

COAST WATCH

Photo by Steve Murray



Like a bridge over troubled waters this boardwalk crosses a salt marsh near Portsmouth.

From downstream, The view is grim

To make a good haul, commercial fisherman Forest Williams is having to send his boats miles offshore. He can no longer earn a living fishing year round from the nearby Bay River and Pamlico Sound, he says. The sounds, bays and creeks by his Reelsboro home aren't yielding the shrimp and oysters they once did.

"In the creeks and stuff there just isn't the life there used to be," Williams says. "The fish aren't spawning like they used to. I've seen the oysters really diminish. When I was twelve or thirteen, I'd take a skiff and catch oysters right along the shore, but there is nothing like that there now. And the

Photo by Ken Green



Williams

ones you do get aren't fit to eat."

Williams is worried about the coastal bays, creeks and sounds—the estuaries. He knows that the state's 2.3 million acres of estuaries, areas where salt water and fresh water mix, are vital to his livelihood as a fisherman.

Williams is not a biologist. But, like lots of other commercial fishermen, he has done his homework on the estuaries. He knows that most commercially harvested species of fish (about 90 percent according to the N.C. Division of Marine Fisheries) are depen-

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dent at some point in their lives on the estuaries. He knows these fish need the estuary's rich nutrients and brackish waters to grow and survive. But he is seeing these estuaries gradually changed and destroyed, and his livelihood threatened.

"Crabs are about the only thing you can catch steadily," says the 37-year-old fisherman. "I believe we have less fish because of all this fresh water coming from farm ditches and industries, and the poisons coming from the farm fields.

"The farmers are doing a lot more ditching now. We can have a rain and 30 minutes later that rain will have been drained from the fields to a nearby creek or marsh, carrying with it all the chemicals the farmer has dumped on his fields to kill weeds and bugs. And you can't tell me that some chemical strong enough to kill one type of life isn't going to affect other kinds of life too."

Fred T. Tippet, a commercial fisherman from Oriental, agrees with Williams. "When I was a boy around New Bern I could catch as many mullet as I could ever want. Now there are no mullet or shad to speak of," he says. "And it's because they're dumping all those chemicals in the water. You can see a plane crop-dusting by the side of a creek one day and the next day you can be sure there will be fish drifting on top of the water. I've seen it happen."

Williams says he doesn't mean to point a finger at agriculture. "The farmers aren't intentionally trying to hurt fishermen," he says. "They're just doing it to make a living. But we have to start working together, making some compromises. They have to have their crop, but we have to have ours too."

The decreased bounty from the estuaries is causing some changes in the fishing industry, Williams says. A lot of fishermen have gone to larger boats. "To make a livelihood they have to be able to go offshore to other fishing areas when there is a bad season. A lot of the boys around here are going north to scallop now and some are talking about going to Alaska," Williams says. "When I was a boy in this area only a handful of fishermen had boats large enough to go offshore. The rest were small-boat fishermen. Now the small-boat fisherman here is just about out of business. The seafood

in this area is just not there for them to fish."

Williams believes it is time for scientists to help. It's going to take some research to prove some of these things are problems," he says. "And somebody has got to be willing to say that some changes are needed. I'm

really concerned about this because this is how I put my bread on the table. I know that bread uses some of the farmer's wheat and eggs. But that farmer also likes to eat my fish. We have got to find a balance for everybody because we all can't eat just fish or bread."

Dash of algae, pinch of salt — A dish that serves millions

Mix several billion gallons of salt water with a like amount of fresh water. Add tons of decaying grass, weeds and wood particles. Stir. Whisk in pounds of tiny floating plants. Season with marsh grass. Simmer to a moderate temperature and fold in a variety of animal life including zooplankton, benthic worms, eels, spotted sea trout, oysters and crabs. Pour into a shallow basin rimmed with barrier islands.

Estuaries serve millions. And, North Carolina has the third largest estuarine system in the United States, trailing only Alaska and Louisiana. And from this vast expanse of fertile water come some of the state's most important commercial and recreational fisheries: shrimp, menhaden, trout, spot, croaker, crabs, oysters and clams.

All these species spend a portion of their lives in the estuary. Some species, like oysters, crabs and spotted sea trout, are primarily estuarine. Others just grow up there. Mother nature sends billions and billions of juvenile fishes, so small they are unable to be seen, to the estuaries every year. The juvenile fishes spend from two months to a year in these "nursery grounds," being nurtured to adulthood. They feed on the estuary's ample food supply.

But while the estuaries are excellent providers, they do not always make very hospitable homes. Rapid changes in the salt content, turbidity and temperature can occur in an estuary's shallow basin, creating fatal or stressful conditions for some species. Thus for most fishes the old adage of "it's a nice place to visit, but I wouldn't want to live here" applies well. As they reach adulthood, many of the fishes return to the ocean, where anglers and

commercial fishermen may reel them in from offshore waters.

Estuaries stand alongside coral reefs and rain forests as being among nature's most productive ecosystems. Nutrients, washed from the land, are swept downstream via rivers and streams to the estuaries. There, they are trapped by the ebb and flow of the ocean tide in the estuary. Most of these nutrients come in the form of detritus—decaying grasses, weeds, and other organic material. As the detritus decays, it becomes food for tiny creatures such as zooplankton, benthic worms and juvenile fishes. These creatures are in turn eaten by small fish which are eaten by larger fish in the food chain.

Sometimes too many nutrients accumulate in the water and an algae bloom occurs. Algae blooms can have natural causes, but often they are created by nutrient pollution. It's because of nutrient pollution that North Carolina's Chowan River blossoms blue-green algae. These blooms can cause massive fish kills by emitting toxins and cutting off the water's air supply which suffocates the fish.

Algae blooms and other forms of pollution point out one very important factor about the estuaries—they are downstream from everybody and everything. And that makes them especially vulnerable. John Gilliam Wood, an Edenton resident and member of the Chowan River Advisory Council, sums it up this way: "The rivers and streams of North Carolina, the sounds, are not ours. We are only tenants. And the condition that we are allowing them to deteriorate to is deplorable."

Estuaries at crossroads, Copeland says

The following is an interview with B. J. Copeland, director of the UNC Sea Grant College Program. Copeland is a member of the Governor's Marine Science Council and a professor in the departments of zoology, botany and marine sciences at North Carolina State University (NCSU).

Copeland began his estuarine research at Port Aransas, Texas, as a faculty member of the University of Texas Institute of Marine Science. He has also served as director of the Pamlico Marine Laboratory in Aurora, and has frequently published reports on the state's estuaries.

Copeland cites his study of an electric generating plant's impact on the Cape Fear River estuary as an example of how scientists can provide government and business with the information they need to manage estuarine resources. Copeland and Ron Hodson, a zoologist from NCSU, found that the plant's water intake system was disturbing only a small fraction of the estuary's fish. The study showed that the plant could operate without costly modifications, and still meet environmental standards.

Why are the estuaries so important?

There are four reasons why the estuaries are so important. One, there are two and three-tenths million acres of estuaries and that is a very substantial portion of eastern North Carolina. Two, the estuaries are nursery areas for ninety percent of the total organisms caught in recreational and commercial fisheries in North Carolina. Therefore the estuaries represent a substantial economic bank. Commercial fisheries brought in fifty-six million dollars to fishermen at the docks last year. Also, the nursery grounds, as a renewable resource, are going to be very important in the future. Three, the estuaries represent some four thousand miles of shoreline. That area is a paradise for developers that must be treated carefully. Four, the estuaries are interlaced with the intracoastal waterway and therefore are

Photo by Kathy Hart



B.J. Copeland

important thoroughfares among people.

With so many pressing coastal problems, why are agencies like Sea Grant and the Division of Marine Fisheries funding so much estuarine research?

For a long time researchers ignored the estuaries. No one seemed to realize their importance. The estuaries were thought to be just wastelands. It was in the late nineteen-forties before researchers discovered that shrimp spent a portion of their lives in the estuary. It was about this time that estuarine research really began to get underway. People began to get concerned about what was happening in the estuaries. But it wasn't until the nineteen-sixties when state officials had to start making management decisions on operations such as Texasgulf's phosphate mines on the Pamlico that the real push for research came. It was quickly realized that we need to know more about the estuaries if we were going to make decisions on how operations like Texasgulf were going to affect them. The research was able to

show the effects of the large mining operation would not be of the magnitude we were afraid it might be. The research showed where to divert water, where to put some materials and not others. The information was helpful to Texasgulf and the Environmental Management Commission, which had never had a Texasgulf on its estuaries before. It helped them make plans and determine what permits to allow.

What is Sea Grant's role in this state's estuarine research?

It is Sea Grant's role, as part of the university system, to help provide sound research results. It's our job to bridge the gap between basic research and the need for management information. Sea Grant takes the basic information and works up what the effects are. For instance, we have more fresh water flowing into the estuaries now because of drained farmland, superfarms and cleared forests. So we need to know what effects this drainage has on the estuaries and fishes. Sea Grant funded a research project by Preston Pate of the Division of Marine Fisheries to find out what the effects were on shrimp. He found that the shrimp couldn't withstand the drastic fluctuations in salinity caused by the influx of fresh water from the drainage ditches during rains. The shrimp either died or were forced to other areas, which is equally disastrous. The estuary can only support a certain amount of life per unit area. When things get too crowded everything can't survive because of the tremendous competition for space and food. This is the type of information management people need.

What is it going to cost us to preserve the estuaries?

We can never preserve the estuaries. If we did we would have no development or economic advances. It is going to cost us to manage the estuaries. We have got to learn we can't have our cake and eat it too. I have no idea exactly what that cost will be, but it will

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A fisherman weaves through the marsh on Roanoke Island

be millions of dollars. There are going to have to be some tradeoffs between fishermen, farmers and industry. And if we start making the right decisions now there will be less tradeoffs further down the road. Again, looking at Preston Pate's study, we found that if you put ditches that drain fresh water in the wrong places then you can drastically reduce the shrimp production. Now we know we need to put that ditch where it doesn't impact the primary nursery grounds. To move that ditch may cost several million dollars. Initially, you may only be killing one million dollars worth of shrimp. But that shrimp is a renewable resource, something that renews itself year after year. The tradeoffs in this situation must be made, but the criteria for making these decisions must be more than straight dollars and cents.

Are we on the brink of losing the estuaries?

No, not yet. But we are at the crossroads as far as the estuaries are concerned and what we do in the near future may indicate whether there will be a state of emergency over the estuaries in the future. Right now, the

estuaries in North Carolina are in fairly decent shape. We have no large areas in this state of completely decimated land. But if we don't make some decisions now we may find ourselves in a place of no return in the near future.

What poses the greatest threat to the estuaries?

Land use. It's the land use patterns around the estuaries that are going to dictate what goes into them. It is things like pesticides and fresh water from the land that are going to change the estuaries. That's why we need all the research we can get to understand the estuaries. Managers need this kind of information to make decisions. They need scientific information to tell a farmer or an industry they can't put a ditch into a certain area of the estuary. If managers don't know for sure a ditch is going to harm the estuary then they have difficulty denying a farmer or industry a permit to put it in. We can't base decisions on thin air. And, while I know we can't comprehend all the information mother nature has put together, we can sure work toward trying to understand enough to make sound decisions.

State's stance: Time for action

The algae blooms on the Chowan River and the recent decline in shrimp harvests may be only the first indications that our estuaries are not healthy.

Connell Purvis, director of the state Division of Marine Fisheries, says as far as the estuaries are concerned, "the handwriting is on the wall and the time for some strong cooperative management policies is at hand."

Purvis believes the biggest problem facing the state's estuaries is freshwater intrusion from agricultural and industrial development. Purvis says that abnormally large amounts of fresh water can actually "pollute" a primary nursery area.

"That fresh water can kill," Purvis says. "And those fishes that aren't killed are driven into secondary nursery areas where there is less protection and less food and thus a poorer production of fish. We feel like agricultural drainage and the drainage associated with industrial operations like peat mining are detrimental to the optimal fish production in this state."

Purvis says there is a very direct relationship between fish productivity and estuarine salinity. "This year is a good example," he says. "We had drought conditions this year and the water was extremely salty further up into the estuaries. We had many more acres capable of supporting estuary species than in previous years and I think we'll have more fish. We already know we had more shrimp."

"I think it would be narrow-minded of us to advocate there be no drainage into the estuaries. But there are less destructive ways to accomplish drainage. Instead of placing a drainage outlet into the head of an estuary, reroute the ditch so it dumps directly into the sounds or rivers. That's a lesser-of-evils solution. Or instead of cutting ditches through the marshes, stop the ditchwork at the marsh edge and let the water flow through the marsh in sheets. The technology exists in water management to accommodate the needs of agriculture and fisheries, so let's stop managing one at the expense of the other."

The management of ditching, however, does not lie with the Division

of Marine Fisheries. Purvis says it is only Marine Fisheries' job to define and delineate the primary nurseries for the state's economically important species. It is up to other agencies like the Office of Coastal Zone Management (CZM) and the Division of Environmental Management to use the information Marine Fisheries gathers to make management decisions.

Neil Grigg, director of the Division of Environmental Management, whose job it is to uphold the state's air and water quality standards, says his agency has developed an intensive program aimed at cleaning up the Chowan River. "We can control the point-source pollution from industries and cities," he says. "But the non-point pollution from agriculture and forestry isn't so easy to manage. We're going to have to do some educational work and teach the people how to care for their rivers and estuaries."

But the Chowan River is no longer the only river experiencing algae blooms. The Neuse and Pamlico rivers have also blossomed, but on a smaller scale. Grigg says study efforts are already underway on these rivers.

When asked about freshwater ditching into the estuaries, Grigg says

his agency "has not reached the point where freshwater is considered a pollutant."

The Office of Coastal Zone Management manages the placement of drainage ditches into the estuaries. Preston Pate, director of field services for CZM, says that when his office makes decisions about freshwater drainage into an estuary, it considers the biological impact, the economic and public benefit of allowing or denying ditching, and the project's consistency with CZM standards for preserving the habitat.

"Since our office was given permitting authority we have not allowed any new drainage into primary nursery areas," Pate says. "We have good control over existing regulations. We are continually refining our standards to make them better. But we have no control over the clearing and draining of inland areas that tie into existing drainage ditches. That's the chink in our armor. Every time another acre of land is cleared that much more water goes into the estuary. We've already seen a definite drop in the salinity in Pungo River and Rose Bay."

Tom Ellis, an environmental planner for the Department of Agriculture,

says the agricultural community is satisfied with present drainage regulations. "I think we've reached a good baseline on the estuarine resources," he says. "But we can't afford to start closing up existing drainage systems. We can't start all over. It doesn't work that way."

Ellis said farmers are routing their ditches into large freshwater streams or connecting with existing ditches. Unlike Pate, Ellis says his department sees "very little if any further damage" being caused by tying into existing ditching systems.

To reach a compromise of water management programs, Grigg, in his capacity as assistant secretary of Natural Resources and Community Development, is appointing a task force that will bring together farmers, fishermen and forestry representatives to work on drainage problems.

"There are benefits for both sides from this kind of joint effort," Pate says. "There are indications after this summer's drought that maybe we've overdrained some of eastern North Carolina. Also many farmers are part-time fishermen. We need to sell the community on this type of cooperative spirit. There is no reason why all interests can't survive and thrive."

Photo by Mike Dunn



Jeff Woodward sets up his net for sampling the eating habits of spot and croaker

Team researches Natural nursery

John Miller and his research team saw that the only way to get to know young spot and croaker was to get right down in the marsh with them. So that's what they did.

For two years, Miller, a Sea Grant researcher, and his North Carolina State University graduate students sampled and studied the juvenile sciaenids such as spot and croaker in nursery grounds along Rose Bay, one of the most fertile estuaries in the state. "We're asking questions about the estuaries that haven't been asked before," Miller says. "For the sake of posterity, we must have a better understanding of how the estuaries operate."

Miller knows the spot and croaker move into the nursery grounds between December and April, after being spawned offshore. They measure about

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one-half inch or less. After reaching a size of three to six inches by August or September, the spot and croaker move to deeper waters in the estuary. They will probably spend another year there before moving offshore to spawn.

But the period the juvenile sciaenids spend in their nursery grounds may be the most critical time in their lives, Miller believes. It could well determine how many of the spot and croaker survive to reach adulthood, the age when they become a valuable asset to commercial and recreational fishermen.

But Miller first must put together all the pieces of the sciaenid's life in the estuarine nursery grounds. And that's why he needs to answer some basic questions about spot and croaker—what the spot and croaker feed on, what habitats they prefer, what temperature and salinity ranges they can withstand, and whether spot and croaker compete for food. Miller says that by answering some of the basic questions about spot and croaker first, he and other researchers will be able to ask more specific questions later. "The kind of research we're doing can lead to a more rational way to look at the nursery areas, a more rational way of managing them, and a better determination of what constitutes the greatest threat to them," Miller says.

Any good management strategy for spot and croaker would have to take into account their diet. That's why Jeff Woodward trapped some of the spot and croaker in natural enclosures along the edges of the estuary, sampled their menu, and then examined the sciaenid's stomach contents. Woodward was able to determine the sciaenid's diet. He found that in Rose Bay, the spot and croaker feed on zooplankton until they reach a length of one inch. Then they begin eating benthos—organisms that live along the bottom. Woodward learned that a little over 50 percent of the sciaenid's benthic diet in Rose Bay consisted of clam siphons, the tubular organs clams use to draw in food. Another student, Woody Sutherland, examined the sciaenid's effect on the clam's growth and reproduction. Without this kind of information, managers could make a decision that might drastically reduce the clam populations in Rose Bay, thereby also reducing the numbers of spot and croaker that reach adulthood.

But these subtle management questions not only apply to food

Photo by Mike Dunn



Block nets mark off part of a nursery ground

Photo by Mac Currin



Mike Dunn adjusts his flip net for sampling along shore

preferences, but also to habitat preferences. What if fishermen wanted to use a piece of equipment that destroyed the grass beds along the estuary's fringes? What fishes would be affected? Mike Dunn found that spot and croaker like to make their homes in muddy estuarine bottoms, but other juvenile fish such as sea trout, bluefish, silver perch and mullet, frequent the grass beds of Rose Bay. Using these data, managers could predict how that equipment might disturb the homes of billions of young bluefish and mullet—a disturbance that could mean fewer fish later.

Larry Gerry learned that spot and croaker are sensitive to salinity changes. He found fewer spot and croaker in areas where the salinity changed drastically because of large influx of fresh water. Managers could use this research to manage the impact of freshwater drainage from farms or industry.

It's research like Miller's that allows the N.C. Division of Marine Fisheries and others to set up cause-and-effect relationships in management schemes. For example, a company may ask for a dredging permit to build a dock on Rose Bay. The dredging might cover the bay bottom with a layer of silt that would smother the clams. The dredging would not directly affect the spot and croaker because they're suspended in the water. But, killing large numbers of clams may mean many of the spot and croaker would starve. Environmental managers could deny the company a dredging permit, or take other measures, because the dredging would be not only harmful to the clams but to the spot and croaker as well.

Even this complicated example is oversimplified. But the message is clear. Managers need the basic information researchers like John Miller are gathering to make complicated management decisions now and later.

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, workshops and new publications. For more information on any of the projects described, contact the Sea Grant office in Raleigh (919/737-2454).



Everything you've always wanted to know about crabs and crab shedding was the subject of a recent workshop in Belhaven sponsored by UNC Sea Grant. Fielding questions and describing all aspects of the shedding business were John Foster of the NCSU Eel Culture Project, Hughes Tillet, Sea Grant's marine advisory agent at Roanoke Island, and Murray Bridges, a Collington crabber with a successful shedding operation.

"The purpose of the workshop," Foster said, "was to provide information on shedding to crabbers in Beaufort, Hyde and Pamlico counties. We also wanted to know what type of information they need from us, and what we can do to help them start a small shedding business."

Beginning with a basic biology of the blue crab, the 25 participants learned everything from how to identify a "peeler" (a crab about to shed its shell) to what permits are necessary in the business. Bridges, who has been shedding crabs for almost 10 years, described his operation and shared his marketing experience.

After a lengthy question-and-answer session, many crabbers left with plans to experiment with shedding crabs. Several women in the crabbing business also left with definite plans to start their own shedding operations. One crab house owner said he had been looking for a way to diversify with crabs and thought this just might be his answer.



The University of North Carolina Sea Grant College Program has been awarded \$2,350,000 in federal funds for its 1981-82 budget from the National Office of Sea Grant. According to B. J. Copeland, Sea Grant's director, all of the projects proposed and presented before the site visit team in October will receive funding.

UNC Sea Grant has also received \$70,000 from the National Oceanic and Atmospheric Administration's National Weather Service to add a coastal weather specialist to Sea Grant's marine advisory services staff. This will bring the total award to \$2,420,000. The new specialist will act as a link between the National Weather Service and other federal, state and local agencies in providing weather information and developing weather disaster plans. The specialist also will work with the Sea Grant advisory agents, the Marine Resource Center personnel, and the agricultural extension agents to increase the coastal weather awareness of the public.

The federal funds will be matched by \$1,210,000 in state funds.



Divers flock to the North Carolina coast to dive among the wrecks of blockade runners and German submarines. But early next year, they will be flocking to an inland destination for a different kind of diving experience — "SEAS '81," the Southeast Atlantic States Underwater Film Festival and Diving Conference.

The conference will be held, Feb. 21 and 22 at the Mission Valley Inn in Raleigh. The program begins at noon on Saturday with a series of concurrent workshops on underwater photography, diving medicine, wreck diving, fish identification, home aquariums and research diving. Presentations will also be made on the Southeastern Undersea Research

Facility (SURF), being established at Wilmington, and on the record saturation dive made in the hyperbaric chamber at Duke University Medical Center.

There will be a banquet Saturday evening followed by a film festival hosted by Paul Tzimoulis, editor and publisher of *Skindiver* magazine. Tzimoulis will also conduct workshops on Saturday and Sunday on macrophotography.

The conference will also offer a photo contest, diving travelogues, tourism presentations and diving equipment displays. The conference is being sponsored by the N.C. Marine Education and Resources Foundation and the N.C. Wreck Diving Association, with technical assistance from UNC Sea Grant and the Office of Marine Affairs.

For those who register early, the conference costs are: \$8 for the workshops, \$5 for the film festival and \$13 for the banquet. Those who register after January 31 will be charged \$11 for the workshops, \$7 for the film festival and \$13 for the banquet.

For registration forms and further information, write the N.C. Office of Marine Affairs, 417 N. Blount Street, Raleigh, N.C. 27611, or call (919) 733-2290.



A North Carolina landmark is losing ground — and rapidly. The gale-force winds and erosive tides of a recent storm have placed the Cape Hatteras Lighthouse in peril again.

Larry Roush, chief of resource management and visitor protection for the Cape Hatteras National Seashore, says emergency measures have been taken to prevent further erosion near the lighthouse, which now stands less than 70 feet from the Atlantic Ocean. "We did extend the southernmost

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groin about fifty feet," he explains, "and that will probably buy us time to evaluate the options. Then a decision will have to be made concerning the future of the Cape Hatteras Lighthouse."

MTMA Design group of Raleigh was hired by the National Park Service 18 months ago to study the area. In December, a lengthy report was turned in. Jim Turk of MTMA says the report presented six options: move the lighthouse somewhat west of its present location; completely encircle the lighthouse with a revetment of rock and/or cement; provide a revetment in front of the lighthouse; extend the present groins and provide beach nourishment; and take no action at all.

Bill Harris, superintendent of the Cape Hatteras National Seashore, says a decision will probably be made after the first of the year.



Preliminary Energy Budget for a Salt Marsh in the Cape Fear River Estuary, North Carolina, by Leon Cammen, Udo Blum, Ernest Seneca

and Linda Stroud, is a technical publication that examines the exchange of material between an emergent marsh and the Cape Fear River estuary. For a copy, write UNC Sea Grant and ask for UNC-SG-WP-80-3. The publication is free for North Carolina residents, but all out-of-state requests must include \$2.25 per copy.

Management of Colonial Waterbirds Summary Proceedings of a Workshop 17-19 May 1979, edited by James F. Parnell and Robert F. Soots, is a condensed version of the proceedings of a workshop held to discuss the management of colonial waterbirds such as terns, egrets and herons in the coastal areas throughout the United States. Researchers and environmental managers gathered in Wilmington to discuss the current status, needs and management of colonial waterbirds.

For a copy of the summary proceedings, write UNC Sea Grant, Box 5001, Raleigh, N.C. 27650. Ask for UNC-SG-80-06. Single copies of the publication are free to North Carolina residents. For others, the cost is \$2 per copy.



When the trout are on the move in North Carolina's coastal waters in the fall, they make for some of the best recreational fishing around. And each year, more and more sport fishermen are waiting to reel them in.

But successful trout fishing demands more than a taste for trout and a yen for light-tackle angling. Skill and a thorough knowledge of the water are key requirements.

That's why Bob Hines, Sea Grant's marine advisory agent at Bogue Banks, put together a workshop designed to teach trout fishing.

The workshop was held Oct. 25 at the Marine Resources Center at Bogue Banks. The instructor was Tom Earnhart, an accomplished sport fisherman from Raleigh. Earnhardt covered a range of topics, from baits and lures to finding the best fishing locations.

If you missed the workshop, here are a few of Earnhart's pointers about fishing spots: If you're looking for grey trout, he said, try Oregon Inlet or the waters around the Neuse River marker on summer nights. In the fall, greys are often feeding off Carolina Beach and near jetties in the Cape Lookout area.

Earnhart said that the favorite holes for speckled trout are guarded secrets. But he did point out that "specks" are marsh-bound fish, and you don't usually have to travel far from your marina to find them.

The program drew a crowd of more than 100 and was so popular, Hines says, that he plans to conduct another workshop like it next year.

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