Coastwatch

UNC SEA GRANT ▪ MARCH 1990

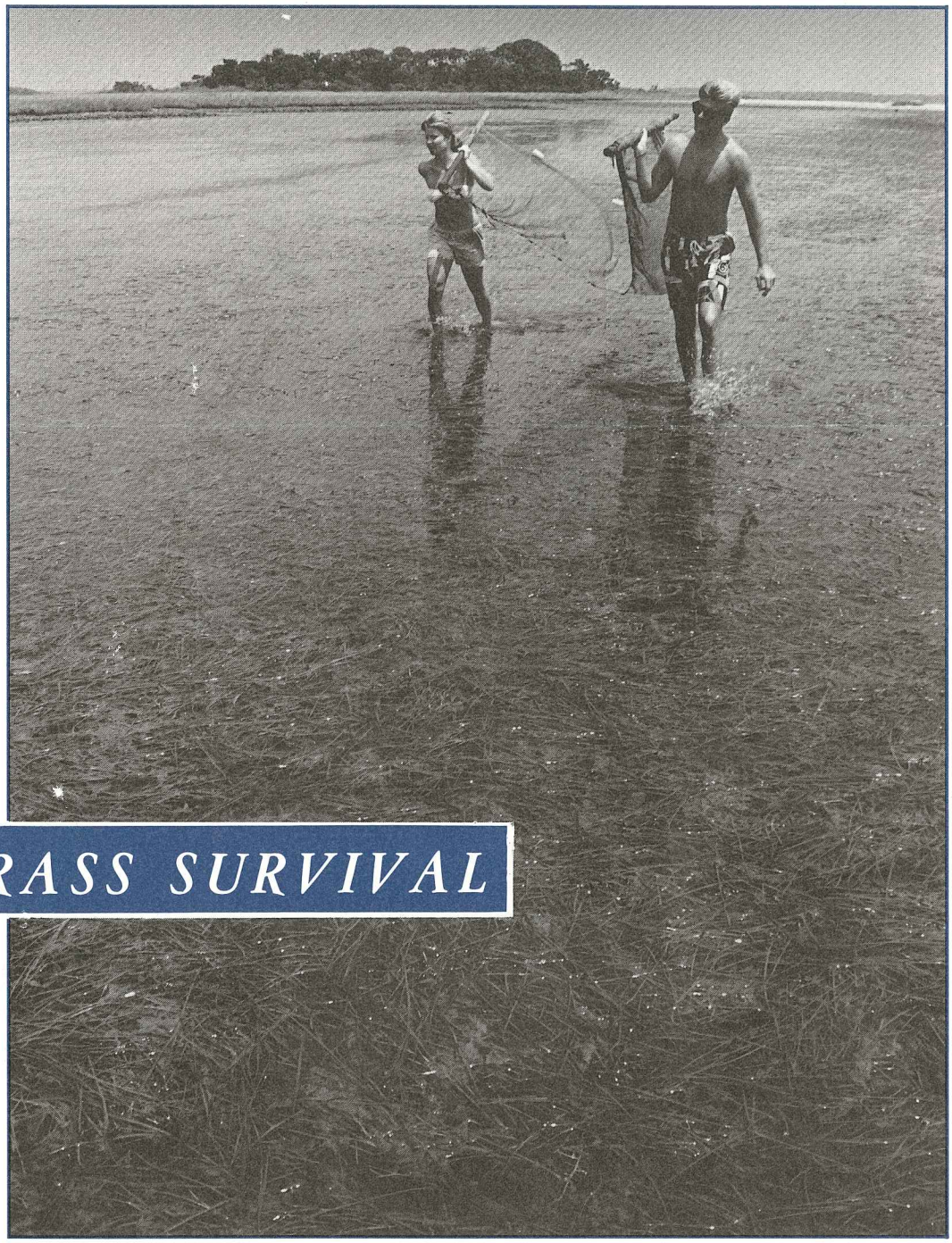
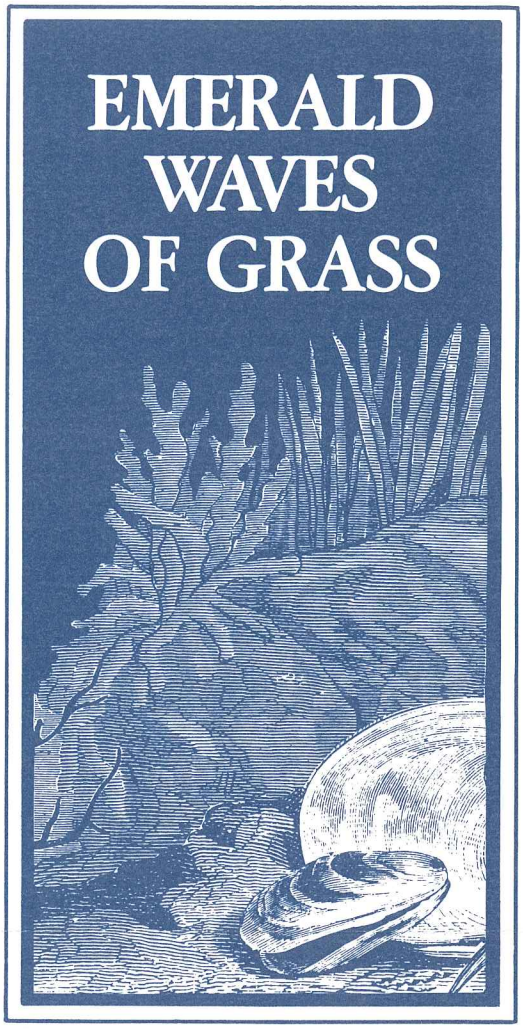


Photo by Scott Taylor

SEAGRASS SURVIVAL

Two Duke University undergraduates pull a seine through eelgrass on Phillips Island near Morehead City.

EMERALD WAVES OF GRASS



By Michael Weaver

Their boats were all but loaded down and gassed up when the word reached clam fishermen last December: You can't kick for clams in these waters, the state said. There's grass here.

Grass?

Seagrass.

It had covered so much of the estuary floor through Core Sound that fisheries officials closed 20 percent of the available clam beds off Carteret County to mechanical harvesting that could destroy the underwater lawns.

The grass beds—discovered during aerial surveys last year—harbor many of the state's most important recreational and commercial species. Among the species are clams—a much-sought-after mollusk that supports an economically important winter mechanical-harvest fishery.

Closing these newly discovered grass beds had Carteret County shellfishermen angrier than a disturbed hornet. They needed to harvest the beds to make a living, they said.

But is today's harvest of clams worth destroying a habitat that's vital to tomorrow's production of many species of fish and shellfish?

Indeed, protected seagrass beds are nothing new. For years, the state has protected underwater meadows prized for their role as food sources and refuge for thousands of sea creatures.

Young mullet, spot, blue crabs and hard shell clams share the cover of seagrass with adult sea trout, flounder, shrimp and dozens of other species. Bay scallops make seagrass fields their sole nursery grounds, and sea turtles as well as birds from egrets to osprey eat the wavy green leaves.

Dense seagrass fields cover up to 200,000 acres of shallow coastal waters in North Carolina, second only to Florida in area. And only in North Carolina does eelgrass—the most common along U.S. shores—coexist with two of the other 47 varieties known worldwide.

The unique habitat makes for a wonderful playground for fish and shellfish, an occasional battleground for fishermen and a fascinating study ground for scientists.

Salt marshes, which cover roughly the same number of acres in North Carolina, are certainly more visible, but no more valuable, experts say.

"These are critical nursery habitats," says Gordon Thayer, a scientist with the National Marine Fisheries Service and an authority on seagrasses. "Without them we think we would have different animals using the habitats—and a lot fewer of them."

Marine scientists who have spent the better part of careers studying seagrass still fascinate at its size, beauty and productivity. A healthy patch of seagrass—they vary in size from 1 acre to 6,000—can rival the productivity of a heavily farmed agriculture crop.

"It's just teeming with all sorts of things," North Carolina State University botanist JoAnn Burkholder said while flipping through pages of color slides of the neon-green seagrass beds.

As part of a Sea Grant research project, Burkholder and NCSU zoologist Larry Crowder have transplanted some 8,000 eelgrass shoots in a dozen mesocosms, 380-gallon tanks set up along the docks at Bogue Sound. Their tests to determine its resistance to algae and other clinging plants are among the first long-term experiments

of seagrass in controlled environments of that size.

Little is known about seagrasses, admit researchers who until this century focused little attention on the stringy plants. Losses, too, are hard to document since few records mapped their growth before the mysterious "wasting disease" of the early 1930s that wiped out 90 percent of seagrasses along the Atlantic shoreline.

What *is* known is impressive.

Eelgrass—along with shoal grass and widgeon grass in North Carolina—curbs underwater erosion through roots that anchor soils to the sound bottom. Since seagrass typically grows in shallow estuarine waters, its destruction can drastically alter the shape of the nearby shorelines.

Though seagrasses are rarely found in what Burkholder calls "wave-beaten areas," they do flourish along more protected embayments along some coastlines. Throughout Core Sound, however, 88 percent of the three varieties are concentrated along the calmer, inner shores of Core Banks.

The roots—spaghetti-like strands that dig deep into muddy bottoms—also draw nutrients from the soil, passing that energy along to other plants and animals when the seagrass plant dies or exfoliates each season.

A century ago, long, tough strands of eelgrass were so common along New England shores that residents there scooped up wagonloads of shredded seagrass and thatched roofs with it.

To this day, seagrasses—largely recovered from the wasting disease—"grow like carpets, like your back yard," Thayer says.

In the dense, tangled leaves, microscopic and more visible plants and animals attach themselves to the plants and hide among their thick mat.

Outside the calm of seagrass beds, fish and shellfish fend for themselves without cover of the sprawling, protective canopy. Bay scallops search out seagrass beds, where they grow from larvae.

When wasting disease ravaged so much of the Atlantic Seaboard's seagrass from 1930 to 1933, the impact was immediate. Harvests of scallops in the Delmarva Peninsula of Chesapeake Bay that had totaled 25,000 pounds in 1930 plummeted to zero by 1933 and '34.

More recent declines in seagrass in the Chesapeake Bay are blamed on pollution and dredging, a deadly combination brought about by coastal development that chokes the life from seagrass. Because they are plants dependent on light for photosynthesis, seagrasses suffocate under cover of turbid waters or heavy algae that block the sunlight needed to make food.

With no light, there is no life—the reason you find most seagrasses in waters 6 feet deep or less. Multilayered meadows thrive in shallow waters along most of the earth's continents, from the Arctic Circle to Tasmania.

Dredging and filling remain seagrasses' most direct enemy, though outside influences that alter water temperature, salinity and light also pose a threat.

Like the Chesapeake, North Carolina's coast has seen drastic development in the past generation, but Thayer and others are not ready to link that buildup with a downturn in seagrass.

"We don't have a particularly good historic record," he said from his Beaufort office. "There just aren't any historic maps."

Researchers agree, however, that seagrass in the Beaufort area has waned little over the past 20 years.

Only in that time have federal and state regulators entered the scene, writing laws to protect seagrasses from potentially destructive activity such as dredging or mechanical harvesting.

"It's pretty clear that these practices such as clam-kicking are destructive to the bottom," researcher Charles Peterson says of mechanical methods that use hydraulic dredges or boat motor propellers.

"You can see those trails for years," Thayer says.

Add to the equation the wandering nature of seagrass beds, and it's clear why the protection puzzle is a complicated one.

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Aerial view of seagrass beds surrounding a duck blind in Core Sound near Davis, N.C.

Photo by Scott Taylor

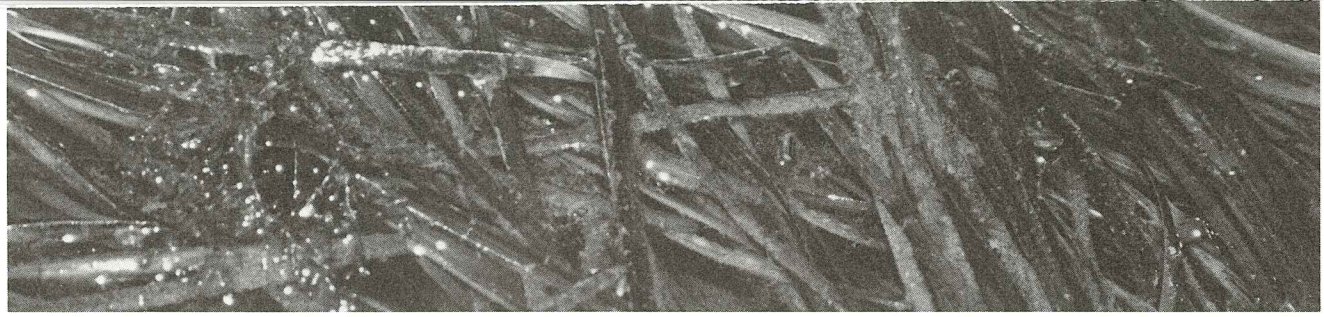


Photo by Scott Taylor

Eelgrass

As many as 100 clam fishermen marched a picket line around the Marine Fisheries building in Morehead City last month, demanding opening of closed waters in Core Sound.

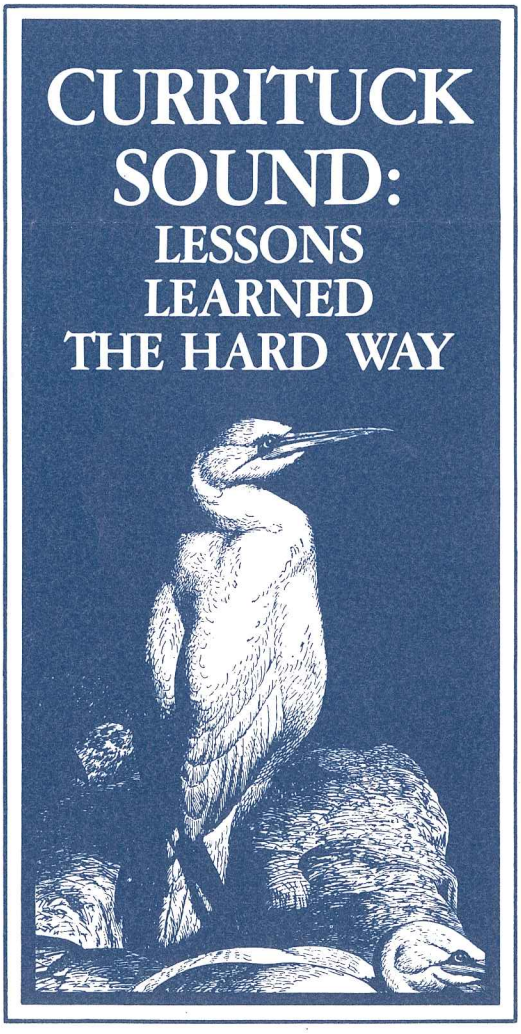
Division Director William Hogarth refused, agreeing that while some areas had less grass than earlier thought, grass beds have a tendency to move from season to season.

Peterson, of the UNC Institute of Marine Sciences in Morehead City, puts it this way:

"If we'd decided to dredge Core Sound out one year because we'd said it didn't have seagrass, we'd have been wrong.

"There's a lot we don't know," Peterson admits.

But, he adds, the lifeblood of ocean life is tied so closely with seagrass habitats that, "if all the seagrass [suddenly] is missing, we'll know." ■



By C.R. Edgerton

Before the turn of the century, fishermen on North Carolina's Currituck Sound would often lean over the sides of their boats and take long, cool drinks from the sound.

Outdoorsmen would travel great distances to camp under clear skies, hunt the masses of waterfowl and fish for largemouth bass.

The shallow waters of Currituck were clear then and, because a hurricane had closed the sound's only link with the Atlantic Ocean in 1828, they were more fresh than salt. Fish were abundant and swam in playful schools. Migratory birds nested there by the thousands. The sound was pristine, untouched by the ravages of civilization.

Native submerged seagrasses, tiny but essential ingredients in the fragile ecology of this Eden, flourished. Fish, shellfish and other coastal creatures found shelter, food and protection here.

Through the years, the fortunes of Currituck have hinged on the ebb and flow of the sound's seagrass beds. Lessons learned here have prevented similar situations in the state's other sounds.

In 1918, the residents of Currituck Sound—the people as well as the flora and fauna—witnessed an apparently innocent event that would one day mean disaster for the then tranquil, unpolluted waterway.

Construction was completed on a series of canals and locks that linked Currituck with Norfolk Harbor and the Chesapeake Bay via North Landing River. The canal connected the Carolina sounds with Virginia's busiest waterway, uniting the two states by inland water and bringing progress and growth.

But the plan backfired. The new waterway brought not only commerce and trade, but allowed some of the dirtiest water on the Eastern Seaboard to flow unhindered from the polluted Chesapeake Bay to Currituck.

Raw sewage. Silt from continuous

dredging. Industrial wastes. They had begun to strangle the huge Virginia bay and were now making a home in Currituck Sound.

The pristine beds of seagrass began to choke beneath the turbid waters. The muck and mire of too much pollution spelled doom for sago pondgrass, widgeon grass, wild celery and other grasses essential to survival of the sound's underwater creatures.

Hungry fish moved to healthier waters. Most of the migratory waterfowl chose not to return to their normal nesting sites. The fishermen could no longer drink the waters of Currituck, which were now rank with the odors of civilization and salty from the influx of Virginia seawater.

But things began to improve in the early 1930s. W.S. Bourne, a scientist who dedicated much of his life to trying to discover the causes of the death of Currituck's seagrasses, urged officials to redesign the series of locks and canals linking the two states.

The new design worked. For the next 30 years, Currituck Sound allowed Mother Nature to clean out the sludge and sewage that had accumulated there for two decades. The vital seagrasses returned, though not in their earlier abundance.

The bass also returned, luring fishermen from around the United States to the Currituck low country.

The old hunting clubs, built to house waterfowl hunters, flourished again as most of the migratory birds reclaimed their nesting sites.

But the fragile Currituck ecosystem and its vital underwater seagrass beds had not seen the last of their troubles. Hurricanes in 1954 and 1955 stirred sediments, clouded the waters and choked native grasses.

And, in March 1962, the powerful Ash Wednesday Storm blew in from the northeast, pounding North Carolina's Outer Banks and opening several new inlets into Currituck Sound. Salty seawater poured in, transforming the sound from a freshwater haven to a brackish sea.

The sudden influx of seawater decreased much of the turbidity that had choked the widgeon grass, wild celery, and other native underwater grasses. The inlets later closed, and the saltiness of the water diminished. But the brief period of increased salinity cleared the water and opened the door to yet another challenge for the Currituck system.

Eurasion watermilfoil, a thickly growing underwater plant that robs its host waterway of life-giving oxygen, gained a foothold in the sound. Scientists believe the milfoil, a non-native species, was transplanted by accident, off boats plying the canal between milfoil-choked Chesapeake Bay and Currituck Sound.

Again, local fishermen began to see the consequences of the destruction of native seagrass beds. Fewer fish were caught. Fewer sea birds were seen. Boat propellers were often clogged and even stopped by this choking underwater weed.

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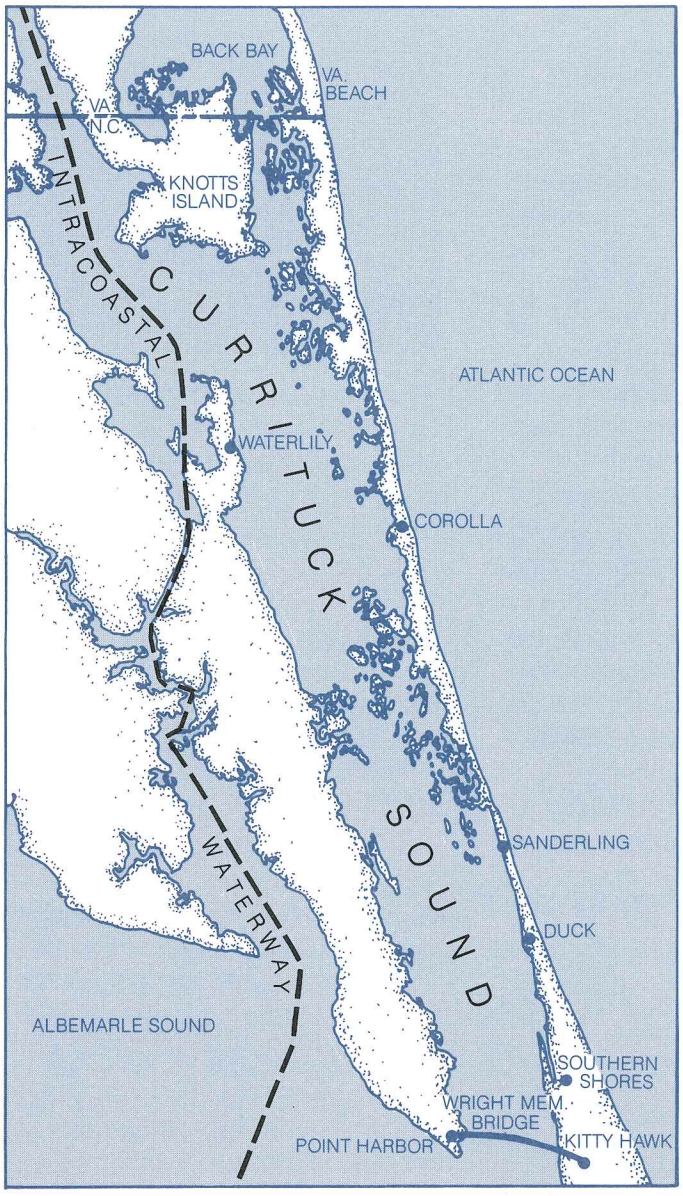


The fortunes of Currituck have hinged on the ebb and flow of the sound's seagrass beds. The Intracoastal Waterway links Currituck Sound with Norfolk Harbor and the Chesapeake Bay.

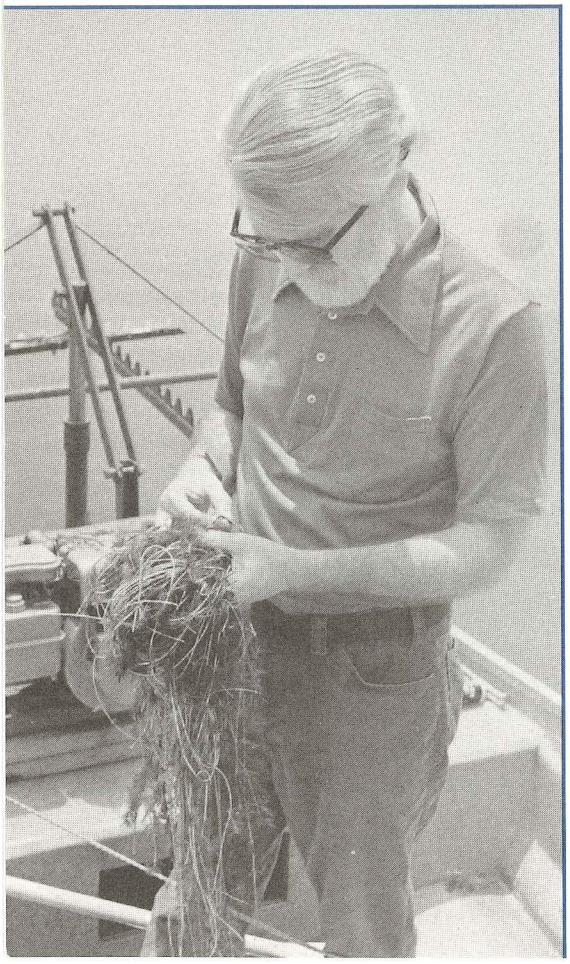
Photo by Jim Page

But Mother Nature was not yet finished with Currituck Sound's seagrasses. By the late 1970s, the salt-heavy seawater that had poured into the sound during the Ash Wednesday Storm had disappeared. Lighter, fresher water prevailed. The milfoil began a decline that continues today. And scientists aren't sure what process or combination of processes caused the choking weed to wither, especially in southern parts of the sound.

"Invading weeds like this tend to take over for awhile and then fade out," says East Carolina University biologist Marc Brinson. Perhaps, he says, the milfoil's decline can be traced to a series of weather-related events like those that destroyed some milfoil beds in Pamlico Sound in the mid-1980s.

Today, nearly half the milfoil that once dominated seagrass beds in Currituck Sound is gone, says Brinson who, with ECU biologist Graham Davis, has studied and written about the seagrasses in the sound. They say some of the native grasses are returning.

ECU's Graham Davis studies milfoil in Currituck Sound.



But the fish haven't yet come back and the birds haven't been convinced that Currituck is the right place to nest and raise their young.

Ernie Bowden, a 65-year-old lifelong resident and observer of the Currituck Banks, thinks he knows why.

"The seagrass beds disappeared in the late 1950s, though right after World War II they were abundant," Bowden says. The absence of the seagrasses began a chain of events that Bowden says can't be reversed.

"The real problem in Currituck Sound is the filling in of the sound because of shoreline erosion," says Bowden, who remembers when the sound's five-foot deep waters were 12 feet deep or more.

"Once the grasses disappeared, the waves just rolled in at will, cutting away at the shore like crazy. When I was a boy it was unusual to see a wave even 18 inches high. Now it's not unusual to see them three feet or more."

Bowden admits his observations of the sound are not truly scientific. "But I've lived here all my life and my father did and his father before him," he says. "I've witnessed what's happened here."

The most obvious change brought about by the death of Currituck's seagrasses has been the decline in fish and bird populations.

"In 1957, we began to see the demise of the migratory waterfowl and bass," says Bowden, who once operated a private hunting club near Corolla. "Hunting and fishing like they used to do with the big hunting clubs is practically history in Currituck Sound. There's just nothing for them to eat here anymore."

Will the sound ever return to its glory days, when its waters rolled clean and fresh and the residents along its shores enjoyed its beauty?

"In terms of waterfowl, it probably won't," says Brinson. "But it's not just the seagrass beds that are a problem. They need to stop the excessive hunting in the area, to preserve the species that do come there."

Brinson says some of the seagrasses that died in the 1960s and 1970s have returned to portions of Currituck Sound and Back Bay. And in areas where milfoil once dominated, the seagrasses are making a comeback.

He also says excessive erosion in Currituck hasn't been positively linked to the demise of seagrass beds. "In fact, if there's filling in the sound and the depth of the water is less than it used to be, that would make conditions better for the growth of seagrasses, which need shallower water to survive," he says.

But Bowden has a less optimistic view. He thinks future visitors to Currituck Sound will never again witness the bountiful waters that he grew to love as a young boy.

"I don't think it will ever be the same again," Bowden says. "When some things are messed up, they're messed up for good." ■