The Albemarle-Pamlico Estuarine Study: Defining What Needs To Be Done

by Doug Rader, Ph.D.

When Dr. John Costlow, noted expert on marine ecology and management of estuarine and marine systems, looked in his crystal ball to predict the future of coastal North Carolina, he saw two separate outcomes, equally probable.

On the one hand, he could envision a stunningly rich coastal environment, swarming with creatures of all kinds, supporting a diverse panoply of traditional lifestyles.

On the other hand, he saw a barren region devoid of marine life, poisoned by fertilizers, sediment and toxic materials.

While these two visions represent extreme points of a broad spectrum of possible futures, it is absolutely clear that change driven by human activities is coming to our coastal region. The signs of the change are unmistakable. The possible costs of ignoring them are high.

We stand at the crossroads, and our choices in this decade will determine the future of our coast.

This need for immediate, concerted action based on careful planning has provided the primary impetus for the Albemarle-Pamlico Estuarine Study (APES).

Importance of the APES Region

All who have spent time in the area understand that the Albemarle and Pamlico sounds and their tributary rivers and streams offer a spectacular array of recreational and commercial opportunities.

The rich natural resources of the region support a full range of commercial fisherman: shrimp trawlers, crab potters, long-haul seiners, pound netters, gill netters, oyster tongers and many more.

Roughly two-thirds of all commercial fish landings in North Carolina were from Albemarle, Pamlico and Core sounds in 1985.

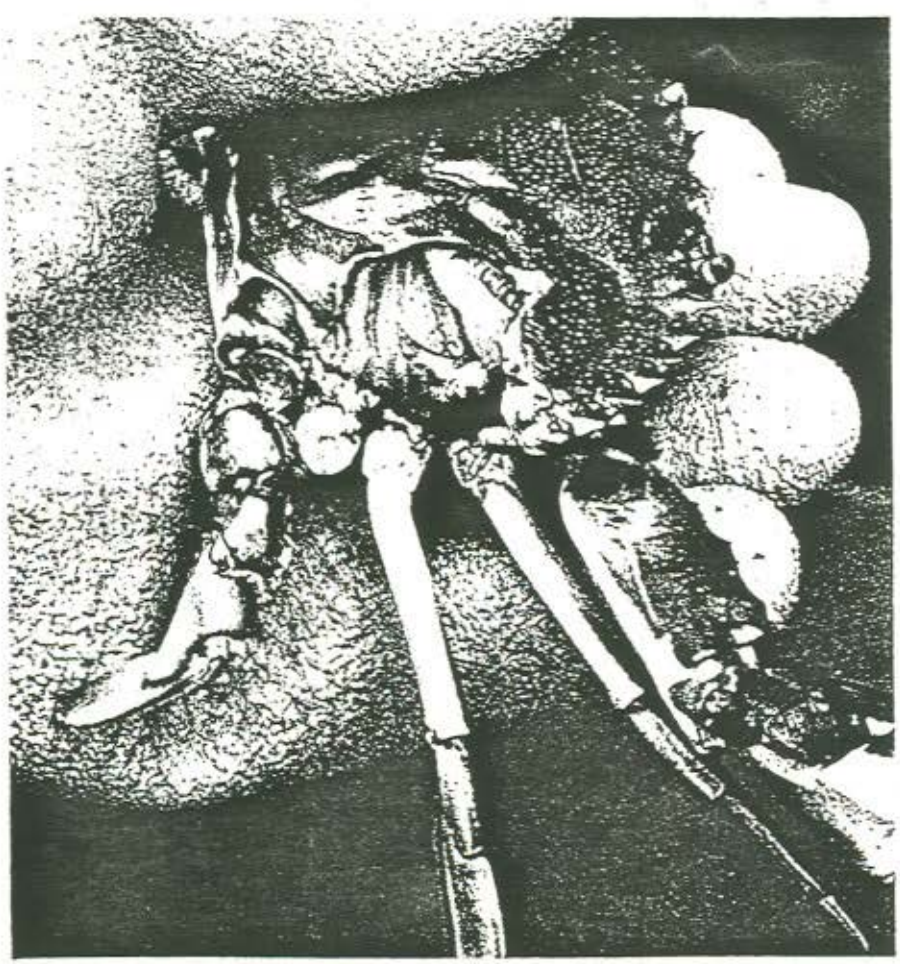
Many scientists believe that North Carolina's sounds provide the nursery habitat which supports much of the mid-Atlantic coast fishery.

Recreational fishing and boating activities raise the total economic value of healthy estuarine waters by many millions of dollars per year.

In addition, the wildlife value of the Albemarle-Pamlico basin is enormous. Migratory waterfowl, many of which are declining in number, use the diverse wetlands of the region for food and shelter.

Fur-bearing mammals, including raccoons, minks, muskrats, opossums and black bears, are common in the area.

A number of threatened or endangered species occur in the region. Taken together, the linked wetlands throughout the basin support an incredible diversity of plants and animals.



Crabs like this one, suffering from "burnt shell disease," began appearing in the Pamlico in 1987. Paul Nuremberg Photo.

These rich resources combine to form an absolutely unique natural treasure of unusually high aesthetic value.

The primary goal of APES is to produce an integrated management plan which can guarantee the long-term protection of our rich natural heritage and the traditional lifestyles it supports.

Change is Coming

The popular perception of the Albemarle-Pamlico system centers on its wildness, remoteness and unspoiled beauty. Yet change is coming inexorably to this fragile system.

The national trend of migration to the coasts is reflected in North Carolina. Some counties may double in population before the year 2000. Two of North Carolina's fastest growing counties, Currituck and Carteret, lie in the Albemarle-Pamlico watershed.

This kind of across-the-board growth will guarantee increased stress on the estuarine waters which ultimately receive the runoff and wastes from all these activities. The need for careful planning and management – before the problems occur – is clear.

Signs of Environmental Stress

The need for strong management in anticipation of expected environmental stress is sharply focused by the fact that our estuaries are showing a host of problems right now.

These warning signals suggest that the luxury of time for extended planning has expired, and concerted action must be taken soon.

A major sign that the system's tolerance is being exceeded is the noxious blooms of algae which choke a number of the important tributaries to the Albemarle and Pamlico Sounds.

The enrichment of waters by fertilized nutrients (mostly nitrogen and phosphorus) causing excessive growths of minute floating plants is called eutrophication.

These nutrients can come from runoff from farms and forests, from discharges of waste from wastewater treatment plants and industries, and even from the atmosphere itself.

Diseases of fishes and crabs have been dramatic in the region since about 1980. Red sore disease troubled the Albemarle in the early 1980s, and persists as a problem in some species in some areas.

An outwardly similar disease of menhaden and other commercially important species, called ulcerative mycosis, reached epidemic proportions in the Pamlico River in 1984. This fungus-caused sore disease is induced by environmental stress on the fish; the specific causal factor remains unknown.

Incidence rates in menhaden sometimes exceed 90 percent on an ongoing basis. This past summer showed another unique problem: blue crabs were affected by a shell-eroding condition called "brown crab" or "burnt crab" disease. The problem was greatest in the central part of the Pamlico River, especially among mature female crabs.

Another significant environmental change in the last decade has been a major shift in the distribution pattern of aquatic organisms. Rooted aquatic plants (also known as submerged aquatic vegetation, or SAV) have shown particularly spectacular changes.

The Pamlico River was swathed in native plants, important as a food source for waterfowl and as a feeding nursery ground for fish, in 1976. By 1985, most species were gone completely. Similar booms and busts have occurred in other areas (Currituck Sound for example). Similarly, oysters have shown a spatial displacement in the Neuse and Pamlico rivers of about 10-15 miles downstream.

Other signs of stress or environmental degradation can be found in the Albemarle-Pamlico system as well. Shellfish beds in the saltier parts of the estuaries are being closed due to urban, residential and resort development, when storm water carries fecal contaminants into the adjacent streams.

Wide acreages of forested wetlands have been converted to corporate farms since the early 1970s, with dramatic effects on wildlife. Dense drainage networks that were installed to make former wetlands trafficable continue to pour freshwater, sediment and associated contaminants into the fragile nursery areas for commercially important saltwater fish, shrimp and crabs.

The great majority of these phenomena have a direct impact on the fishery, both commercial and recreational. While relatively little information exists on the recreational fishery, data on commercial landings shows alarming trends.

Overall landings for the study area show continuing declining trends since a historical peak in the late 1970s. Many individual species show the same pattern, including striped bass, croakers, blue crabs and weakfish (speckled trout). Striped bass are in particular trouble; no successful year class has developed since 1976-1978 in any major tributary.

All of these conditions and symptoms add up to significant evidence that the buffering capacity of these vital estuaries is being exceeded. Even though specific causes of degradation may prove elusive, the overwhelming weight of evidence demonstrates that a deliberate plan of action must begin immediately.

Causes of Environmental Problems

The major sources of pollution in the Albemarle-Pamlico drainage area are readily identified. They are agriculture, forestry, municipal wastewater treatment plants and industrial discharges.

In this rural region, agriculture dominates land use. Where improper agricultural practices are followed (especially upbasin where the terrain is steep), enormous loads of sediment, fertilizers and pesticides can be flushed into streams.

In the coastal fringe, drainage water itself can be a major pollutant if salinities are dramatically modified at the wrong time (for example, when baby shrimp are settling into nursery areas). Forestry may contribute similar pollution, but usually at lower per acre rates because of extended harvest/disturbance cycles. Thus, changing land use contributes enormously to overall estuarine health.

Point sources of pollution contribute major pollutant loads as well. Wastewater treatment plants generally discharge nutrients (organic materials that re-

move oxygen from the water when acted upon by microorganisms) and, sometimes, toxic substances. Treatment plants are located in all basins, but large ones are concentrated on the Neuse River.

Industrial discharges may contain a wide variety of contaminants. Major industrial dischargers include paper mills in the Chowan, Roanoke and Neuse systems, a phosphate mine and fertilizer manufacturer in the Pamlico, dye works in the Chowan and textile manufacturers in the Pamlico.

In addition to these large contributors of pollutants, virtually all other human activities in the region bring about some level of impact. Military operations in the area are complex and have tremendous local ramifications. Resort development has important implications for shellfish beds and wetlands. Tourism greatly influences the environment through higher use rates of powerboats, marinas and restaurants, as well as through severe seasonal fluctuation in sewage production.

Practically any level of action, whether washing out a dog kennel or farming a large tract, can have significant environmental effects if improperly conducted. The lesson is clear: effective management must be basin-wide and comprehensive.

One Answer: APES

APES, then, is charged with analyzing this complex of interrelationships to determine where management must occur to be effective for the long term. The Clean Water Bill Amendment of 1987, which authorizes this program, states our mission clearly: to protect and, where possible, restore the valuable estuarine resources of the system.

Toward this end, the state of North Carolina has recently signed an agreement with the U.S. Environmental Protection Agency officially designating APES to be consistent with the Clean Water Bill, but also clearly identifying the actions and evaluations required under the program.

These evaluations will culminate in the production, by November 1992, of a comprehensive conservation and management plan ready to be implemented. This document will lay out not only what needs to be done, but by whom, when and at whose expense. An interim product by October 1990 will be a comprehensive report on status and trends in water quality and fisheries resources and on probable causes of environmental problems. This approach is action-oriented and guarantees that difficult issues will be confronted.

The program is designed with three major components, each vital to its success: information acquisition, information management and public involvement.

The first component, information acquisition is bureaucratic language for research directed toward specific management-related questions. All research conducted under the program must have a high likelihood of yielding results that will lead to management actions. During 1987-1988, seventeen technical projects are underway, addressing questions from oyster bed viability and swamp forest nutrient assimilation to possible reduction of fish mortality during shrimping. New projects will be requested and funded during spring 1988. All funded projects must move us closer to the specific goals laid out in our work plan.

The second major problem function is information management. Dr. John Costlow is fond of referring to stacks of research conducted in the past in this system that has yielded little real progress in managing the system as a whole. APES is responsible for producing an information system which will allow integration of existing computerized databases so that environmental policy decisions can be based on the best available information. The system will be located at the geographic information system now being operated by the Land Resources Information Service, so that maps and other graphics may be readily produced.

The final and probably most important component of the program is public involvement. The term, public involvement, implies a depth of action not often found in governmental programs. The program is currently receiving advice and information from two 30-member Citizens' Advisory Committees, one each from the Pamlico and Albemarle regions. The members are noted representatives of their communities, chosen for specific interest area as well as geographic area. The elected chairs of those committees are voting members on the Policy Committee, the highest level administrative board. The elected vice-chairs are voting members on the Technical Committee, the board responsible for month-to-month administration and implementation of the program.

In addition, the program has recently hired Joan Giordano to be the public involvement coordinator, located in the Washington Regional Office of the North Carolina Department of Natural Resources and Community Development. She will be responsible for implementing the public involvement program. This program will include a local government liaison network, a series of public awareness-building projects conducted by nonprofit organizations, schools and universities, a newsletter and many other facets.

Overall, the best hope for the future lies in our hands. We are blessed with invaluable natural resources, currently threatened by cumulative impacts of growth basin-wide. Governor Jim Martin has agreed with this assessment and has committed the state of North Carolina to the programs necessary to protect our irreplaceable estuaries.

The legislature of the state of North Carolina has identified the need for immediate and comprehensive action and has appropriated significant funds to this effort. The federal Congress, led by Rep. Walter B. Jones, Sr., has agreed and has listed the Albemarle and Pamlico Sounds as estuaries of national concern. The Environmental Protection Agency has agreed and has committed to a five-year effort (and beyond) to help manage the Albemarle and Pamlico wisely.

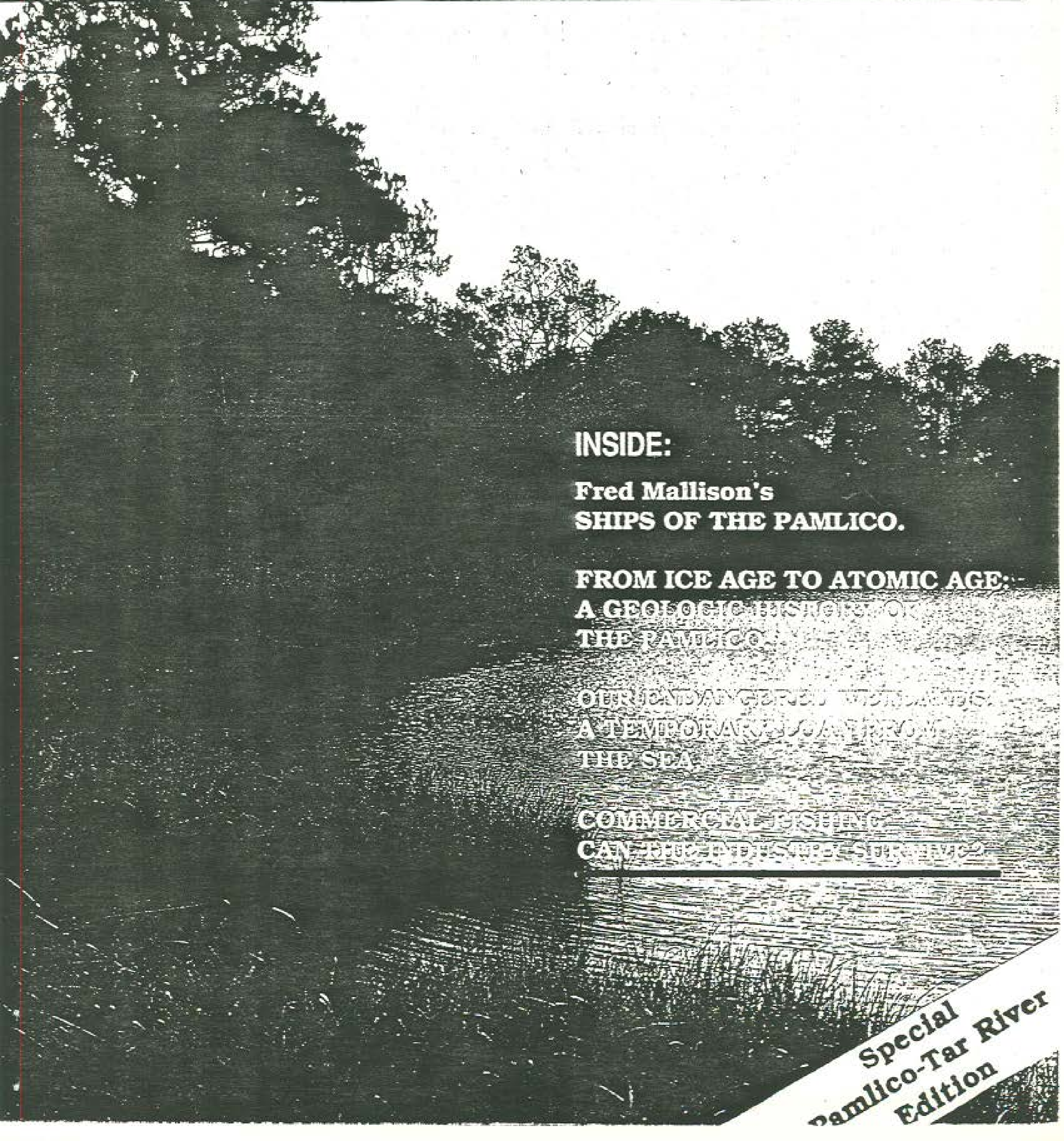
The final ingredient needed is public support. With it, we can act in a timely fashion, with a carefully reasoned plan, to guarantee the long-term productivity of our estuaries.

Which vision of the future will it be? The choice is ours. □

APES

ORIGINAL

BEAUFORT COUNTY



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Fred Mallison's
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OUR ENDANGERED WETLANDS:
A TEMPORARY LOAN FROM THE SEA.

COMMERCIAL FISHING:
CAN THE INDUSTRY SURVIVE?

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