

Serious trouble stalks two of the nation's largest estuarine areas, threatening the state's eastern economy and environment. Our best hope for restoration may lie with this five-year study.

by Mark Taylor

On a clear fall day, there isn't a finer place in the world than the top deck of the Cedar Island-Ocracoke ferry. I took my place at the rail, and watched the mainland's golden salt marshes fade into the distance. We passed several trawlers crossing the open waters of Pamlico Sound, and as we approached Ocracoke, two fishermen in a snow-white skiff waved as they checked their crab pots. Nearby, a flock of terns dove for minnows in the shallows.

"Beautiful, isn't it," said a middle-aged woman beside me as she lowered her binoculars. "I've made this trip a hundred times, and never get tired of it. I just hope it lasts."

She wasn't alone. Many people feel that North Carolina's largest estuaries, Pamlico and Albemarle sounds, are living on borrowed time. These waters are still incredibly beautiful and productive, second in size and fisheries only to Chesapeake Bay—our nation's most valuable estuary. In the past decade, however, there have been unmistakable warning signs that our estuaries are deteriorating—frequent, massive fish-killing algal blooms, deadly diseases that eat holes through the shells of crabs and bodies of fish, the disappearance of aquatic grasses which sheltered and fed marine life and waterfowl, and a waterfront building boom that has fouled shellfishing waters with organic pollution.

These signs clearly point to a system in trouble. Because of this, North Carolina has launched a major program—the Albemarle-Pamlico Estuarine Study—designed to develop a management plan by 1992 that will clean up our coastal waters. This five-year,

Pamlico and Albemarle sounds are among the nation's most productive estuaries, but are also beset by pollution. The Albemarle-Pamlico Estuarine Study—a five-year cooperative effort with the federal Environmental Protection Agency—will produce by 1992 a plan to restore the water quality of the estuaries.

CAN ALBEMARLE
AND PAMLICO
BE SAVED?

part of the National Estuary Program, a cooperative effort of the federal Environmental Protection Agency and individual states to halt the degradation of our most valuable coastal waters. Other areas targeted for clean-up efforts are Long Island Sound, Buzzard's Bay, Narragansett Bay, San Francisco Bay, and Puget Sound. Funding for the program is provided through the federal Clean Water Act and matching state funds and services.

"The major goal of the Albemarle-Pamlico Estuarine Study is to develop a management plan by 1992 that will enable us to clean up Albemarle and Pamlico sounds, and maintain the estuaries and their natural resources in a healthy state," said Dr. Robert Holman, project director of the study for the N.C. Department of Natural Resources and Community Development. "Implementation of this conservation plan will then take place over the following five to seven years."

The Albemarle-Pamlico Estuarine Study is administered by four committees representing state and federal agencies, universities, conservation organizations, coastal sites, conservation organizations, citizen interests, and area citizens. The policy and technical committees set study goals and research priorities, and two citizens advisory committees act as a link to the public.

The work of the study is accomplished mostly through one- or two-year research projects done by universities, conservation organizations and state and federal agencies. Research proposals are screened annually by the study's technical committee, and a priority list is developed for funding. In 1987, the first year funding was available to the study, the technical committee received over 100 project proposals. Seventeen projects were funded, falling roughly into four areas—water quality and estuarine relationships, fisheries, areas and resources critical to the health of the estuaries, and the human use and environment of our estuaries.

This work will help the study reach a major milestone in 1990, when a comprehensive report will be issued on the status and trends in water quality and natural resources in Albemarle and Pamlico sounds. The sources of pollution and

Recreational boating, commercial vessels and marina development contribute organic pollution to our coastal waters, resulting in the closure of waters to shellfishing. The problem is especially acute for oysters. Biologists are mapping oyster beds and studying the feasibility of establishing new beds in cleaner waters.

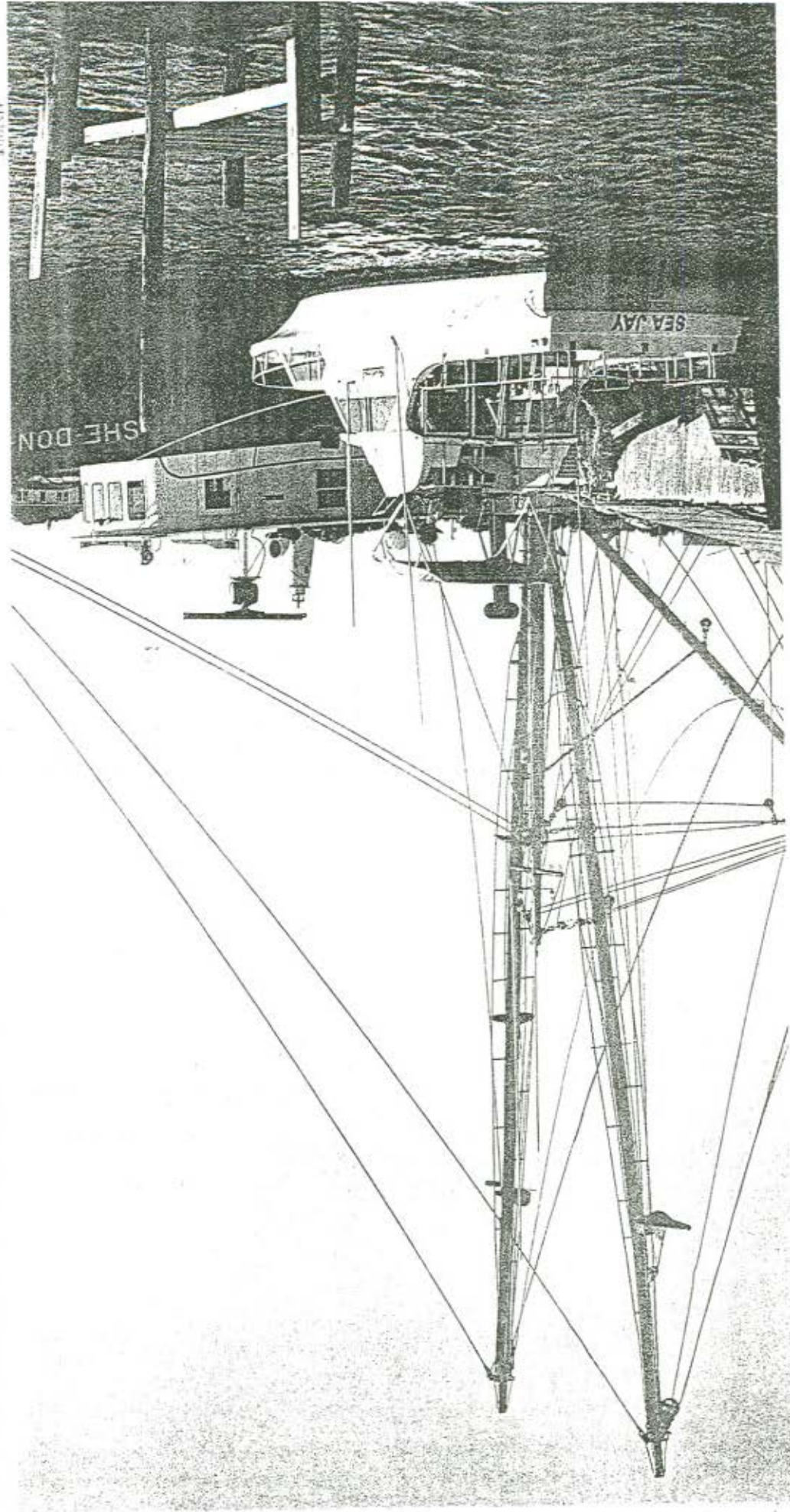


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other problems will also be catalogued in this report.

"After this report is issued, the study's focus will shift from basic research to developing and implementing specific management practices that will improve water quality," said Holman. "Another important facet of the study is public education, and our citizens' advisory committees are involved in all phases of the study. We won't be able to solve our water-quality problems without the understanding, support and involvement of the public."

Holman adds that the current research projects focus largely on nutrients, toxic materials, water-quality monitoring, and fisheries.

"Excessive amounts of the nutrients nitrogen and phosphorus cause algal blooms, and are an on-going problem. Project investigators are identifying and mapping the sources and loads of these nutrients, and are also evaluating the role that nutrients buried in bottom sediments may play in stimulating blooms. Other studies are investigating the roles that coastal swamps and agricultural best management practices play in reducing nutrient runoff.

"Researchers are also looking at toxics such as heavy metals and pesticide residues. This is a widespread problem in more heavily industrialized states, and there may be hot spots here. Consequently, we're analyzing bottom sediments and fish tissues for toxic materials. Finally, we're expanding our water-quality monitoring effort to include the tributaries and open waters of the sounds, and are taking a closer look at nutrient loads in these waters."

Holman is also excited about a citizens' program for monitoring water quality. This program is coordinated by the Pamlico-Tar River Foundation and is based on a successful program developed by the Chesapeake Bay Foundation. Volunteers take water samples weekly and test them for temperature, salinity, dissolved oxygen, acidity or pH, and turbidity or suspended solids.

"We've established 16 sampling stations in the Pamlico watershed, and tried to avoid areas that were already being monitored by the state or East Carolina University," said Grace Lekson of Wake Forest, who developed the program with David McNaught, director of the Pamlico-Tar River Foundation. "The factors we test for are basic water quality measures, but we also encourage our volunteers to note anything unusual. In the near future, we'll train additional volunteers from other groups, and expand this monitoring to include Albemarle Sound."

Holman adds that volunteers' observations are as important as their data. "We often don't hear of an algal bloom, fish kill or pol-



lution problem until it's too late. Now, our volunteers can spot these problems early, and be our first line of defense on the water."

A number of fisheries studies are also underway. Researchers are mapping the remaining submerged aquatic plants and grasses, which provide habitat for marine life and waterfowl, and they are also trying to determine why this vegetation disappeared, and whether it can be restored. Another project is surveying existing oyster beds—oysters have declined as salinities dropped—and testing the feasibility of establishing new beds. Still another has tested the effectiveness of excluder devices for shrimp trawls. Excluder devices prevent sea turtles from drowning in nets, and also reduce the accidental catch and wastage of young flounder, spot, trout and other fish. Other investigations are continuing into the causes of fish and crab diseases.

One of the study's fisheries projects has already met with success. Recent work by

Runoff from shoreline and urban development (left) contributes many pollutants to our estuaries. Researchers are sampling bottom sediments and fish tissues for toxic materials, and will use this data to identify and clean up contaminated areas in the future.

Farmland (below) is a major source of nutrient pollution, but conservation practices by farmers can control this pollution. These practices have already reduced nutrient runoff into the headwaters of Merchant's Millpond State Park in Gates County.





Dr. Roger Rulifson at East Carolina University indicates that the decline of the striped bass in Albemarle Sound may be caused by fluctuating flows in the Roanoke River, which serves as their spawning ground. The river's flow is controlled by several dams. If flows are too low during the spawning season, there may not be enough water to carry the developing eggs to the food-rich, protected waters of the upper sound. If too much water is released, the eggs may be flushed out into open water where food is scarce and predation high. Experimental releases that simulated natural flows last spring produced the best crop of young stripers since 1976.

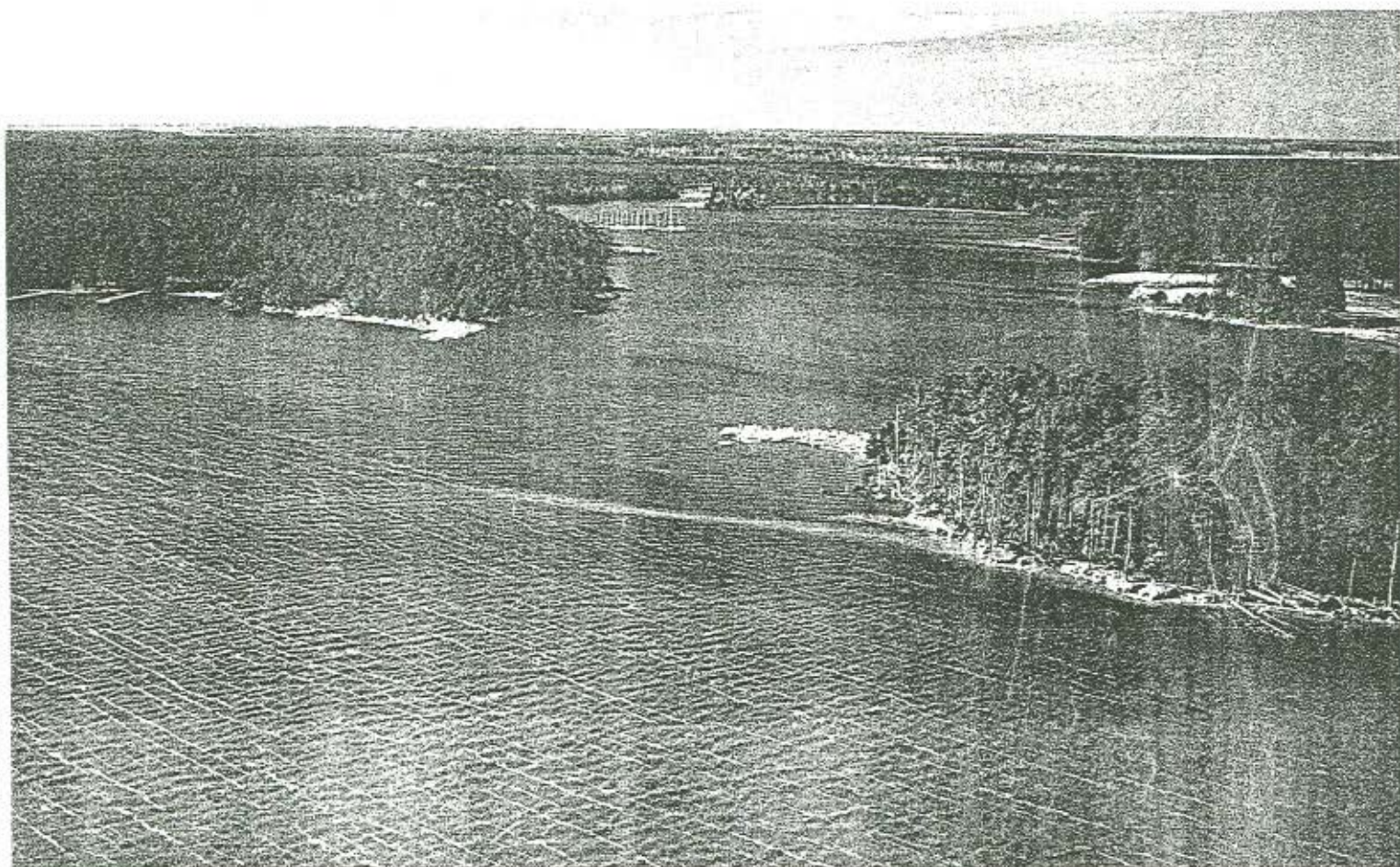
"The decline of the striped bass is probably the number one concern around Albemarle Sound," said Dr. Parker Chesson of the College of the Albemarle in Elizabeth City, and chairman of the Albemarle Sound Citizens Advisory Committee. "However, it's just one of the visible signs that something's wrong with our estuaries."

The Albemarle-Pamlico Estuarine Study has also earmarked funds to correct immediate problems. This year, cost sharing for agricultural best management practices is being provided to farmers in Gates County to reduce nutrient runoff into Merchant's Millpond State Park, which is suffering from excessive algal blooms and aquatic weeds. In Hyde County, a water-control device is being installed on a drainage ditch that leads directly into a primary nursery area for young shellfish and other marine life. The device will protect aquatic life from sudden influxes of fresh water, and will also allow fresh water to be slowly released where it will be quickly and harmlessly dissipated in the sound.

These two projects are typical of the measures that will be needed to protect our sounds in the future. Estuaries are a mix of both fresh and salt water, but too much fresh water can cause problems. The loss of aquatic vegetation, shellfish nursery areas and oyster beds are all linked to declining salinities caused by excessive freshwater runoff. The nutrients carried in this runoff also fuel algal blooms, and contribute to fish and crab diseases.

As the human populations of North Carolina and Virginia have expanded, however, land clearing in both urban and rural areas has caused more freshwater—

Commercial fishermen sort crabs at a packing house. Diseases that affect fish and crabs threaten the livelihoods of many fishermen, and have been linked to many of the pollution problems in Albemarle and Pamlico sounds.



sed with nutrients, agricultural chemicals, heavy metals and oil residues, and nonpoint pollution—to rush into the sounds with every heavy rain. The problem has been compounded by the ditching and draining of coastal swamplands. Much of the success of the Albemarle-Pamlico Estuarine Study will ultimately depend on controlling freshwater runoff through better land management,” said Dr. R.J. Holman, a member of the study’s technical committee, and also director of the North Carolina Sea Grant program. “One of the study’s current projects, for example, is an inventory of the wetlands, forests and other natural areas surrounding the sounds. We want to preserve these areas because they act like water like a sponge, filtering out nutrients and other harmful substances as water slowly seeps through the soil. We also need wider use of greenbelts, riparian strips, stormwater runoff controls, and agricultural best-management practices. If these practices are similar whether they’re used in cities, on farms, or in coastal developments. A strip of undisturbed land bordering the water so that unfiltered runoff will not have a chance to reach our sounds and sounds. Other changes will also be needed. Agricultural drainage ditches should be routed

away from shellfish nursery areas into more open waters, and equipped with devices that control their flows. Sewage-treatment plants should be upgraded, and many coastal communities have already made improvements by switching to the land application of sewage. The treated sludge is spread on forests and fields, where the nutrients enter the soil instead of the water.”

The technology certainly exists to clean up our coastal waters; however, the ultimate success of the Albemarle-Pamlico Estuarine Study is dependent upon public involvement and support. We will have to change the way we build our cities, farm our land, develop our coast, fish our waters, and even alter some of our personal habits and lifestyles if we are to have healthy and productive estuaries.

“We’re fortunate that our estuaries are still relatively clean compared to others—such as Chesapeake Bay or Long Island Sound,” said Holman. “In another four years this study will give us the tools we need to clean up our waters, but then it’s up to the public to see that the work gets done. I’m optimistic, however, because I think the outcry we heard last summer about the closed beaches in New York and New Jersey shows that the public cares about clean water, and wants to quit using our coastal

Coastal wetlands and forests play an important role in protecting coastal water quality. These areas absorb water like sponges, preserving salinities in adjacent waters and filtering nutrients and pollutants. Study investigators are surveying coastal natural areas, and developing strategies for their protection.

waters as dumping grounds.”

Holman is not the only member of the study who feels we are at a crossroads. Captain Al Howard of Arrowhead Shores near Edenton is a member of the Albemarle Sound Citizens’ Advisory Committee, and has been involved in the cleanup of the Chowan River since he retired there from the Navy in 1975.

“We can clean up our estuaries if we really want to,” he said, “but I think we’ve abused our waters so badly that this is our last chance. We’re putting together a good plan, but only the public can see that its measures are put in place and then rigidly enforced. If we don’t act soon, I see a sad day coming. That’s when you’ll be able to stand on the Oregon Inlet bridge, look to the east, and see nothing but the blue waters of the Atlantic. Look to the west, though, and all you’ll see are green, algae-covered sounds.”