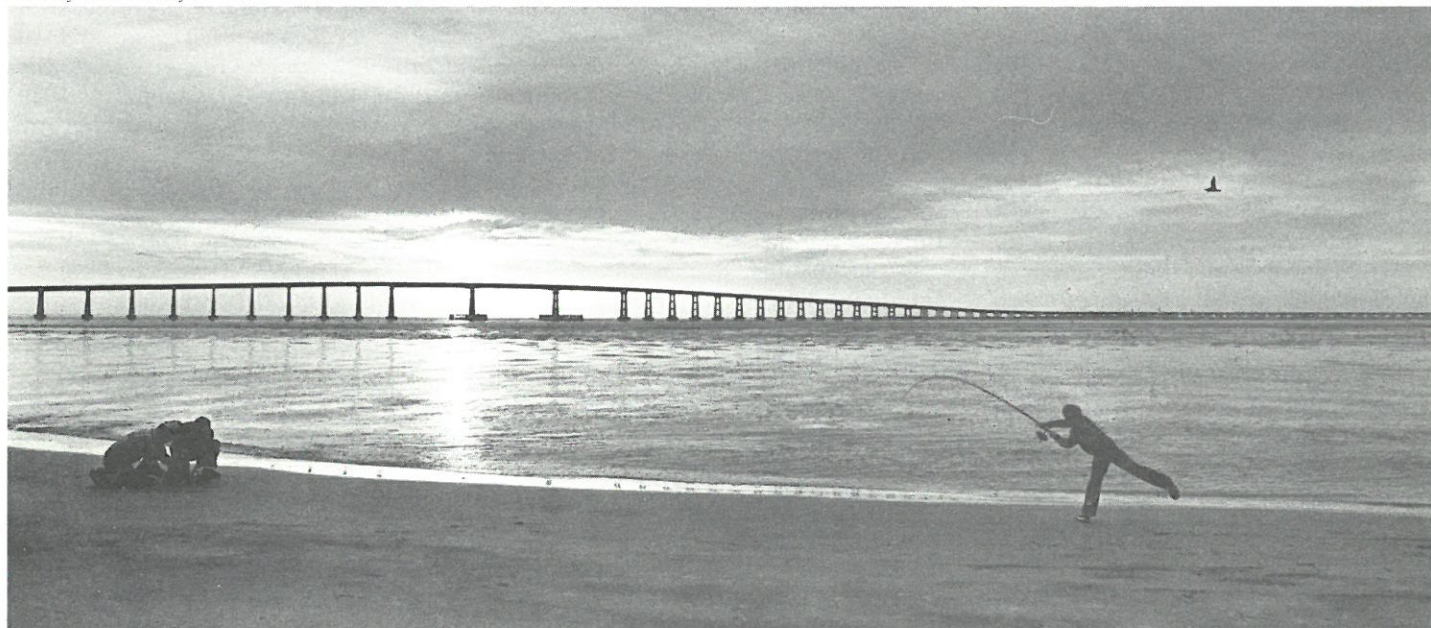


COASTWATCH

Photo by Steve Murray



The serenity of Oregon Inlet at sunset belies its changing and sometimes treacherous waters

Which course should inlets take: nature's or man's?

*Editor's Note: Providing adequate transportation for coastal North Carolina is no simple matter. The area is laced with numerous rivers and vast sounds, which both aid and hinder transportation. In the first of a two-part series, the October issue of **Coastwatch** examined coastal bridges and ferries. In this issue, **Coastwatch** takes a look at the waterways themselves and how they are used by both commercial and recreational traffic.*

Ever since he took up commercial fishing twenty years ago, Kenny Daniels has had a running battle with Oregon Inlet.

Sometimes the inlet wins. Ten years

ago, for instance, Daniels left his hometown of Wanchese and moved to Virginia when it became impossible to safely navigate the shallow inlet with his trawler.

But family roots run deep in Wanchese and Daniels eventually returned to run the family-owned Wanchese Fish Company. First he sold his old boat. Now the company's ten fishing vessels are built with a shallow draft to allow them to navigate Oregon Inlet. But Daniels contends that this design makes them less seaworthy.

Like a lot of fishermen in the Dare County area, Daniels worries about the safety of his crew. He believes the time has come to stabilize Oregon Inlet.

Not everyone agrees. The question of what to do about many of North

Carolina's inlets is developing into a hot issue. Some favor maintaining sufficient channel depth through dredging, while others contend that permanent stabilization with jetties is the only solution. Still others lobby for a policy of leaving inlets undisturbed so that they can follow their natural courses.

North Carolina's 26 inlets flow between the state's outer chain of barrier islands—parcels of land that are constantly moving as the ocean washes the sand away from one place and deposits it somewhere else.

These natural changes often make navigation of the inlets difficult for boat captains and fishermen, who com-

Continued on next page

plain of the hazards. Daniels is one.

"Most of the boats that get in trouble in the inlet are people not familiar with the area," Daniels says. Coast Guard Quartermaster Dennis Purcell agrees. Purcell, stationed at the Cape Hatteras Coast Guard station, says many out-of-state boats ask to follow Coast Guard escorts or local fishermen through the inlet.

Situated near what scientists call "high energy" beaches, Oregon Inlet frequently shoals with sand and its channel migrates southward. Four fishermen lost their lives in the inlet last April after their boat became disabled and was smashed against the inlet's ocean bar, Purcell says. The Coast Guard station at Oregon Inlet answered 320 calls last year; 180 to 190 of the calls came from boats in the inlet, Purcell adds.

In recent years, state and federal agencies have answered fishermen's complaints about the state's inlets by dredging them. But some fishermen say dredging is not enough to keep some of the more widely-used inlets, such as Oregon and Ocracoke Inlets,

a role in establishing priorities for inlet maintenance. Last year Lee appointed a committee of coastal specialists and fishermen to study the state's inlets.

"The corps has begun to look more to the state for guidance on these projects and it may begin to look to us for funding in the future, too. So it was decided we should begin to take a greater leadership role in establishing which ones are essential to the state," says Ronald Earl Mason, chairman of the committee.

The committee presented its recommendations to Lee in October, but Mason and engineers for the corps emphasize that these recommendations are not binding.

The committee recommended that those inlets programmed for stabilization be completed as soon as possible, that the deep water inlets at Morehead City and Wilmington be maintained at their present depth and that Ocracoke Inlet be stabilized.

Ocracoke Inlet, like Oregon Inlet, is extremely changeable. Jones says fewer and fewer fishermen are trying to navigate the inlet and the dangerous

state may be willing to foot some of the bill for stabilization of Ocracoke Inlet. But corps engineers say unless the project is begun soon the costs will outweigh the benefits.

One corps engineer speculates that, considering the rising cost of such projects, Oregon Inlet will be the last inlet ever stabilized along the east coast.

When authorized in 1970, the Oregon Inlet stabilization was approved at an estimated \$9 million. Now after numerous delays, the corps estimates that stabilization will cost \$61 million with an annual upkeep cost of about \$2 million. Congress has set aside funds for starting the project during the current fiscal year and the Corps of Engineers hopes to begin construction during the summer of 1980.

In spite of Congressional approval, the project still doesn't have the green light. The Corps of Engineers must answer some important environmental questions before the U.S. Fish and Wildlife Service and the U.S. Park Service will grant the corps land-use permits needed to begin construction.

Larry Roush, chief of resource management and visitors protection at the Park Service's Cape Hatteras National Seashore, says the park service is concerned that the project will accelerate erosion of its land on Bodie Island. Officials of the U.S. Fish and Wildlife Service are worried about erosion on the wildlife refuge at Pea Island.

The proposed jetties, which will extend 1½ miles into the ocean, will stop much of the sand that moves up and down the beach. This will deprive these beaches of sand which normally replaces sand lost to the continental shelf and other beaches.

The Corps of Engineers plans to alleviate this problem with a sand bypassing system that will employ a pipeline dredge to transport sand from the north side of the jetties to the areas of sand depletion.

Lawrence Saunders, chief of economic analysis for the Wilmington district of the Corps of Engineers, says the corps expects to operate the dredge once a year and bypass 400,000 to 500,000 cubic yards of sand.

The final design plans for the sand-bypassing system are not on paper yet, though the system is "conceptually feasible" Saunders says. The parks service wants to see final plans, however, before any decision is made.

But East Carolina University

"You're risking a half-million-dollar boat and sometimes life, too . . ."—Roger Jones

deep enough to accommodate many commercial fishing boats.

Fishermen are asking the state and federal government to stabilize some of these inlets with jetties, which would fix the horizontal position of the inlets, reduce the amount of sand deposited in channels and decrease turbulence. Many inlets along the Atlantic and Gulf coasts have already been stabilized. It's not a new idea. Fishermen in Dare County have been clamoring for stabilization of Oregon Inlet since the 1950s.

"It's a big thing, a major undertaking, to try to stabilize inlets along this treacherous coast, but it can be done if we the people push hard enough," says Roger Jones, owner of R. W. Jones Fish Co. in Carteret County.

Masonboro Inlet is partially stabilized with jetties now and plans are in the works for jetties at Little River and Oregon Inlet.

The U.S. Army Corps of Engineers maintains the inlets. But N.C. Secretary of Natural Resources and Community Development Howard Lee has decided that the state should take

inside channel, Big Foot Slough. Instead, he says, fishermen are using Beaufort Inlet and occasionally Oregon Inlet to bring in their catches.

"You're risking a half-million-dollar boat and sometimes life, too," Jones says. "It's just not worth it."

A jetty was authorized for the north side of Ocracoke Inlet in 1960, but the Corps of Engineers deferred construction. "We have not determined there is need for a jetty at Ocracoke yet," says Tom Swain, the Corps of Engineers chief of navigation reports at the Wilmington district office. "We have the inlet under control."

Swain contends that the inlet is deep enough, but that its channel needs to be more closely monitored and marked for changes by the U.S. Coast Guard.

"The real problem at Ocracoke comes just inside the inlet in the sound at Big Foot Slough," Swain says.

Swain says the Corps of Engineers plans to build sandbar dikes at the Slough and dredge the channel to a 15-foot depth. He emphasizes that there are no plans for jetties.

However, Lee said recently that the

Photo by J. Foster Scott



Photo by Gene Furr



The Wanchese Harbor of old (above) is a sharp contrast to the plans (left) state and local officials have for harbor development and construction of a seafood industrial park.

The eventual success of the state's seafood industrial park is partially dependent upon stabilization. Only if the inlet is stabilized will the park be able to attract enough large trawlers for full operation. In fact, says Lawrence Saunders of the Corps of Engineers, the park will reach only 25 to 35 percent of its potential if the jetties are not built.

That may mean a lot of the taxpayers' money down the drain. Authorized in 1970, the Wanchese Seafood Industrial Park is being jointly funded by local, state and federal government. When completed in early 1981, it will carry a price tag of about \$7.2 million. The park is designed to boost the seafood industry by encouraging more seafood processing in the state. When complete, it will have a 15-acre, deep-water harbor adjoining 36 acres to be leased to private industries for the construction of processing facilities and auxiliary businesses.

geologist Stan Riggs says that may not be enough. "The beaches need sediment and sand during high energy storms like northeasters that occur during the winter, but the corps is proposing to bypass the sand only during the summer," he says. "This may not necessarily be when the beach needs it."

Saunders says the bypass system can be flexible and the Corps of Engineers will constantly monitor the beaches to determine when bypassing is needed. The system is designed to bypass up to a million cubic yards of sediment a year if necessary, he says.

But Riggs is not convinced that the Corps of Engineers understands the "processes of such a highly dynamic system at Oregon Inlet well enough" to adequately predict the consequences of stabilization.

"The Oregon Inlet bridge is a perfect example," Riggs says. "The state is having problems there now because they didn't understand the dynamics of the inlet when the bridge was built."

Riggs says that building jetties at Oregon Inlet will only increase the possibility of a new inlet blowing through another narrow, low-lying area along the barrier islands.

"An inlet is like a self-adjusting valve that allows water in and out of the sound as the pressure builds and lessens. When you put in jetties you tend to lock the inlet in and doing this only increases the pressure somewhere else," he says.

Saunders says Riggs' predictions are unfounded. The amount of water exchanged between the ocean and the sound will remain the same after stabilization occurs in the inlet. And,

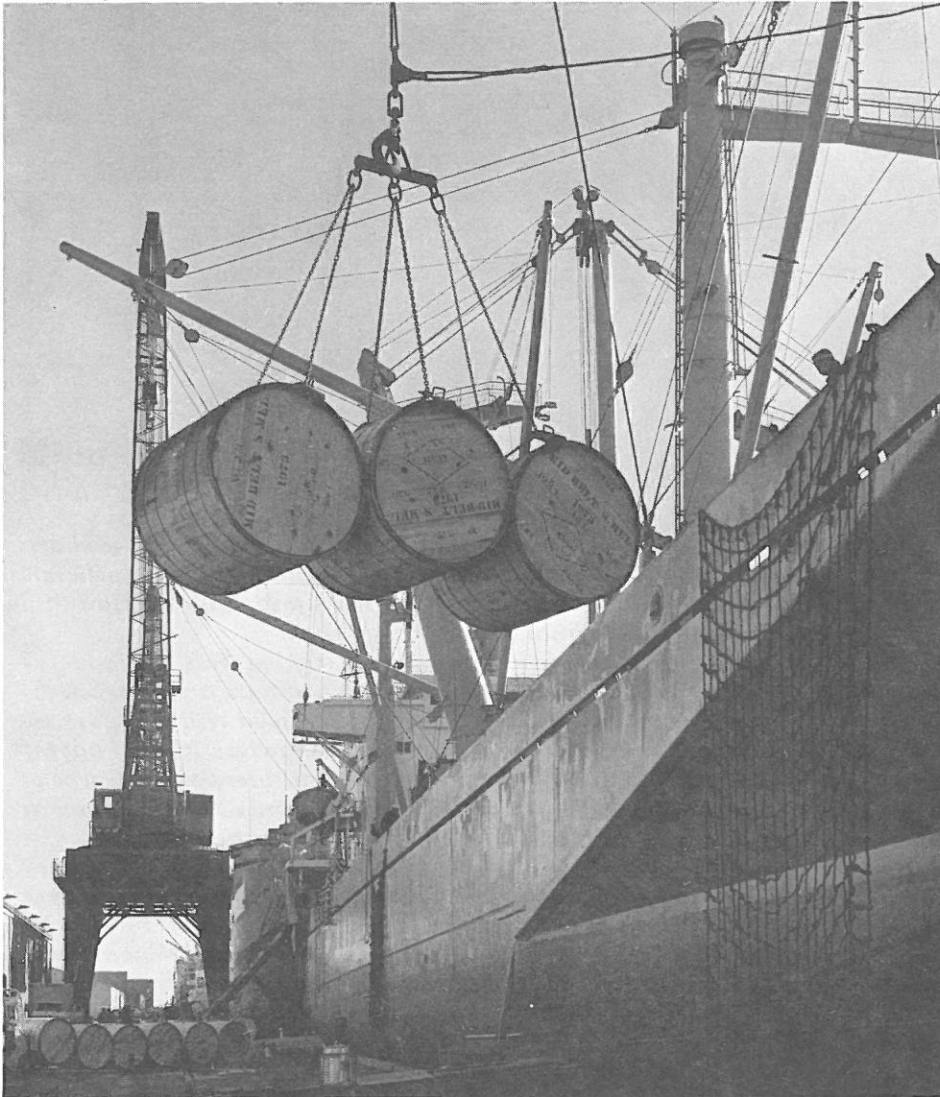
he adds, salinity levels, vital to fish and shellfish survival, should go unchanged.

However, officials of the Park Service and the Fish and Wildlife Service remain doubtful. "We feel we have some legitimate concerns," says David Rackley of the Fish and Wildlife Service. "We would like nothing better than to tell the Corps of Engineers to go ahead and make the inlet safe, but we can't do that at the expense of the fisheries and our refuge."

Rackley says that, ultimately, the Fish and Wildlife Service can appeal to the federal Council on Environmental Quality "to can the project" if it is not satisfied with the corps' plans.

This will be a last resort, Rackley says. The Corps of Engineers and the two federal agencies are looking for answers that will satisfy everyone.

Photo by Clay Nolen



Hogsheads of tobacco are loaded onto a ship at Morehead City

State ports inching into the black

It took a controversy over a \$2.5 million 40-ton container crane to get the North Carolina ports in the headlines. That's the most North Carolinians had heard about their state ports at Wilmington and Morehead City, which have in the past been among the least-used ports on the eastern seaboard.

But that picture could be changing. Wilmington and Morehead City soon may be as high on the lists of importers and exporters as the port cities of Charleston, Norfolk and Savannah are now. According to North Carolina State Ports Authority (SPA) officials, Morehead City and Wilmington are fast becoming major ports along the east coast.

In the 1978-79 fiscal year, the two ports showed the largest profit in the

27-year operation of the ports authority, says Bill Stover, the SPA director of communication. Total net profit was \$563,214, up from a \$152,000 deficit last year and a 220 percent increase over the previous best year.

The Wilmington profits for 1978-79 were \$776,272, while Morehead City again recorded a deficit of \$202,295. The deficit was reduced two-thirds from the previous year, and SPA officials believe this year that port will break even. Officials also note that the ports are no longer requiring a \$150,000 supplement from the General Assembly to operate.

But Gov. James B. Hunt Jr. said at a July SPA meeting that if the ports are to continue to grow they must receive better support from industry within the state. "Statewide, we are

developing special marketing efforts to convince more of our industries that are now shipping out of our state to ship through the ports within this state," he said.

A poor east-west highway system in the state has hurt port development, Stover says. "Many Piedmont industries have found it quicker and sometimes cheaper to transport goods to Norfolk, Charleston or Savannah because they have four-lane highways to these areas," he says. "There are no four-lane highways from the Piedmont to Wilmington and Morehead City."

The answer to the transportation problem may be an inland port. A consulting firm, hired by the SPA, has suggested that the inland port facility, located in the Piedmont, could act as a collecting point for containers that would later be shipped by rail to Wilmington.

The firm found that North Carolina produced more goods for the international market than any of its surrounding neighbors, yet only 30 percent of these goods were being exported via the North Carolina ports. With the inland port, the firm estimates that North Carolina could have 70 percent of all the container shipping traffic in the state. Stover says, however, that the inland port is merely a suggestion and will have to be carefully considered.

In the past, a paucity of major shipping lines calling at the ports also slowed development, Stover says. There are now ten regular shipping lines calling at the Wilmington port, compared to three lines two years ago. Five shipping lines call at Morehead City, where none called two years ago.

The shipping lines that call on the state's ports serve all major world ports except Australia, Puerto Rico and South America. But, Stover adds, lines that serve these areas will call on the North Carolina ports when there is a large shipment.

"We see the next five years as growth years and our theme is 'The New North Carolina Ports,'" Stover says. "We're not the ports we used to be. We're growing, competitive and aggressive ports with more services to offer our customers."

"Norfolk and Charleston are no longer going to get the slack we can't handle because now we can handle it," said Hunt in July. "Those businesses that haven't checked out the Wilmington and Morehead City ports in

the past two years should. They'll find new and improved services, expanded facilities and a strong desire to be the best-run ports on the east coast."

This year the Wilmington port added 26 acres of paved open storage to its facilities at a cost of \$1,135,000, while at Morehead City \$447,000 in capital improvements were made. The General Assembly allotted \$7.5 million, the largest state appropriation ever, to the SPA this year to operate the ports.

Stover says SPA plans are to develop Wilmington into the state's container port. This year 23,000 to 24,000 containers crossed the docks at Wilmington, and by 1985 the SPA expects 200,000 containers to be moved. This will call for an additional three to four container cranes.

Morehead City, on the other hand, is seen more as a bulk port, exporting goods like tobacco and lumber. It is the largest tobacco exporting port on the east coast, Stover says. But, he adds, this has made the port's revenues dependent on a fluctuating tobacco harvest.

The Morehead City port is now becoming one of the east coast's leading exporters of lumber, and this, the SPA hopes, will provide the port a more steady income.

Stover says another container crane also may be in the Morehead City port's future if the port can attract enough container business. Lack of container business was the reason behind the SPA's decision to move the port's first container crane to Wilmington.

The move spurred a major controversy and added to the long-time rivalry between the two ports. Some Morehead City residents say the SPA's decision was yet another example of the state's favoritism toward Wilmington.

But others say it was the state's desire to treat the ports equally that initially led to the problem. When Wilmington needed a container crane in the mid 1970s, one was also placed at Morehead City. However, the Morehead City port had not developed any container business and the crane sat idle most of its 18 month stay, in-

curing heavy costs which kept the port running at a deficit, Stover says.

In November 1978, the SPA voted to move the crane to Wilmington. Some Morehead City residents banded together to stop the crane's removal, taking their fight first to the N.C. General Assembly and later to the courts.

Their efforts failed. In June, 1979, the crane was moved to Wilmington. Defending the SPA decision, Stover says the crane was used more in its first two months at Wilmington than it was ever used at Morehead City.

"The Morehead faction is insisting that there will be enough business to warrant a crane at the port next year," he says. "But that does not match our figures. Another crane will be put at Morehead City as soon as it becomes detrimental to the port not to have one."

Meanwhile, SPA officials are hoping the effort to develop the two ports along different lines may still some of the rivalry and put them on the road to becoming major eastern ports.

Intracoastal waterway provides haven for vessels

The Atlantic Intracoastal Waterway meanders through North Carolina, offering commercial and recreational vessels a protected haven from the unpredictable ocean.

Its path through the state is 308 miles long. Most of it winds just behind North Carolina's barrier islands and through the sounds and rivers, but several sections had to be dug through land masses.

Built in the 1920s and 1930s, the waterway, which extends from Florida to New Jersey, was designed to provide a protected passageway for commerce to move along the east coast.

The waterway was to be the Atlantic seaboard's answer to the Mississippi River. But it has never reached that potential, says Tom Swain, chief of navigation reports for the Wilmington district of the U.S. Army Corps of Engineers.

A lack of industrial development along the southeastern coast has limited waterway use, Swain says. "There are big cities, big industries, and a lot of grain movement along the Mississippi River to boost its traffic,"

he says.

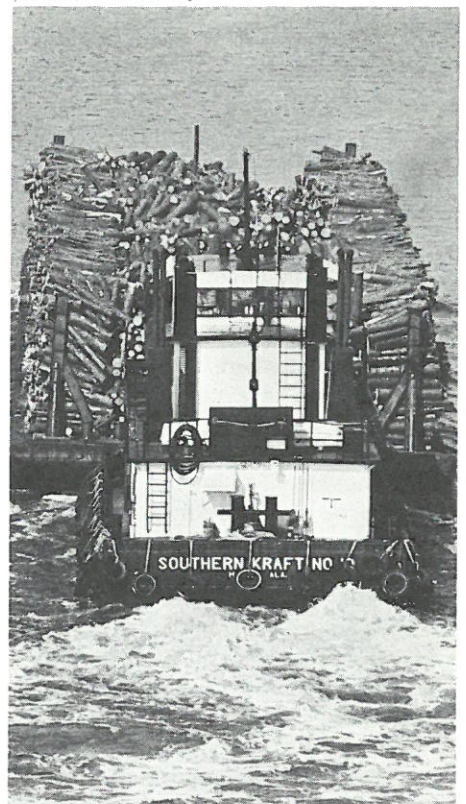
In 1977, more than 3 million tons of material were transported in North Carolina over the waterway, Swain says. This was more than in South Carolina, Virginia, Georgia or Florida, where there is not as much intra-port transportation, he adds.

Swain says it is more economical to transport bulk loads of heavy materials by water than by truck or railroad. A ton of materials can be moved along the waterway for a cost of 1½ cents a mile, whereas a ton of material moved by rail costs 4½ cents a mile and by truck, 17 cents a mile.

The hitch, Swain adds, is that water transportation is slower. "I wouldn't recommend it for someone who needed to have materials immediately," Swain says.

Don Bennett, traffic and transportation supervisor of distribution for Texasgulf Inc. says, however, that if a company plans to transport enormous quantities of material, the waterway may indeed be faster.

Photo by Steve Murray



Barge moves along the waterway

Continued on next page

"A barge can carry 4,000 tons in one trip, while a truck can only carry 25 tons," Bennett says. "Sure the truck might get there faster, but think of how many trips it would take to deliver the same tonnage."

Bennett says Texasgulf has found the waterway to be a cheap and easy means of bringing in large quantities of raw materials and shipping out the company's finished product. Texasgulf has purchased its own barges and tugboats for transportation of materials, he says.

Commercial use aside, the intracoastal waterway is probably best known as the yachtman's highway. Each year about 2,000 yachts, sailboats and cruisers travel along the waterway in late fall and early spring as boaters move south for the winter and then north for the summer. Recreational and commercial fishermen also use the waterway to move from one fishing ground to another.

To keep the waterway navigable for both commercial and recreational use, the Corps of Engineers must constantly dredge parts of the waterway to maintain its designated 12-foot depth and 90-foot width.

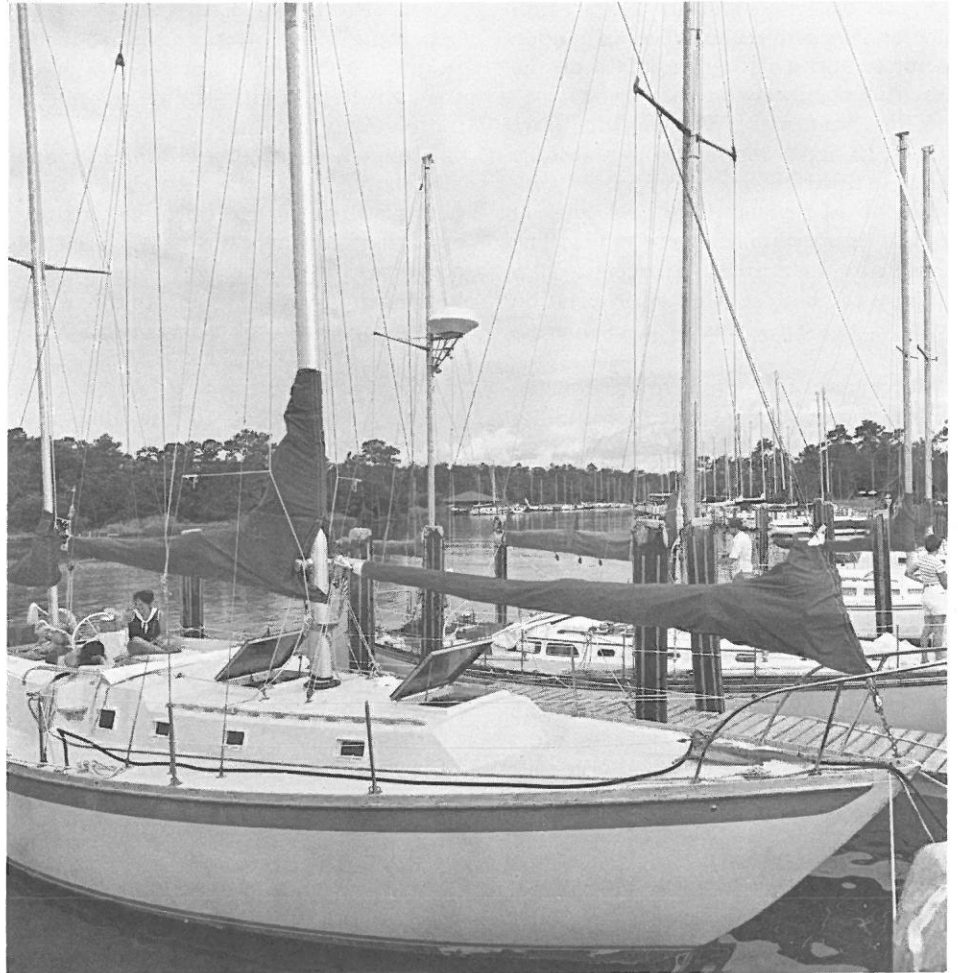
Jim Wells, an engineer for the corps, says two to three million cubic yards of material are removed from the waterway each year. He says the corps' heaviest maintenance job is in Brunswick County, where the waterway is subject to tidal influence. The Corps of Engineers also does a lot of maintenance work on the waterway's land cuts to the Alligator and Pungo Rivers, Wells says.

Officials of some companies using the waterway complain that it is not adequately maintained. Dave Hewitt, the Corps of Engineers' public information officer in Wilmington, acknowledges that there is sometimes a problem with maintenance. "We dredge areas where there is the greatest need first," he says. "But we always have a backlog."

The Corps of Engineers uses survey boats to determine which areas need dredging and to investigate the complaints they receive, Hewitt says. He estimates the corps spends \$10 million to \$15 million a year on maintenance.

Dredging became a bigger headache for the Corps of Engineers after a 1971 regulation made it illegal for the corps to dispose of dredged material in open water. Now the corps must dispose of dredged material in either diked

Photo by Clay Nolen



Sailboats like these crowd the waterway each spring and fall

islands or behind shoreline dikes.

As there is limited island space that can be used for disposal, the corps soon may be trying to dispose of the material along the 100-foot easement deeded to the corps when the waterway was built. This may lead to problems, however, since developers have since sold property within the easement and homes have been built there. The problem is particularly acute in Brunswick County, where about 100 homes, as well as the Holden Beach Town Hall and the Holden Chapel Church, are situated within the easement.

Corps officials have recently notified landowners, developers, bankers and others in the area that the agency has "the perpetual right to use land within the easement and have placed a moratorium on construction in the area," Hewitt says.

The corps is basing its actions on a 1975 court case in Carteret County in which the federal court ruled that further development of property within the easement was not compati-

ble with corps use.

Homeowners living in the easement in Brunswick County are upset by the Corps of Engineers' actions. They fear that the corps might next ask them to tear down their homes or relocate. Brunswick County Attorney John R. Hughes has represented these homeowners in negotiations with the Corps of Engineers. Hughes says county administrators planned to meet with corps and state officials December 18, "to gain assurances in writing for the homeowners that their homes will not be disturbed."

The owners of undeveloped land in the easement will have to negotiate with the corps on an individual basis, Hughes adds. "The situation was potentially devastating if the corps had taken a hard line toward the problem, but fortunately they have not," he says.

The Corps of Engineers is blaming no one for the encroachment on its easement. "It's our belief that development has taken place inadvertently," Hewitt says.

THE BACK PAGE

"The Back Page" is an update on Sea Grant activities—on research, marine education and advisory services. It's also a good place to find out about meetings and workshops, and new publications. For more information on any of the projects described, contact the Sea Grant office in Raleigh (919/737-2454).



The Rangia clam may no longer be considered a trash food junkie, eating only other sea creatures' cast-offs. Sea Grant researcher Don Jeffreys of East Carolina University has found in laboratory tests that Rangia clams will eat euglena, a form of algae, and live bacteria. Researchers have been unsure of the clam's food sources and believe it to be a "trash eater."

In another part of the study on Rangia clams, Sea Grant researcher Barney Kane of ECU has found that clams taken from the same area may exhibit widely varying bacteria counts. In an experiment with nine clams, eight clams showed a bacteria count of less than 10,000, while one clam had a count of more than 160,000. A high bacteria count means the clam will have a shorter shelf life when marketed. Kane says further studies are needed to determine why bacteria counts vary so widely.

Kane also has found that increased water turbidity due to dredging has only a slight effect on bacteria counts in the clams. Articles in scientific journals had suggested that high bacteria counts resulted during increased turbidity. But Kane said experiments at a dredge site in the Pamlico Sound showed only a slight increase in the clams' bacteria count.

Wanted alive: thousands of elvers from eastern North Carolina's streams, rivers and inlets. Description: baby eels, two-and-a-half to three inches

long, nearly transparent. Between January and March, elvers can be seen migrating upstream into brackish and fresh waters. They usually travel in large schools and often can be found near dams and culverts.

If you spot a large school of elvers, please call the North Carolina State University Eel Aquaculture Project in Aurora, (919) 322-4054. Ask for John Foster or Jack McCauley.

Researchers with the Sea Grant-supported eel farm are looking this year for a big crop of elvers to stock their newly-completed, grow-out ponds. Last year the eel farm moved from New Bern to expanded facilities on the shores of the Pamlico River.

Since 1975 researchers have been perfecting techniques for raising eels in eastern North Carolina. Cultured eels are in demand in the Orient and in parts of Europe, where they are considered delicacies.



After Christmas when the Yuletide spirit has fizzled and it's time to take down the decorations, don't throw away your Christmas tree. Old Christmas trees can be used to mend damaged sand dunes, according to Sea Grant coastal engineer Spencer Rogers.

The trees are most useful where pedestrian traffic has worn a sand dune down and killed the vegetation. Rogers says a Christmas tree is very effective for repairing dunes because its thickness slows the velocity of sand-laden winds. The sand then drops out and accumulates around the tree. In windy areas, a tree could trap up to five feet of sand a year.

To mend the dune, Rogers says, line the tree up with the crest line of the adjoining dunes. It should be on its side and parallel to the beach. Be sure to position the tree far enough landward so it won't be affected by the highest tides. If using more than one tree to fill the gap, line them up end to end

parallel to the shoreline, Rogers says.

Christmas trees also can be used to encourage emerging dunes. Place the trees in low areas in front of the forming dunes. *The Dune Book* offers further information on stabilizing dunes. For a free copy, write Sea Grant, Box 5001, Raleigh, N.C. 27650.



One of the regular expenses for charter boat operators is bait. Fishermen use a lot of it. Traditionally, the favorite bait for marlin fishing is ballyhoo, which is relatively expensive and must be shipped from Florida.

Last spring Sea Grant recreation agent Dennis Regan and Robert (Huck) Harris with the Division of Marine Fisheries got the idea of cutting down on costs by using hickory shad as skip bait. In North Carolina the female shad is caught for roe, but there is no market for the buck shad.

During the short shad run last spring, Regan and Harris caught 300 pounds of shad. They then brined the fish and froze it. Brining, soaking in a high-salt solution, is necessary to keep the fish from falling apart when it's dragged through the water.

Early in the season, Regan and Harris gave the frozen shad to charter boat captains working out of Oregon Inlet. Many of the captains reported that they liked using the shad, which they say has good action in the water. It was a poor marlin season, but at least one 300-pound marlin was caught on hickory shad. The bait apparently works well for dolphin and wahoo also.

Regan and Harris are planning to experiment with hickory shad bait on a larger scale next summer. They hope to distribute the bait to fishermen all along the coast. If all goes well, it could mean extra income for commercial fishermen and a new bait industry for North Carolina.

Continued on next page



Does the prospect of tax time make you flinch? If you're a commercial fisherman or charter boat owner, a series of tax workshops sponsored by Sea Grant and the N.C. Agricultural Extension Service could make things a little easier.

Whether you usually prepare your tax forms yourself or hire a professional, you may not be aware of all the ways you can legally cut down on your taxes. Did you know, for instance, that you might be able to save money if you include on your payroll family members who work for you?

Sea Grant's economist Leon Abbas and agricultural extension economists Jim Easley and Bill Eickhoff are planning three tax workshops for commercial fishermen and charter boat owners to be held during January in Wilmington and at the Marine Resources Centers on Bogue Banks and Roanoke Island. Final dates have not yet been set. For more information, contact the Sea Grant agent in your area: Leon Abbas, Raleigh (919) 737-2454; Jim Bahen, Fort Fisher, (919) 458-5498; Bob Hines, Bogue Banks, (919) 726-0125; and Hughes Tillett, Roanoke Island, (919) 473-3937.

Discussions will cover a variety of topics, including income averaging, tax changes for 1980, the effects on taxes of buying and selling assets, depreciation and investment credit. A representative of the Internal Revenue Service also will be present.

To some folks 4-H means cows, chickens and tobacco. But 4-H is much more than agriculture for the 190,000 young people who are members of 4-H clubs in North Carolina. Through club meetings and special interest groups, many of them learn about everything from bicycling to political science.

Beginning next spring, marine studies will be added to the repertoire of subjects leaders teach at club meetings. Last summer Sea Grant awarded a mini-grant so that Paulette Britt of Raleigh could write several lesson plans to be used in 4-H club sessions. Britt, a former teacher and extension agent, worked with education specialists Lundie Mauldin of Sea Grant and Neal Conoley of the Office of Marine Affairs. Together, they came up with four simple lesson plans designed to increase the club members' understanding of the ecology and economy of the coastal area.



Along the state's sounds and estuaries, erosion is raking away soil and hitting landowners where they live. A study by Sea Grant researchers Ernie Seneca and Steve Broome of North Carolina State University has shown that, in many cases, marsh grasses planted along shorelines can slow or stop erosion. But now that the word is out, there is a problem: How can people

find the kind of cordgrass they need for transplants?

Dune grasses have been available from dealers for some time, but Seneca says he's been unable to find anyone interested in supplying landowners with marsh grass. So he has begun to develop nurseries to produce the grasses—one near Lockwood Folly Inlet, one near Beaufort, and one near Sunset Beach. He plans a fourth nursery in the Manteo area next year.

Seneca is training county agricultural extension agents to manage nurseries and provide landowners with the plants and information they need to start their own plantings.

Not all plantings succeed. But Broome says slow-release fertilizers improve the odds for a good stand of grass. In some test sites, he has found shortages of nitrogen and phosphorus, which he says should be added to the furrows when the grasses are planted.

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