermen contribute to the pressure on the fisheries resources. Increasing demand for fisheries products and for recreational fishing pursuits has contributed to stock declines through over-fishing and destruction of habitat by certain harvest techniques. Several important species are considered to be overfished: summer flounder, weakfish, red drum, striped bass, American shad, river herring, oysters, hard clams, and some species of sharks. Another factor which may contribute to the pressure on stressed fisheries resources is by-catch of nontarget species, often juveniles, in trawls, long haul seines, pound nets, and other gear. The significance of the impact of by-catch, as compared to overfishing, is unknown. In addressing these problems, consideration must be given to the interests of the various users of the estuary's resources.

The occurrence of fish diseases and fish kills is a significant concern in the Albemarle-Pamlico region. Large numbers of fish and shellfish have been affected by red sore disease, ulcerative mycosis, MSX, and Dermo. While not all diseases have fatal effects, they may increase avenues for secondary infections, reduce growth and reproduction, and make fish unmarketable. The number of fish kills that have been reported in the region has increased in recent years. The causes of diseases and kills are not well understood. Both natural and human factors may play a role. At present time, diseases and kills do not have a significant effect on overall fisheries productivity, but they may reflect a stress on the natural system. Further investigation and monitoring of fish kills and fish diseases is needed.

A lack of information on certain fisheries often hinders management efforts to protect the resource. While a large data base of commercial statistics exists, landings are not a true indicator of the status of fisheries stocks, and for many species, stock assessments are needed. Furthermore, there is a general lack of data concerning the amount of fishing effort, and little is known about the socioeconomics of the people involved with the fishing industry. An expansion of current fisheries research is needed.

## II. Current Management Strategies

The fishing community has been an active and concerned participant in efforts to manage the fisheries and to protect fisheries habitat. Stocks declines and threats to fisheries habitat have been addressed through the management efforts of the N.C. Marine Fisheries Commission, the N.C. Wildlife Resources Commission, and several federal fisheries programs. In addition, the N.C. Environmental Management Commission protects fisheries habitat through the implementation of its water quality standards.

### State Fisheries Management Programs

In the Albemarle-Pamlico region, the Marine Fisheries Commission (MFC) and its staff, the Division of Marine Fisheries (DMF), regulate coastal fishing waters to protect the fisheries resources for long-term use. The MFC regulations control fishing seasons, times, areas, gear, sizes of fish caught, and daily harvest quantities. The Wildlife Resources Commission (WRC) regulates inland fisheries with similar management strategies.

### Federal Fisheries Management Programs

The Atlantic States Marine Fisheries Commission (ASMFC), the South Atlantic Marine Fisheries Council (SAFMC), and the Mid-Atlantic Marine Fisheries Council (MAFMC) create federal fishery management plans for some species within the Albemarle-Pamlico region. The National Marine Fisheries Service (NMFS) is primarily responsible for some research and monitoring efforts in the A/P region, but also has the authority to pre-empt state regulation within DMF's jurisdiction if necessary.

### Critical Fisheries Habitat Protection

The MFC has designated nursery areas in the estuary and protects them from potentially harmful fishing

practices. The Coastal Resources Commission and the Environmental Management Commission further protect these designated nursery areas from physical alteration and water quality degradation. In inland waters, the WRC has recently designated estuarine nursery areas for protection.

## III. New Management Options

An important goal of the Albemarle-Pamlico Comprehensive Conservation Management Plan is to protect fisheries stocks for long-term public use. Fish and shellfish habitat should be protected from adverse impacts of human activities. The harvest of fish and shellfish should be managed for the benefit of current and future commercial and recreational fishermen. Management strategies should be developed to address fish and shellfish diseases and kills.

Several management options have been suggested to achieve these objectives. Some options may be in use in the Albemarle-Pamlico region and may only require an expansion of current activities. Others may require new legislation, additional funding, or expanded staffs. The range of options being considered includes a variety of water quality protection strategies such as expansion of best management practices (BMP) to control polluting runoff, increased enforcement of point source discharge regulations, improved management of small-scale sewage treatment systems, and increased regulation of marine sanitation devices. These options will be a part of the water quality action plan of the CCMP. Options concerning the protection of wetlands and other critical habitat areas will be a part of the critical areas action plan.

The following management options are being considered for the fisheries action plan which will address fish kills and disease, protection of fisheries habitat, overharvest, by-catch, and fisheries enhancement.

### Responding to Fish Kills and Diseases

1. Establish a continuous database of information on finfish and shellfish kills and diseases to support efforts to determine causes.
2. Where human activities are determined to be a factor in the cause of finfish and shellfish kills and diseases, design management strategies to minimize human impacts.

### Protecting Fish Habitat

1. Identify, designate, and protect the following critical habitats: submerged aquatic vegetation (SAV) beds, shellfish beds, spawning areas, and additional nursery areas. The official designation should include a buffer area which receives the same level of protection as that given the critical habitat.
2. Establish appropriate activity regulations such as limits on clam kicking and trawling to protect these critical habitats from physical disturbance.
3. Adopt appropriate water quality standards and regulations for the protection of these designated critical habitats.
4. Develop a comprehensive water management plan to meet the water quantity (flow) needs of critical habitat areas (e.g., anadromous fish spawning areas).
5. Expand state ownership of lands associated with these designated critical habitats, and/or expand the compensation of private land owners for conservation measures on such lands.
6. Restore, where feasible, finfish and shellfish critical habitats.

### Controlling Overharvest

1. Develop and implement state fish management plans with targets to eliminate overfishing for species important to recreational and commercial fishermen.
2. Grant the Marine Fisheries Commission authority to limit entry to fisheries.
3. Develop regulatory strategies including size limits, gear restrictions, season and area closures, and quotas

where necessary to reduce excessive harvest.

### Protecting and Enhancing Stocks

1. Encourage private sector aquaculture with expanded technical support.
2. Prohibit the introduction of non-native species and disease infected organisms.
3. Conduct restocking efforts as needed.

### Reducing By-catch

1. Expand efforts to develop by-catch reducing gear and require use of this gear as it is demonstrated to be practical (e.g., finfish excluder devices, culling devices for long haul seines).
2. Implement a cost-share program to encourage use of by-catch reducing gear.
3. Use areal and seasonal restrictions to reduce by-catch.
4. Reduce by-catch allowances and increase their enforcement.

### Strengthening Fisheries Management Efforts

1. Initiate a long-term, coordinated, public education program.
2. Strengthen enforcement in existing management programs.

## IV. Information Needs

We recognize that some information required to implement these potential management options may not be readily available. These information needs include:

- Begin estuarine-wide stock assessments as part of the development of state fishery management plans.
- Expand collection of data on fishing effort.
- Quantify and evaluate the effects of by-catch on fisheries stocks.
- Continue to evaluate the use of excluder devices, minimum mesh sizes, and other by-catch reduction measures.
- Assess further the effects of dredges, trawls, and clam kicking on bottom habitat.
- Monitor and investigate on a continuous basis the occurrences of fish and shellfish diseases and kills.
- Increase research on fish and shellfish kills and diseases in a coordinated effort to determine their causes.
- Assess the socioeconomic effects of regulatory actions.

## POINT SOURCE DISCHARGERS

### I. Introduction

The Albemarle-Pamlico (A/P) Estuarine Study was the first National Estuary Program to be designated under the 1987 amendments to the Clean Water Act. It represents a cooperative effort between the Environmental Protection Agency and the State of North Carolina. The A/P Study was designed as a 5-year program to combine scientific research, the evaluation of potential management options and public involvement and education. This effort will determine how serious the environmental problems are in North Carolina's estuaries and how the estuarine systems can be preserved and managed to maintain their environmental integrity and maximize the use and pleasure people derive from them.

The study area covers roughly 23,500 square miles of the watershed for Albemarle and Pamlico Sounds. Human activities within the A/P region contribute to the environmental problems associated with the loss and degradation of the region's fisheries, water quality, and industries which make use of the natural resources of the region. These environmental concerns include:

- recent declines in fisheries productivity
- fish kills and fish and shellfish diseases
- loss and degradation of fish and shellfish habitat
- effects of toxic pollutants on plants and animals
- excessive algal growth from increased nutrient loading
- loss and degradation of wetlands and essential and unique habitat

Declining water quality has been a particular concern in the A/P region for some time and was one of the primary factors responsible for the designation of the region to the National Estuary Program. The pollutants of primary concern in the A/P estuarine system: toxicants (such as metals, pesticides, petroleum based substances, and other toxic materials), nutrients, oxygen consuming wastes, bacteria and pathogens, particulates, and even fresh water.

Sediments near point source dischargers have been found to contain elevated levels of metals. Elevated levels of dioxin have caused health advisories to be posted for significant portions of the Albemarle region. New outbreaks and epidemics of some fish and shellfish diseases have been associated with polluted areas. Periodic nuisance algal blooms have plagued the waters of many of the tidal streams and rivers, causing an imbalance in the food chain, bad odors, and anoxic (lacking oxygen) conditions. When anoxic conditions are present, aquatic life is stressed or killed. Regulations designed to protect human health prohibit the harvest of shellfish from waters contaminated with fecal coliform bacteria; many areas of potentially productive shellfish waters in the A/P estuarine system are now closed to harvest. Elevated levels of organic and inorganic particles in the waters reduce the amount of light available for photosynthesis; this is thought to be one of the major causes of the dramatic decline of submerged vegetation in the A/P region.

Water quality can be altered and degraded by nonpoint and point sources of pollutants. Nonpoint sources of pollutants include wide land areas or diffuse sources which contribute contaminants to receiving water bodies. Such sources include farm fields and the associated runoff of sediments, nutrients, and pesticides. Nonpoint sources are, by nature, difficult to identify, but represent a major contribution to the degradation of the waters of the A/P region.

Point sources, on the other hand, represent those sources which can be readily identified as discharging directly into the waters of the state. This paper focuses on the role of point source dischargers in the A/P region and the potential cumulative contribution to the problem of declining water quality.

There are two major types of point source discharges: domestic wastewater disposal (private and municipal) and industrial wastewater disposal (industry, mining, defense, etc). These discharges are regulated and permitted by the State through various programs which are described in the Current Management Strategies section.

Human waste, collected and treated by central processing systems, is ultimately discharged, some onto the land, some directly into the waters of the state. Treated wastewater can contain significant quantities of heavy metals, nutrients, and fecal coliform bacteria.

Industries, such as textiles, timber, furniture, mining, and others involved with manufacturing and processing, use numerous chemical components, washes, dyes, and cleansers. Some of the residual chemicals including dioxin, heavy metals, acids, and organics end up in the waste stream that is discharged, and so eventually reach the waters of the A/P system.

## II. Current Management Strategies

Point source dischargers have, in general, continued to improve their compliance record and the quality of their effluents through new and improved technologies, waste reduction, reuse, and recycling programs, and through the use of less environmentally damaging components and processes. The results have been marked, including, for example, decreases in the acreage closed to the harvest of shellfish due to the discharge from wastewater treatment plants.
There are several environmental regulatory programs in place that directly affect activities of point source dischargers.

1. The National Pollutant Discharge Elimination System (NPDES): The NC Division of Environmental Management (DEM), the primary agency responsible for maintaining the quality of the waters of the state, implements the NPDES program for the EPA. The NPDES program was designed to monitor and minimize the detrimental effects of point source discharges. Under the program, point source dischargers are required to obtain a permit, achieve certain permitted effluent limitations, and maintain a regimen of water quality monitoring and reporting to DEM.

2. North Carolina water quality classifications and associated standards: DEM maintains a listing of water quality classifications and standards which form the foundation of their mandate to preserve "best uses" of the waters of the state. Water quality standards may be used in regulatory actions.

3. The basin-wide planning program: DEM has just begun to implement a basin-wide approach to water quality planning and management. Under this new approach, hydrologic boundaries and regimes, and long-term and cumulative effects will be taken into consideration in management strategies. All the monitoring, permit, and review activities within one basin will be synchronized in an effort to generate the greatest understanding and most efficient management of the system.

3. Nutrient Sensitive Waters: All waters with the supplemental classification of Nutrient Sensitive, receive more rigorous monitoring, planning, and management. Special scrutiny and more stringent regulations are applied to activities with the potential for increasing nutrient loading.

4. The NC Mining Act: This act makes requisite a permit from the NC Division of Land Resources (DLR) for all land disturbing activities that affect more than one acre for mining purposes. Activities that could cause excessive erosion and sedimentation are thereby regulated.

## III. New Management Options

The A/P Study has collected suggestions from a wide variety of sources for management options relating to

water quality in the A/P estuarine system. Some of the management options have already been implemented in areas within the A/P region and may only require an expansion of current activities. Others are new and may require new legislation, additional funding, or expanded staffs. Generally, options considered so far include planning initiatives, new regulations or standards, monitoring and enforcement, and remediation. Selected options will be a part of the water quality action plan of the CCMP. Options concerning the protection of wetlands and other critical habitat areas, fisheries, and the human environment will be a part of the critical areas action plan, fisheries action plan, and human environment action plan, respectively.

Planning initiatives:

a. Create sanitary districts in an effort to improve the function of and long-range planning for and management of domestic wastewater.
b. Target sources of airborne nutrients in nutrient management and reduction plans.
c. Prioritize and target for reduction toxicants found in waste-streams and nonpoint source runoff.

New regulations or standards:

a. Adopt new or refine existing water quality standards for: total suspended solids (TSS), transparency (PAR), nitrate, total nitrogen, total phosphorus, BOD, and chlorine.
b. Reclassify as SA all non-SA waters that are or have been approved for the harvest of shellfish. (note: SA = tidal salt water classification for waters suitable for commercial shellfishing and all other tidal saltwater uses)
c. Require for new or expanding discharges submission of acceptable proof to the Division of Environmental Management of the environmental safety of the proposed discharge.
d. Redefine the minimum acceptable technology for the treatment of wastewater to better reflect improved treatment technologies.
f. Develop new outlet siting regulations to reduce the incentives to discharge to the larger bodies of water.
g. In conjunction with the basin-wide planning effort, allow for greater financial incentives and flexibility to be incorporated in the NPDES permit process.
h. Make more stringent the requirements for the provision and operation of marine sanitation pump-out facilities.
i. Develop sediment criteria as triggers for detailed surveys and further management actions as required.
j. Place stricter nutrient reduction requirements on new and expanding wastewater treatment plants, especially in areas of high population density and high growth.

Monitoring and Enforcement:

a. Adopt an improved indicator species or test for human pathogens that could contaminate shellfish or finfish.
b. Develop a more standardized series of violations and penalties and enforce them in a more consistent manner.

Remediation:

a. Remediate sites of contaminated sediments, if feasible.

## IV. Information Needs

There is still a great deal that environmental planners and managers do not know about the systems and processes mentioned above. More research, for example, must be initiated to:

- Determine more precisely the desired environmental goals -- acceptable concentrations of metals and toxicants in the sediments, acceptable concentrations of nutrients in the water column, etc.

- Determine the relative contributions of each category of discharger to the resultant environmental conditions.
- Determine the relative effectiveness of different available control technologies.

## RESIDENTIAL AND COMMERCIAL DEVELOPERS

### I. Introduction

The Albemarle-Pamlico Estuarine Study (APES) was the first National Estuary Program to be designated under the 1987 amendments to the Clean Water Act. It represents a cooperative effort between the Environmental Protection Agency and the State of North Carolina. APES was designed as a 5 year program to combine scientific research, the evaluation of potential management alternatives, and public involvement and education. This effort will determine how serious the environmental problems are in North Carolina's estuaries and how the estuarine systems can be preserved and managed to maintain their environmental integrity and maximize the use and pleasure people derive from them.

The Albemarle-Pamlico region covers 23,500 square miles of the watershed for the Albemarle and Pamlico Sounds. Human activities within the region often contribute to the environmental problems associated with the loss and degradation of the regions' fisheries, water quality, and natural areas. More specifically, these environmental concerns include:

- recent declines in fisheries productivity
- fish kills and fish disease
- loss and degradation of fish and shellfish habitat
- shellfish bed closures
- effects of toxic pollutants on plants and animals
- excessive algal growth from human activities
- loss and degradation of wetlands and essential and unique habitat

The permanent population of the Albemarle-Pamlico region has been continuously increasing over the past decades. In 1990, the permanent population of the region was roughly 2,670,000 and is expected to reach almost 3 million by the year 2000. Several counties, particularly those which border the sounds or ocean, also experience great seasonal population increases. This combined increase in population will promote greater use and, in turn, may negatively impact the estuarine system resources.

Development and related activities including marina development, transportation, and the travel and tourism industry have increased with the population increase and will continue to do so into the future. These human activities have many obvious positive aspects, but may also lead to increased demands for raw materials and waste disposal, the conversion of land in its natural state to other uses, and an overall loss and degradation of habitats within the region.

General water quality degradation often results from improperly sited or improperly functioning septic tanks, contaminated urban stormwater runoff, and various marina activities. All of these can contribute fecal coliform to adjacent waters, and so cause their closure to the harvest of shellfish. Urban stormwater runoff may also contribute significant amounts of sediment to estuarine receiving waters and can contain very high concentrations of nutrients, heavy metals, and other toxicants. Marinas may also increase the amount of heavy metals in estuarine sediment, oil and gas pollution, and loss of public trust waters.

Habitat loss and degradation, including that of wetlands, often result from urban and suburban development in the form of dredge and fill operations, toxic inflows (heavy metals and organics in water) due to runoff, pollution discharge, diversion of surface waters, housing development, transportation infrastructure construction and maintenance, and marina construction.

Recent regulatory changes have helped to reduce losses of coastal wetlands due to development activities, however, significant impacts on, and losses of, nontidal wetlands and other important habitat continue to occur

in the coastal area. These areas will undergo heavy residential and commercial development pressure as seasonal and permanent population increases.

## II. Current Management Strategies

In recent years the development community has made an effort to reduce the negative impacts of its activities upon the estuarine system. These resource management strategies include local land planning which is often associated with the NC Coastal Management Program (CAMA), the Sedimentation and Erosion Control Program, the On-Site Sewage Treatment Program, Coastal Stormwater Runoff Regulations, various marina regulations, and Section 404 and 401 of the Federal Clean Water Act (CWA).

### Local Planning and CAMA

Many cities and counties in the Albemarle-Pamlico region have already implemented land and/or water planning in their jurisdictions in an effort to manage growth and development in an orderly fashion. The Coastal Area Management Act (CAMA) requires land and water planning in the 20 coastal counties of the state. In addition, the Division of Coastal Management (DCM) and local governments under the direction of the North Carolina Coastal Resources Commission (CRC) implement the CAMA permit program for development within Areas of Environment Concern (AECs) in the 20 coastal counties.

### Sedimentation and Erosion Control Program

Under the Sedimentation and Erosion Control Program, a disturbance of one or more contiguous acres requires an approved plan to control sediment pollution up to a 10 year storm's peak runoff. This program is administered by the Division of Land Resources and local officials.

### On-Site Sewage Program

The On-Site Sewage Program oversees small treatment systems which serve one to several residential households or small commercial developments, usually 480 gallons per day or less. Regulations are administered by county sanitarians with oversight and assistance from NC Division of Environmental Health staff.

### Stormwater Runoff Regulations

Current regulations for stormwater runoff are administered by the N.C. Division of Environmental Management (DEM) under the Coastal Stormwater Runoff Regulations to limit the degrading effects of stormwater generated from new developments of more than one acre on coastal waters.

### Marine Sanitation Program and CAMA

Regulations affecting marinas and Marine Sanitation Devices (MSD) include CAMA and the Marine Sanitation Program. Marina construction requires a CAMA permit for development in the estuarine AEC. The Marine Sanitation Program regulates sewage discharge from boats.

### Section 404 of the Clean Water Act (CWA)

Section 404 of the CWA is administered by the US Army Corps of Engineers (COE), with final authority under the US Environmental Protection Agency (EPA). Section 404 regulates the discharge of dredged and fill material into waters of the US including adjacent wetlands.

### Section 401 of the Clean Water Act (CWA)

Section 401 certification is required of any project requiring a Section 404 permit or other federal permit. In North Carolina, the 401 certification process requires official review and approval by the N.C. Division of Environmental Management (DEM), and so provides for the application of the state's water quality standards.

## III. New Management Options

An important goal of the Albemarle-Pamlico Comprehensive Conservation Management Plan (CCMP) is to manage the human population growth and development in the region to allow only minimal adverse impacts upon the estuarine system and its natural resources. Specifically, future land use changes should aim for natural area preservation and conservation (including public trust land and water), no net addition of pollutants to surface and ground waters, and only the sustainable development of renewable natural resources as the economy of the region progresses. Our approach towards this goal would be to classify current and desired land uses in official regional or local comprehensive conservation plans. These plans should be enforceable and consider all short and long term individual and cumulative environmental impacts of growth.

Several management options have been suggested that will help achieve these objectives. Some of these options have already been implemented in areas within the Albemarle-Pamlico region and may only require an expansion of current activities. Others are new and may require new legislation, additional funding or expanded staffs. Generally, these options include land planning, water planning, and cooperative regional planning. These are discussed below. In addition, financial resource options, data management, and public education and involvement are addressed. Finally, a summary of information required to address the goals and management options is given.

### Land planning

1. Require and fund development of local land use plans.
2. Develop local government protection programs for wetlands, essential habitat, and rare natural communities.
3. Require stormwater runoff to be reduced and require that all runoff from converted land uses to be of a similar or better quality than at pre-conversion.
4. Expand current coastal stormwater runoff regulations to the entire Albemarle-Pamlico region.
5. Promote alternatives to standard septic tanks, sewage treatment outfalls, and stormwater treatment systems.
6. Institute more stringent septic tank regulations.
7. Enforce consistent monitoring and reporting requirements.
8. Prohibit new septic tanks and remove old septic tanks from inappropriate soils.
9. Require package treatment plants run by homeowner associations to be properly maintained or place these facilities under the management of local jurisdictions from the commencement of the project.
10. Require vegetated buffer strips and restoration of floodplain vegetation to protect receiving waters from excessive quantities of pollutants.
11. Prohibit hard stabilization methods from all estuarine shorelines. At a minimum, amend the CAMA permit process to list estuarine shoreline stabilization practices in order of preference: 1st - vegetative buffer, 2nd - staggered offshore breakwater, 3rd - bulkhead, 4th - groin.
12. Reevaluate the natural areas currently covered by CAMA AEC designation to determine if coverage should be extended.
13. Develop a state wetlands protection policy to avoid, minimize, and compensate wetland impacts. Include a state mitigation program of wetlands enhancement, restoration, and creation in the policy.
14. Expand private protection incentives and strategies, and private and public acquisition programs, and compensation of private land owners for conservation measures.
15. Strengthen enforcement of existing regulatory programs.
16. Expand the use of tax valuation of lands.

### Water supply and water use planning

1. Require and fund development of local water supply and water use plans.
2. Require a reduction in the amount of wastewater per person and promote water conservation

programs by mandating conservation in new construction and developing incentives for water conservation in existing structures.

3. Develop a "no marina sanitation device (MSD) discharge" requirement at boat marinas, and use stronger incentives and educational materials to promote proper operation and maintenance of MSDs. Redefine the Coastal Resources Commission's term "marina" so that the maximum allowable density of slips is reduced. The current definition of a marina is 10 slips or more.
4. Strengthen enforcement of existing regulatory programs.

Public trust rights

1. Develop a comprehensive public access plan and public trust legislation in cooperation with local governments to recognize and implement public trust rights.
2. Institute user fees for all development using public trust waters.
3. Institute performance bonds for marinas.

Cooperative regional planning

1. Develop basin-wide resource management plans.
2. Develop sanitary districts to manage water withdrawal and disposal.

Information management

1. Maintain a central state database with information provided by the counties.
2. Utilize the central database for land and water planning analysis.

Public education and involvement

1. Promote public education and involvement as a significant component of any management plan including education on estuarine resources management issues.
2. Increase involvement of greater segments of the public in estuarine resource management policy making and program implementation.

## IV. Information Needs

We recognize that some information required to implement these management options may not be readily available. Additional information needed to facilitate implementation include:

- Determine the size, type, and effectiveness of vegetated buffers and setbacks required to protect adjacent water quality.
- Delineate wetlands and the effectiveness of constructed wetlands as tertiary treatment plants
- Determine the environmental impacts of various development scenarios.
- Determine cumulative and secondary environmental impacts of land use changes.
- Develop an economic model of the different productivity sectors to allow predictions to be made regarding the scale and location of growth and development and their relations to coastal policy.

## ENVIRONMENTAL GROUPS

### I. Introduction

The Albemarle-Pamlico Estuarine Study (APES) was the first National Estuary Program to be designated under the 1987 amendments to the Clean Water Act. It represents a cooperative effort between the Environmental Protection Agency and the State of North Carolina. APES was designed as a 5 year program to combine scientific research, the evaluation of potential management alternatives, and public involvement and education. This effort will determine how serious the environmental problems are in North Carolina's estuaries and how the natural systems can be preserved and managed to maintain their environmental integrity and maximize the use and pleasure people derive from them.

The Albemarle-Pamlico region covers 23,500 square miles of the watershed for the Albemarle and Pamlico Sounds. Human activities within the region often contribute to the environmental problems associated with the loss and degradation of the regions' fisheries, water quality, and natural areas. More specifically, these environmental concerns include:

- recent declines in fisheries productivity
- fish kills and fish disease
- loss and degradation of fish and shellfish habitat
- shellfish bed closures
- effects of toxic pollutants on plants and animals
- excessive algal growth from human activities
- loss and degradation of wetlands and essential and unique habitat

The permanent population of the Albemarle-Pamlico region has been continuously increasing over the past decades. In 1990, the permanent population of the region was roughly 2,670,000 and is expected to reach almost 3 million by the year 2000. Several counties, particularly those which border the sounds or ocean, also experience great seasonal population increases. This combined increase in population will promote greater use and, in turn, may negatively impact the estuarine system resources.

Human activity in the region have increased with the population increase and will continue to do so into the future. These human activities have many obvious positive aspects, but may also lead to increased demands for raw materials and waste disposal, the conversion of land in its natural state to other uses, and an overall loss and degradation of habitats within the region.

General water quality degradation often results from improperly sited or improperly functioning septic tanks, contaminated urban stormwater runoff, and various marina activities. All of these can contribute fecal coliform to adjacent waters, and so cause their closure to the harvest of shellfish. Urban stormwater runoff may also contribute significant amounts of sediment to estuarine receiving waters and can contain very high concentrations of nutrients, heavy metals, and other toxicants. Marinas may also increase the amount of heavy metals in estuarine sediment, oil and gas pollution, and loss of public trust waters.

Habitat loss and degradation, including that of wetlands, often result from urban and suburban development in the form of dredge and fill operations, toxic inflows (heavy metals and organics in water) due to runoff, pollution discharge, diversion of surface waters, housing development, transportation infrastructure construction and maintenance, and marina construction. Recent regulatory changes have helped to reduce losses of coastal wetlands due to development activities, however, significant impacts on, and losses of, nontidal wetlands and other important habitat continue to occur in the coastal area. These areas will undergo heavy residential and commercial development pressure as seasonal and permanent population increases.

Over 90% of the commercially important and 60% of the recreationally important fish and shellfish caught in North Carolina are dependent on estuarine or wetland habitat during at least a part of their life cycle. The loss and degradation of critical fisheries habitats such as nursery areas, spawning areas, and shellfish and SAV beds results from direct physical disturbance and declining water quality. The region's fisheries are also negatively affected by overharvesting and bycatch of nontarget species. The extent of the impact of bycatch on the fisheries stocks, however, is unknown. Fish and shellfish kills and diseases continue to occur, but the causes of kills and diseases are not well understood.

## II. New Management Options

In an attempt to manage the impact of human activities in the Albemarle-Pamlico region, several management options have been suggested. Some of these options have already been implemented in areas within the Albemarle-Pamlico region and may only require an expansion of current activities. Others are new and may require new legislation, additional funding or expanded staffs. The following management options outline strategies under consideration for the inclusion in the action plans of the CCMP.

### Human Environment Options

1. Require and fund development of local land and water use plans which promote natural area preservation and conservation, consider individual and cumulative environmental impacts of land and water use, and promote development of renewable natural resources.
2. Require vegetated buffer strips around critical areas and require restoration of floodplain vegetation to protect receiving waters from excessive quantities of pollutants.
3. Prohibit hard stabilization methods of erosion control from all estuarine shorelines.
4. Require runoff after land conversion to be of similar or better quality than runoff prior to conversion.
5. Develop a comprehensive public access plan and public trust legislation in cooperation with local governments to recognize and implement public trust rights.
6. Maintain a central database with state funding of all planning-related information for use in local planning efforts.

### Critical Areas Options

7. Develop a statewide comprehensive wetlands protection policy with a goal of avoiding, minimizing, and compensating wetland impacts.
8. Develop a mitigation program of wetlands enhancement, restoration, and creation including; (a) a mitigation bank, (b) criteria for wetland creation, (c) monitoring standards and success criteria and (d) demonstration projects, and educational and technical materials.
9. Assign a centralized state agency with protection of critical areas and rare species.
10. Promote coordinated inventory and mapping of critical areas.
11. Encourage and assist local governments in critical areas preservation and conservation.
12. Strengthen enforcement (training, surveillance, fines) and protection strategies of existing programs (reevaluate, implement).

### Fisheries Options

13. Collect data continuously on finfish and shellfish kills and diseases in an effort to determine causal factors, and where human activities are proven to contribute to causes of diseases and kills, minimize human impacts.
14. Identify, designate, and protect submerged aquatic vegetation (SAV) beds, shellfish beds, spawning areas, and additional nursery areas.
15. Establish appropriate activity regulations, water quality standards, and comprehensive water management plans to protect these critical habitats from physical disturbance.

16. Restore, where feasible, finfish and shellfish critical habitats.
17. Develop and implement state fish management plans with targets to eliminate overfishing for important species.
18. Develop regulatory strategies including size limits, gear restrictions, season and area closures, and quotas where necessary to reduce excessive harvest, and grant the Marine Fisheries Commission authority to limit entry to fisheries.
19. Encourage private sector aquaculture with expanded technical support.
20. Prohibit the introduction of non-native species and disease infected organisms.
21. Conduct fish and shellfish restocking efforts as needed.
22. Expand efforts to develop by-catch reducing gear and require use of this gear as it is demonstrated to be practical. Implement a cost-share program to encourage use of by-catch reducing gear.
23. Use areal and seasonal restrictions to reduce by-catch.
24. Reduce by-catch allowances and increase their enforcement.

Water Quality Options

25. Promote basin-wide planning to ensure consideration of cumulative impacts
26. Expand and refine water quality classifications and criteria to provide additional resource protection (Total suspended solids, transparency, nitrate, total nitrogen, total phosphorus, and biotic indices).
27. Require stormwater control on all new land disturbing activities throughout the A/P area
28. Determine the minimally acceptable Best Management Practices and require their implementation on all existing land disturbing activities to minimize the quantity and maximize the quality of stormwater runoff
29. Target local and regional sources of airborne nutrients for reduction.
30. More stringently regulate the density, placement, inspection, and maintenance of septic tanks
31. Require all new or expanding dischargers to submit acceptable proof to the Division of Environmental Management that the discharge will be harmless and beneficial for the public
32. Develop more stringent outlet/outfall siting regulations for new dischargers to encourage improvement of the quality of waste streams rather than discharge into larger bodies of receiving water
33. Develop more stringent effluent regulations in areas of high growth
34. Create sanitary districts to facilitate long-term regional planning for and management of domestic water extraction and wastewater disposal
35. Require counties to ensure the provision of adequate numbers of convenient pump-out facilities and dumping stations for sludge and septic disposal and the provision of adequate pump-out regulations and enforcement.
36. The CRC, EMC, and DMF should cooperatively develop and implement a more restrictive "marina" definition to better protect against cumulative impacts of marina development

General Options

37. Expand efforts to gain state ownership and/or to encourage conservation measures by private landowners on lands associated with critical areas and fish habitats.
38. Require buffer zones such as vegetated buffer strips for critical area and water quality protection.
39. Strengthen enforcement in existing management programs.
40. Include public involvement and education in estuarine policy making and plan implementation.
41. Restore, where feasible, water quality, critical areas, fish habitats, and fish stocks.

## III. Information Needs

We recognize that some information required to implement these management options may not be readily available. Additional information needed to facilitate implementation include:

- Determine the environmental impacts of various development scenarios and the cumulative and secondary environmental impacts of land use changes.
- Determine the size, type, and effectiveness of vegetated buffers and setbacks required to protect adjacent water quality.
- Delineate wetlands and the effectiveness of constructed wetlands as tertiary treatment plants.
- Develop an economic model of the different productivity sectors to allow predictions to be made regarding the scale and location of growth and development and their relations to coastal policy.
- Begin estuarine-wide fish and shellfish stock assessments as part of the development of state fishery management plans.
- Quantify and evaluate the effects of by-catch on fisheries stocks.
- Continue to evaluate the use of excluder devices, minimum mesh sizes, and other by-catch reduction measures.
- Assess further the effects of dredges, trawls, and clam kicking on bottom habitat.
- Monitor and investigate on a continuous basis the occurrences of fish and shellfish diseases and kills.
- Increase research on fish and shellfish kills and diseases in a coordinated effort to determine their causes.
- Assess the socioeconomic effects of regulatory actions.

# APPENDIX B
## Questionnaires Distributed at the Workshops

**Northern Elected Officials**

**Southern Elected Officials**
**February 11, 12, 1992**

# QUESTIONNAIRE

Albemarle-Pamlico Estuarine Study Local Officials Workshop

February 12, 1992

Attached is a list of management options for the Albemarle-Pamlico Region developed by the study process and team. Review the list of options and then respond to the following questions.

1. If it is determined additional action is needed to protect water quality in the region, which five management options would you be most inclined to support? List the numbers below.

2. Which five options do you believe would be the most controversial? List the numbers below.

3. Are there options you can think of that you believe would help, but are not listed on the attached sheet? Briefly describe them below.

## LOCAL GOVERNMENT RELATED MANAGEMENT OPTIONS
for the Albemarle-Pamlico Estuarine Region

1. Require and fund development of local comprehensive land use plans.
2. Require a local comprehensive plan element to protect wetlands, essential habitat, and rare and natural communities.
3. Require post-development stormwater runoff to be equal to or less than pre-development runoff.
4. Expand the current coastal stormwater regulations to the entire Albemarle-Pamlico Region.
5. Institute more stringent septic regulations and use of alternative septic systems.
6. Promote alternatives to sewage treatment outfalls and stormwater treatment systems.
7. Require proper management and maintenance of package sewage treatment plants.
8. Require vegetated buffer strips and restoration of flood plain vegetation adjacent to shorelines.
9. Restrict the uses of bulkheads, groins and other "hard" stabilization methods along shorelines.
10. Expand areas considered "Areas of Environmental Concern" (AEC's) under CAMA.
11. Develop a state wetlands protection policy with the goal of avoiding, minimizing and compensating for adverse impacts on wetlands.
12. Expand private land protection incentives and strategies for critical areas including wetlands, rare and natural communities and endangered species habitat.
13. Expand public acquisition programs for critical areas.
14. Strengthen enforcement of existing regulatory programs.
15. Require and fund water use and supply planning at the local level.
16. Mandate use of water conserving plumbing fixtures in new construction and develop incentives to promote water conservation in existing structures and operations including residential, agricultural, commercial and industrial uses.
17. Tighten regulatory requirements on marinas.
18. Develop a comprehensive public access plan through local-state cooperation to promote access and protection of public trust lands.
19. Develop basin-wide resource management plans.
20. Develop a central data base to serve as a basis for local and state planning in the watershed.
21. Promote public education and involvement in estuarine resource management policy making and program implementation.

# QUESTIONNAIRE

Albemarle-Pamlico Estuarine Study Agriculture and Forestry Workshop

February 13, 1992

Attached is a list of management options for the Albemarle-Pamlico Region developed by the study process and team. Review the list of options and then respond to the following questions.

1. If it is determined additional action is needed to protect water quality in the region, which five management options would you be inclined to support? List the numbers below.

2. Which five options do you believe would be the most controversial? List the numbers below.

3. Are there options you can think of that you believe would help, but are not listed on the attached sheet? Briefly describe them below.

## AGRICULTURE AND FORESTRY RELATED MANAGEMENT OPTIONS
### for the Albemarle-Pamlico Estuarine Study

1. Improve the Agricultural Cost Share Program by providing more money to target, monitor and enforce the program.

2. Require and fund development of local comprehensive land use plans.

3. Require the use of vegetated buffer strips and restoration of flood plain vegetation adjacent to shorelines and tributary streams.

4. Phase out agricultural and silvicultural exemptions for CAMA permits and Sedimentation Pollution Control Act.

5. Phase out agricultural and silvicultural exemptions for 404 permits.

6. Increase enforcement of the Sodbuster program.

7. Increase the use of Integrated Crop/Pest Management.

8. Develop nutrient reduction targets for all basins in the Albemarle-Pamlico Region.

9. Require modification of drainage ditches to protect primary fish nursery areas and control sediment and nutrient loading.

10. Identify valuable shellfish, nursery and spawning areas and require more stringent land management practices in areas adjacent to these.

11. Develop a state wetland protection policy with the goals of avoiding , minimizing and compensating for adverse impacts on wetlands.

12. Expand private protection incentives and strategies as conservation easements and use value taxation to protect critical areas including wetlands, rare and natural communities and threatened and endangered species habitats.

13. Expand public acquisition programs to protect critical areas.

14. Institute pollution taxes and fines to increase use of BMPs.

15. Promote water conservation in existing structures and operations including residential, agricultural, industrial and commercial.

16. Promote public education and involvement in estuarine resource management policy making and program implementation.

*17. Develop new water quality standards in order top address non-point sources of pollution.

*18. Examine the "takings" (property rights) issue and determine how this could affect the A/P Study.

*NOTE:* * = *options that were added by the participants.*

## QUESTIONNAIRE

Albemarle-Pamlico Estuarine Program
Workshop for Commercial and Recreational Fishermen

February 19, 1992

Attached is a partial list of potential management options for the Albemarle-Pamlico Region, developed for your consideration by participants in the National Estuary Program's study of the Albemarle-Pamlico Region. An expanded list of potential management options, which also includes potential options of interest to other user groups, is available for your review and comment.

Please review the list of potential options and then respond to the following questions.

1. If it is determined that additional action is needed to protect the environmental quality of the Albemarle-Pamlico Region, which five management options would you be most inclined to support? List the numbers of the five options below.

2. Which five options do you believe would be the most controversial or difficult to achieve? List the numbers of the five options below.

3. Are there potential options which are not listed but that you believe would improve the environmental quality of the Albemarle-pamlico Sounds? If so, briefly describe them below.

## COMMERCIAL AND RECREATIONAL FISHERIES MANAGEMENT OPTIONS
### For the Albemarle-Pamlico Sounds Region

Response to Fish Kills and Diseases

1. Establish and maintain an information database on finfish and shellfish kills and diseases to help determine causes of the kills and diseases.

2. Develop and implement management strategies to minimize human activities which are found to contribute to finfish and shellfish kills and diseases.

Protection of Fish Habitat

3. Identify and designate, including buffer areas, the following critical habitats for protection: submerged aquatic vegetation (SAV) beds, shellfish beds, spawning areas, and other nursery areas.

4. Develop appropriate activity regulations to protect designated critical habitats from physical disturbance.

5. Adopt appropriate water quality standards and implementing regulations to protect designated critical habitats.

6. Develop a comprehensive water management plan to meet water quantity or flow needs of designated critical habitats.

*6A. Monitor all discharges including freshwater runoff from agriculture operations.

7. Expand public acquisition programs for lands associated with designated critical habitats.

8. Expand compensation and other incentives progrdams for private land owners who undertake conservation measures on lands associated with designated critical habitats.

9. Restore, where feasible, finfish and shellfish critical habitats.

*9A. Remove permit exemptions for forestry and agriculture.

Control of Overharvesting

10. Develop and implement state fishery management plans, including targets, to eliminate overfishing for species important to recreational and commercial fishermen.

11. Provide authority to the Marine fisheries Commission to limit entry to fisheries.

12. Develop regulatory restrictions to reduce excessive harvesting, including size limits, gear restrictions, season and area closures, and quotas where necessary.

Protection and Enhancement of Stocks

13. Encourage private sector aquacultural activities by providing expanded technical support.

*13A. Identify seafood suppliers, i.e., North Carolina product, U.S. product, etc.

14. Prohibit the introduction of non-native species and disease infected organisms.

15. Conduct restocking efforts as needed.

Reduction of By-catch

16. Expand efforts to develop by-catch reduction gear and require use of this gear if it is demonstrated to be practical.

17. Implement a cost-share program to encourage the use of by-catch reduction gear.

18. Restrict by-catch on an areal and seasonal basis.

19. Reduce by-catch allowances.

20. Strengthen enforcement of by-catch limits.

Strengthened Fisheries Management Efforts

21. Initiate a long-term public education program which is coordinated with other ongoing state and local public education activities.

22. Strengthen enforcement of existing management programs.

*NOTE: * = options that were added by the participants.*

## QUESTIONNAIRE

Albemarle-Pamlico Estuarine Program
Workshop for Pipe Dischargers (NPDES Permits)

February 20, 1992

Attached is a partial list of potential management options for the Albemarle-Pamlico Region, developed for your consideration by participants in the National Estuary Program's study of the Albemarle-Pamlico Region. An expanded list of potential management options, which also includes potential options of interest to other user groups, is available for your review and comment.

Please review the list of potential options and then respond to the following questions.

1. If it is determined that additional action is needed to protect the environmental quality of the Albemarle-Pamlico Region, which five management options would you be most inclined to support? List the numbers of the five options below.

2. Which five options do you believe would be the most controversial or difficult to achieve? List the numbers of the five options below.

3. Are there potential options which are not listed but that you believe would improve the environmental quality of the Albemarle-pamlico Sounds? If so, briefly describe them below.

## PIPE DISCHARGERS MANAGEMENT OPTIONS
### For the Albemarle-Pamlico Sounds Region

Planning Initiatives

1. Create sanitary districts to improve the long range planning for and management of domestic wastewater.

2. Expand nutrient management and reduction plans to target and address sources of airborne nutrients.

3. Identify and reduce toxicants found in wastestreams and nonpoint source runoff.

New Regulations or Standards

4. Adopt new or strengthen existing water quality standards for total suspended solids (TSS), transparency (PAR), nitrate, total nitrogen, total phosphorus, BOD, chlorine, submerged aquatic vegetation (SAV), and shellfish classifications.

5. Review and revise the classification of waters to appropriately reflect approval status for the harvest of shellfish.

6. Require new or expanding dischargers to submit information to the State, in conjunction with the permit application, on the environmental safety and economic benefit of the proposed discharge.

7. Strengthen wastewater treatment technology requirements to reflect improvements in technology.

8. Reduce incentives for discharges to larger bodies of water through such actions as more stringent mixing zone and outlet siting requirements.

9. Provide dischargers with increased financial incentives and flexibility in the NPDES permit process as part of the basin-wide planning effort.

10. Develop sediment criteria to support appropriate management actions.

11. Require more stringent nutrient reduction measures for new and expanding wastewater treatment plants, especially in areas of high population density and high growth.

Monitoring and Enforcement

12. Adopt an improved indicator species or test for human pathogens to better detect the potential for contaminated shellfish or finfish.

13. Develop a standardized system of violations and associated penalties and enforce them in a consistent manner.

Remediation

14. Conduct remediation activities at contaminated sediment sites, where feasible.

*15. Provide technical/engineering assistance to improve treatment plant operation.

*16. Develop a new biological indicator species for aquatic health.

*17. Increase filed inspections of waste water treatment facilities.

*18. Establish pollutant loading fee (pollutant/lb. basis) to provide resources for environmental improvements.

**NOTE: * = Options that were suggested by the participants.**

# QUESTIONNAIRE

Albemarle-Pamlico Estuarine Program
Workshop for Developers and Marina Owners

February 21, 1992

Attached is a partial list of potential management options for the Albemarle-Pamlico Region, developed for your consideration by participants in the National Estuary Program's study of the Albemarle-Pamlico Region. An expanded list of potential management options, which also includes potential options of interest to other user groups, is available for your review and comment.

Please review the list of potential options and then respond to the following questions.

1. If it is determined that additional action is needed to protect the environmental quality of the Albemarle-Pamlico Region, which five management options would you be most inclined to support? List the numbers of the five options below.

2. Which five options do you believe would be the most controversial or difficult to achieve? List the numbers of the five options below.

3. Are there potential options which are not listed but that you believe would improve the environmental quality of the Albemarle-pamlico Sounds? If so, briefly describe them below.

## DEVELOPERS AND MARINA OWNERS-MANAGEMENT OPTIONS
### For the Albemarle-Pamlico Estuarine Study

Land Planning

1. Require and fund development of local comprehensive land use plans.

2. Require a local comprehensive plan element to protect wetlands, essential habitat and rare and natural communities.

3. Require post-development stormwater runoff to be equal to or less than pre-development runoff.

4. Expand current coastal stormwater regulations to the entire Albemarle-Pamlico region.

5. Institute more stringent septic tank regulations.

6. Promote alternatives to standard septic tank systems, sewage treatment outfalls and stormwater treatment plants.

7. Require proper management and maintenance of package treatment plants.

8. Require the use of vegetated buffer strips and restoration of flood plain vegetation adjacent to shorelines and tributary streams.

9. Amend the CAMA permit process to restrict the use of "hard" stabilization methods along estuarine shorelines, giving preference to: 1) vegetative buffers, 2) staggered offshore breakwaters, 3) bulkheads and 4) groins.

10. Evaluate and expand, if appropriate, areas considered "Areas of Environmental Concern" (AECs) under CAMA.

11. Develop a state wetland protection policy with the goals of avoiding, minimizing and compensating for adverse impacts on wetlands.

12. Expand private protection incentives and strategies as conservation easements and use value taxation to protect critical areas including wetlands, rare and natural communities and threatened and endangered species habitats.

13. Expand public acquisition programs for critical areas including wetlands, rare and natural communities and endangered species habitat.

14. Strengthen enforcement of existing regulatory programs.

15. Create (expand) use value taxes on land.

Water Use and Supply Planning

16. Require and fund development of water use and supply plans at the local level.

17. Mandate use of water conserving plumbing fixtures in new construction and develop incentives to promote water conservation in existing structures and operations including residential, agricultural, commercial and industrial use.

18. Develop requirements for no "marine sanitation devices (MSD) discharge" at boat marinas and promote proper operation and maintenance of MSDs.

19. Reduce the density (number) of slips at marinas.

Public Trust Rights

20. Develop a comprehensive public access plan and public trust legislation through local-state cooperation to promote access and protection of public trust lands.

21. Establish user fees for development or use of public trust waters.

22. Require performance bonds for marinas administered by the State.

Cooperative Regional Planning

23. Develop basin-wide resource management plans.

24. Establish sanitary districts to manage water withdrawal and disposal.

Information Management

25. Develop and maintain an central database to serve as a basis for local and state planning in the watershed.

Public Education and Involvement

26. Promote public education and involvement in estuarine resource management policy making and program implementation.

# APPENDIX C
## List of Workshop Invitees

## Southern Elected Officials

Mr. Frank Bonner
Chair, County Comm.
P.O. Box 1027
Washington, NC 27889
(Beaufort)

Ms. Louise Dollard
Chair, County Comm.
Aministration Bldg.
Manteo, NC 27954
(Dare)

Mr. Ronald Goswick
Chair, County Comm.
215 E. Nash St.
Louisburg, NC 27549
(Franklin)

Mr. Alton Ballance
Chair, County Comm.
Courthouse
Swan Quarter, NC 27885
(Hyde)

Mr. Horace Phillips
Chair, County Comm.
P.O. Box 266
Trenton, NC 28585
(Jones)

Mr. Moses Carey
Chair, County Comm.
106 E. Margret Ln.
Hillsborough, NC 27278
(Orange)

Mr. Thomas Johnson, Sr.
Chair, County Comm.
1717 W. Fifth St.
Greenville, NC 27834
(Pitt)

Mr. George Shearin, Sr.
Chair, County Comm.
P.O. Box 619
Warrenton, NC 27589
(Warren)

Mr. Don Flowers
Executive Director
Albemarle Commission
P.O. Box 646
Hertford, NC 27944

Mr. Thomas Elkin
Executive Director
Region L COG
P.O. Drawer 2748
Rocky Mount, NC 27802

Mr. Carl Tighman
Chair, County Comm.
Courthouse Square
Beaufort, NC 28516
(Carteret)

Mr. William Bell
Chair, County Comm.
Co. Judicial Bldg.
Durham, NC 27701
(Durham)

Mr. Robert Strother
Chair, Couunty Comm.
P.O. Box 906
Oxford, NC 27565
(Granville)

Mr. Pascal Ballance
Vice-Chair, County Comm.
Courthouse
Swan Quarter, NC 27885
(Hyde)

Mr. George Graham
Chair, County Comm.
P.O. Box 3289
Kinston, NC 28501
(Lenoir)

Mr. Paul Johnson
Chair, County Comm.
P.O. Box 776
Bayboro, NC 28516
(Pamlico)

Mr. Terry Garrison
Chair, County Comm.
Courthouse, Young St.
Henderson, NC 27536
(Vance)

Mr. John Wooten, Sr.
Chair, County Comm.
P.O. Box 227
Goldsboro, NC 27530
(Wayne)

Mr. Robert Paciocco
Executive Director
Mid-East Commission
P.O. Box 1787
Washington, NC 27889

Mr. Bradley Barker
Executive Director
Triangle J COG
P.O. Box 12276
RTP, NC 27709

Mr. Charles Potter
Chair, County Comm.
P.O. Box 1425
New Bern, NC 28563
(Craven)

Mr. J.O. Thorne
Chair, County Comm.
Adm. Bldg., Box 10
Tarboro, NC 27886
(Edgecombe)

Mr. Frank Walston, Jr.
Chair, County Comm.
P.O. Box 326
Snow Hill, NC 28580
(Greene)

Mr. Norman Denning
Chair, County Comm.
P.O. Box 1049
Smithfield, NC 275774
(Johnston)

Mr. Claude Mayo, Jr.
Chair, County Comm.
Courthouse
Nashville, NC 278561
(Nash)

Mr Harry Stonbraker
Chair, County Comm.
Courthouse
Roxboro, NC 27573
(Person)

Mr. Vernon Malone
Chair, County Comm.
Co. Off. Bldg., Rm 1100
Raleigh, NC 27602
(Wake)

Mr. Frank Emory
Chair, County Comm.
P.O. Box 1728
Wilson, NC 27893
(Wilson)

Mr. Neal Mallory
Executive Director
Kerr-Tar COG
P.O. Box 709
Henderson, NC 27536

Mr. Roy Fogle
Executive Director
Neuse River COG
P.O. Box 1717
New Bern, NC 28560

## Southern Elected Officials

Mayor Floyd Brothers
P.O. Box 1988
Washington, NC 27889

Mayor Edward Dixon
706 Arendell Street
Morehead City, NC 27885

Mayor Leander Morgan
P.O. Box 1129
New Bern, NC 28560

Mayor Harry Rodenhizer, Jr.
101 City Hall
Durham, NC 27701

Mayor Moses Ray
P.O. Box 220
Tarboro, NC 27886

Mayor Allie Ellington
P.O. Box 1307
Oxford, NC 27565

Mayor Norwood Worley
P.O. Box 761
Smithfield, NC 27577

Mayor Orice Ritch, Jr.
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Kinston, NC 278501

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Mayor Hal Plonk
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Mayor Ralph Ramey
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Mayor Donald Beaver
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Mayor Robert Young, III
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Mayor Katherine Cloud
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Winsdor, NC 27983

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Chairman, County Comm.
117 N. 343
Camden, NC 27921

Mr. James Dail
Chairman, County Comm.
P.O. Box 1030
Edenton, NC 27932

Ms. Frances Walker
Chairman, County Comm
Courthouse
Currituck, NC 27929

Mr. Sherwood Eason
Chairman, Co. Comm.
Courthouse
Gatesville, NC 27938

Mr. Harry Branch
Chairman, Co. Comm.
P.O. Box 38
Halifax, NC 27839

Mr. Claude Odom
Chairman, Co. Comm.
P.O. Box 116
Winton, NC 27986

Mr. Daniel Bowen
Chairman, County Comm.
P.O. Box 668
Williamston, NC 27982

Mr. J.W. Faison
Chairman, County Comm.
P.O. Box 808
Jackson, NC 27845

Ms. Patsy McGee
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Courthouse, Rm. E. 201
Elizabeth City, NC 27909

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Co. Office Bldg.
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Mr. C.M. Stokes
Chairman, County Comm.
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Edenton, NC 27932

Mayor James Harrington
P.O. Box 347
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P.O. Box 32
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Mayor Norma Cahoon
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Mayor Gus Granitzski
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Mayor William Brandon
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Mayor William Ward
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Mayor Rice Day, Jr.
1221 North High Street
Franklin, VA 3851

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Norfolk, VA 23510

Mayor Gloria Webb
801 Crawford Street
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Mayor James Hope
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Mayor Meyera Oberndorf
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Mayor James Hutcherson
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Mayor William Hill
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Mayor J. Lloyd Andrews
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Mayor Kai Hardaway, III
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