



COASTWATCH



FISH ON THE MOVE

To biologists, they're pelagics. To fishermen, commercial and recreational alike, they're king mackerel, bluefish, dolphin, wahoo—fish that swim the near-shore waters of the coast and fish that cruise the deeper waters near the Gulf Stream.

Simply defined, pelagic (pe-laj'-ik) species of fish are ocean-going; they like the open waters of the sea. For fishermen, these species often mean a hefty catch that offers a good fight as well as good table fare. But

for fisheries managers, pelagic species pose a set of problems different from reef fish or inshore species.

This month, *Coastwatch* takes a look at pelagics—their biology, the inherent management problems they pose and how the state is dealing with those problems. And, *Coastwatch* takes you aboard a commercial fishing boat in pursuit of king mackerel, one of the most popular pelagics.

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Pelagic species are often divided into two categories—coastal pelagics and oceanic pelagics—according to their preference for habitat, says Charles Manooch, a research biologist with the National Marine Fisheries Service in Beaufort.

Coastal pelagics, including such species as king and Spanish mackerel, little tunny or false albacore, bluefish, Atlantic bonito and cobia, generally inhabit waters up to about 10 miles offshore.

Their distribution off the North Carolina coast is influenced by water temperature and the availability of food, says Manooch, also author of *Fisherman's Guide: Fishes of the Southeastern United States*. During the spring and fall when smaller food fish are most plentiful, fishermen are more likely to net or hook a coastal pelagic. The exception, bluefish, can be caught year-round off the North Carolina coast, although fall is the most likely time to hook the larger bluefish.

Further offshore, the "blue water" of the Gulf Stream is home to oceanic pelagics such as yellowfin and blackfin tuna, skipjack, dolphin, wahoo, white and blue marlin, and some bigeye and bluefin tuna. "Most of these species are available when they move up onto the continental shelf in the vicinity of the inner edge of the Gulf Stream," says Manooch.

Most pelagics, coastal and oceanic, travel in schools and are a highly mobile set. Like geese, they move south in fall and winter and north in spring and summer. A king mackerel lucky enough to elude North Carolina fishermen during the fall fishing season might spend his winter off of Florida. He prefers to reside in waters that are 68 degrees or above.

Generally, pelagics mature quickly and live short lives. They produce many eggs, but experience high annual mortality rates, says Manooch. Most of the

species spawn offshore, and for the most part their young mature there.

At certain times of the year, in some locations, North Carolina's coastal waters are pelagic paradise for fishermen. The larger fish often gather around inlets and capes, anxious to feast on the tremendous variety of foods there. With the same idea in mind, the state's fishermen flock to the coast, cast out a baited line, and hope to fool a hungry fish into biting the hook.

"Hatteras and Oregon Inlet in particular are ideal for both coastal and oceanic pelagics," Manooch says. And since the Gulf Stream is much closer to the coastline in the northern part of the state than in the central and southern portions, more boats in the Oregon Inlet and Hatteras area fish for pelagic species.

Voracious eaters, pelagics are known to consume "anything that is easy to get," says Manooch. Generally, they are piscivorous, or fish eaters, preferring small anchovies, silversides, sardines and squid or small shrimp and crabs. "The availability of pelagics depends on the availability of forage fish," says Manooch.

And when such a meal is readily available, pelagic species sometimes go into "feeding frenzies." As an example, Manooch refers to a "blues blitz."

"I've seen a school of bluefish follow a school of menhaden, and move them into shoals between bars and the beach. I've seen menhaden on the beach, cut and scarred to pieces, and others just gasping on the beach," says Manooch.

With a reputation like that, bluefish and other pelagics are popular targets for fishermen. It's that hope of tossing a line into a school of those feeding fish that keeps anglers flocking to the North Carolina coast.

— Nancy Davis



North Carolina's coast — a pelagic paradise for fishermen

Managing the Stocks

Used to be a fisherman could ride offshore and snag all the kings or blues he could carry home. But time, fishermen and new technologies changed things. Some species are running in short supply and need to be managed. For the managers, this isn't an easy job, especially when it comes to pelagic fish.

The very nature of these open-water fish makes them difficult to study and to regulate. "Generally, species like coastal pelagics are not as apt to be over-exploited," says Charles Manooch, a research biologist at the National Marine Fisheries Service in Beaufort. "They produce a lot of eggs and the whole stock turns over quicker."

But pelagics don't play by the rules. "The loophole is that these fish school," says Manooch. That makes them easier for fishermen to spot, target and catch.

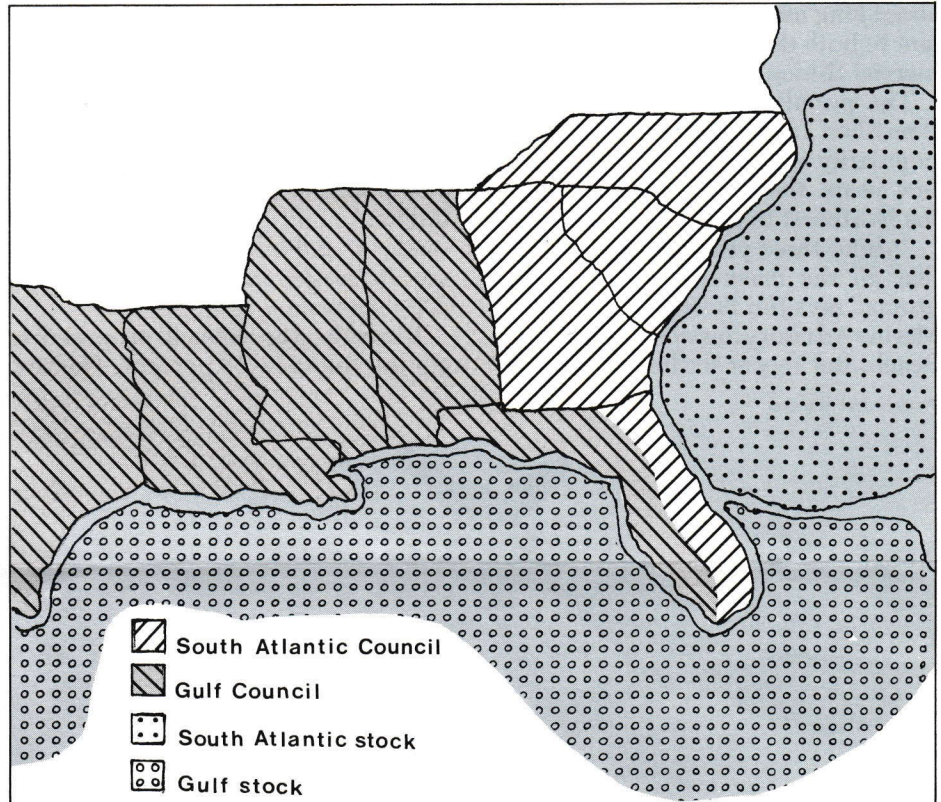
To make matters more difficult, there may be several stocks within one species that travel in different areas, adds Manooch. A stock is a population of fish that migrates together and that is reproductively and genetically different from another population of the same species.

Most of the conflict for managers comes when pelagics cross state lines. Species like mackerel, tuna and marlin rove about the coast like nomads on an offshore interstate.

Unlike blue crabs and clams, most pelagics wander in and out of state boundaries as they please in search of suitable feeding grounds and waters. The N.C. Division of Marine Fisheries monitors and regulates fish and shellfish from the state's sounds to three miles offshore.

But who governs the roaming pelagics beyond the state's boundary lines? And how can the fisheries be controlled equally between the states?

In general, the federal government



November to March, boundaries for the Atlantic stock of king mackerel extend to mid-Florida. April to October, the fish migrate to Florida's southern tip.

regulates the area called the Fisheries Conservation Zone, which lies three to 200 miles offshore. Enforcement powers are shared by NMFS, the U.S. Coast Guard and state fishery programs. Trying to outline the jurisdiction of each is like getting caught and tangled in a gill net.

To untangle some of the confusion, especially with the pelagic fisheries, a regional management system was created in 1976 by the Magnuson Act. Administrators realized such a program was needed to deal with the varied and biologically complex fisheries. That year, eight councils under NMFS were started to carry out this plan. Now, North Carolina joins South Carolina, Georgia and Florida to make

up the South Atlantic Fisheries Management Council.

Its members work alongside the Gulf and Mid-Atlantic councils to make decisions on seasons, gear types, license fees and recreational and commercial catch limits. When the group was established, the members intended to divide the species according to regions, but because fish know no boundaries this couldn't be done perfectly, says Jim Murray, director of UNC Sea Grant's Marine Advisory Service.

When fishing trends suggest that a species within a region or across regions is declining, NMFS investigates for proof. With pelagics, this can be a

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difficult job. The best indicator available at this time is catch data from surveys of commercial and recreational fishermen, says Manooch. The council devises its management plan based on research statistics, public hearings and member concerns.

In the South Atlantic region, the council has been keeping close watch on pelagics such as billfish, tuna and mackerel and has imposed some regulations. Currently in North Carolina, the managers are most concerned about king mackerel, a species important to both the recreational and commercial fishing industries.

The populations of king mackerel flourished for years, but so did their popularity with fishermen. And in a few years, the stocks dwindled from the Northeast to the Gulf.

"About three years ago we thought that all the mackerel were one big group," says Jim Bahen, the Sea Grant Marine Advisory Service agent at Kure Beach. But recent studies determined

two separate fish stocks traveled the coast—one from Virginia to the east coast of south Florida and the other from there to Texas.

In the Gulf, hook and line commercial fishermen caught so many king mackerel in 1983 that they met their quota of nearly 4 million pounds set by the South Atlantic and Gulf councils in just nine months. Until the next season, commercial fishermen could not fish for mackerel with hook and line, and recreational fishermen could not sell their catch because it fell under the commercial quota.

"There's still a serious problem with management in the Gulf, but here we've realized it, and we're starting to manage our resource," says Bahen. The South Atlantic council set an 11 million-pound quota in 1985 for recreational and commercial king mackerel fishermen fishing in the three- to 200-mile zone.

Recently, the council proposed to cut this quota by 18 percent. The new

regulations, scheduled to go into effect April 1, would allow recreational fishermen approximately 6 million pounds and commercial fishermen 3 million pounds. In addition, the council suggested bag limits of three fish per person per trip for private and charter boats or headboats traveling in the Fisheries Conservation Zone.

To come up with such a package plan, it took time, research and some give and take from the fishermen and the council members. "It's kind of difficult when you're trying to regulate something from Florida (to Virginia), but you try to look over your own interests," says Bob Mahood, director of the South Atlantic council and former director of DMF. "We tried to work it out where it's fair to everybody."

Each state in the region has the option to comply with these regulations within their three-mile jurisdiction, says Ernest Carl, a member of the council from North Carolina. So far, Florida has been the only state in the South Atlantic region to adopt these measures.

The change isn't always easy to take. Charter boat captains who cruise the Fisheries Conservation Zone are worried sport fishermen won't take as many trips because of the bag limits, and tournament officials are concerned the commercial quota for that area may be met before fall or winter tournaments can be held. If the commercial quota is reached, any king mackerel caught beyond the three-mile limit in a tournament cannot be sold as is usually done to offset tournament costs.

But Bahen believes short-term management may lead to long-term prosperity in the mackerel fishery.

"We're going to have to manage our resource," he says. "We're going to have to fish for today and save some for tomorrow, take more of a conservation view."

"A good example is if you look back at the striped bass. That is a fishery they let go too far. It got to the point where there weren't any fish at all. It got so bad, some states put a moratorium on it." But as with king mackerel, the councils are trying to do something beforehand.

"It's a big pill for some people to swallow, but they're going to have to choke it down," says Bahen.

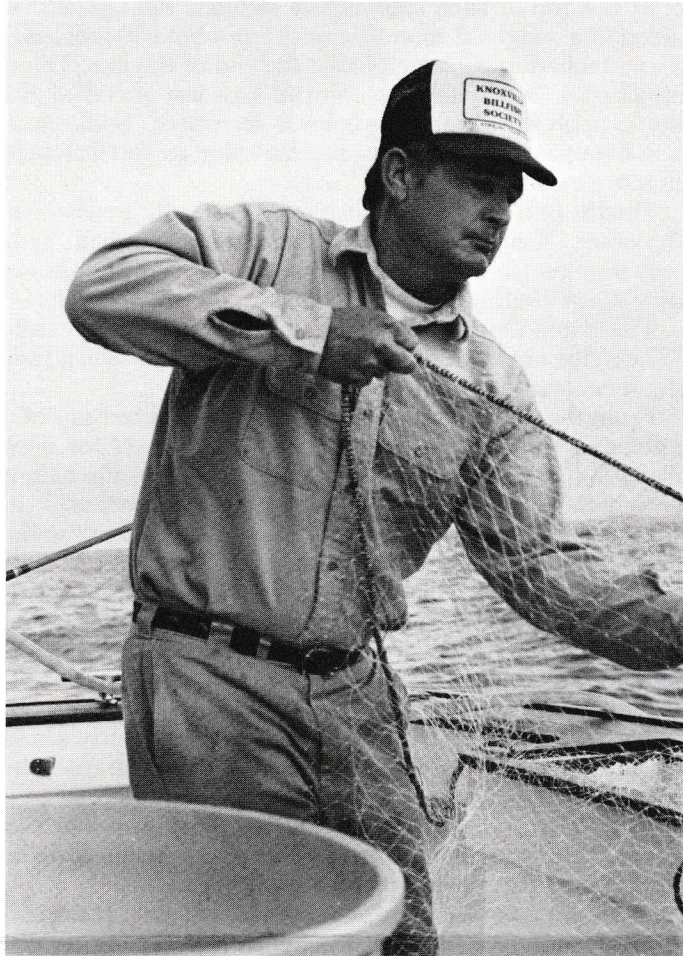
Photo by Joel Arrington



Fishermen reel in a wahoo

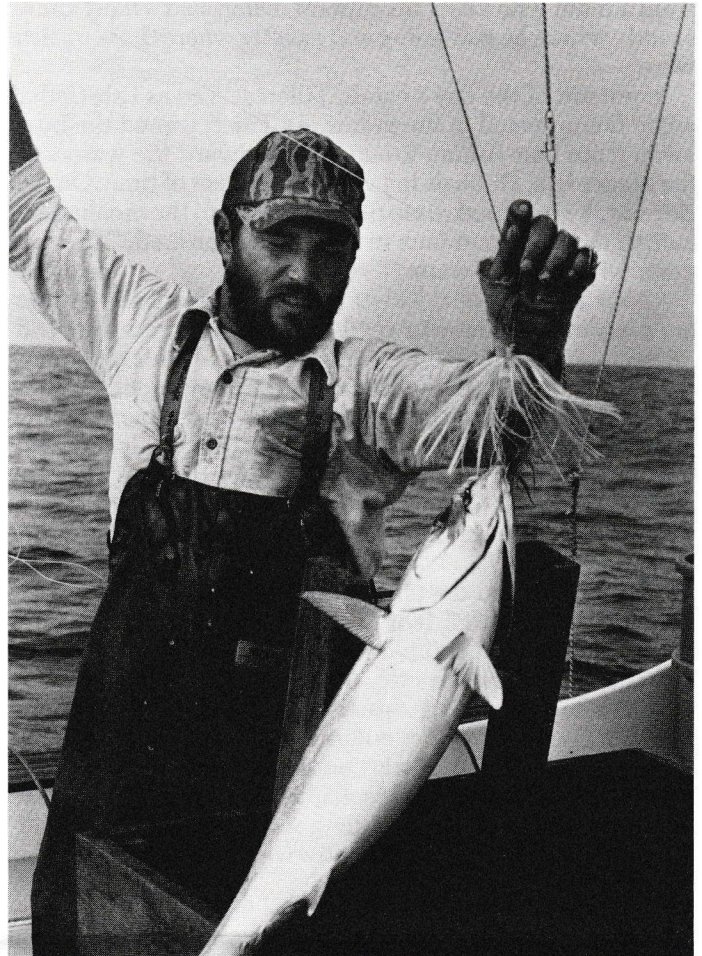
— Sarah Friday

Photo by Nancy Davis



Tony Tillett

Photo by Nancy Davis



Charlie Dunn

A day with the kings

Captain Tony Tillett guided his 53-foot *Carolinian* through the rough surf at Oregon Inlet at 6:30 on a mid-November morning. The sun was just peeking from behind the horizon. "We're late," he said. "Everybody else has already gone."

About half a mile offshore, fishermen on eight other boats had already set out their nets for bait fish. Along with the others, Tillett and mate Charlie Dunn were commercial fishing for king mackerel. They had finished their charter season a couple of weeks earlier. Now, whatever they caught was theirs, and it had to be enough to pay for their expenses in fuel, equipment, bait and ice.

Tillett descended from his perch on the bridge where he was guiding the boat. The two men set out a gill net, let the boat drift away, then returned to the net several minutes later. No, the mackerel weren't this close to shore, Dunn said. They were fishing for "fatbacks. You know, menhaden," he said.

As soon as the fishermen emptied their nets, moved the boat and set them out again, Dunn began preparing the bait. Eviscerated fish would stay fresher longer, he said. "And

the fresher the bait, the better the chance to catch fish."

As the other boats pulled in one last netful of bait fish, a neighboring fisherman pulled his boat alongside the *Carolinian* and donated an extra bucketful. "We all work together out here," explained Tillett. In all, Tillett and Dunn began fishing with about 30 pounds of bait.

Dunn hauled in the nets, and they set off for what Tillett had determined to be the day's fishing grounds, an area of water about 10 to 15 miles offshore.

Around the docks, some folks say Tillett is one of the best fishermen in northeastern North Carolina. Dunn agrees, but Tillett is more modest. No matter how much you know about fishing, he said, there will still be days when you pull your boat into the docks with an empty hold. "A fish is so unpredictable. You'll get fooled from time to time."

But during his 10-hour workday, Tillett's experience helped reel in 51 king mackerel, ranging from 10 to 15 pounds each—as much as anybody else caught that day, even if he did get a late start. To the untrained passenger, Tillett appeared to wander aimlessly across the ocean. But

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from a mate who knew his captain, Dunn said Tillet knew exactly where he was going and exactly where those 51 fish were.

In pursuit of the day's catch, Tillet served as fish-finder while Dunn reeled in the prizes. As Tillet turned the boat away from bait-fishing grounds and toward the waters of the bigger fish, Dunn didn't waste a moment of time. On the ride out, he trimmed some of the flesh from the menhaden, cutting the bait into 6-inch strips. Dunn explained, "They've gotta wiggle in the water."

About 10 miles out, Tillet descended from the bridge once again, this time to ready his downriggers and rod planers—fishermen's lingo for two types of rods and reels. If they didn't use specific names for the equipment, he said, it would be difficult to let other fishermen know which method was working best. Throughout the trip, Tillet continually exchanged such information via his radio with other fishermen on the water that day. "If I catch a fish on a downrigger at 50 feet, they know what I'm talking about," he said.

Tillet explained the terms. A downrigger uses a shorter line, usually 50 to 125 feet of cable, and is fished over the stern of the boat. A rod planer uses about 300 feet of cable and is fished from the side of the boat. A fisherman may vary the length of the cables according to where he is catching fish in the water column.

"Some days we might start out with (a downrigger at) 50 feet and the other one 100 feet, and keep trying to figure it out," said Tillet. This day, he got lucky. His first choice worked, and the fish consistently went for the bait on the downriggers set at 50 feet.

Photo by Nancy Davis



Dunn cleans the catch

At the end of each cable was a stainless steel plate that acted as a weight. A monofilament line, about 50 feet long, was attached to each weight. At the end of the line, Tillet attached a "sea witch" or colorful lure just ahead of the hooks to give the bait some color in the water. "Sometimes you'll start catching fish on a certain color, so you'll change to more of that," he said.

Finally, two hooks were positioned vertically, one behind the other. "King mackerel always cut the bait in half. That way they get hooked on the back hook. With only one hook, they'd just get the bait," said Tillet.

Tillet and Dunn used electric reels to pull in the catch. "They give out from time to time," Tillet said. "When they do, it can cut the catch in better than half."

From the deck, Dunn watched for the slightest dip of a pole, and from above, Tillet scanned the water for signs that a fish had struck the bait. "When a fish hits the bait, it automatically trips the weight and makes it come straight in (to the surface). There's no friction at all. You can see the line start coming up," said Tillet.

Within minutes, Tillet motioned to Dunn, who immediately flicked the switch on one of the downriggers. Soon the day's first king mackerel skimmed the water's surface behind the boat. As the weight neared the top of the rod, Dunn flicked the switch off. Then, hand over hand, he pulled in the 50 feet of monofilament line. As a fish of about 10 pounds rose from the water, Dunn flipped it over the stern of the boat into a box prepared for the catch.

A metal rod, or de-hooker, across the top of the box allowed Dunn to remove the hook without tangling with the floundering fish's row of sharp teeth.

Tillet let a novice in on some other secrets of the trade. "If you catch two fish at a time, you start circling on that spot. We also use Loran. When we hit the fish, we look at those numbers and try to stay on that spot."

Tillet also kept a watchful eye on a temperature gauge on his boat. Temperatures averaged from 65 to 75 degrees. King mackerel prefer 68- to 70-degree waters, he said. But then again, you might catch them in 64- to 70-degree waters. You just never know.

A fathometer helped Tillet know how deep the water was and what the bottom looked like. It also showed evidence of small bait fish that the larger mackerel might feed on.

"A king mackerel moves with the wind and the currents," said Tillet. "The wind and currents move the bait and the mackerel usually move with the bait." Therefore, Tillet kept the boat moving with the current rather than against it.

By the end of the day, aside from several sharks and an albacore, Tillet and Dunn reeled in more than enough to pay for the day's work. At that time, king mackerel were bringing about \$1 per pound at the docks. Just two weeks later, fishermen were catching 18- to 25-pound king mackerel, and the price had dropped to 80 cents per pound. Tillet said, "The more you catch, the less you get for them."

And the line between spending money and making money is a fine one on the water. Tillet figured his boat used about 90 gallons of diesel fuel at \$1.25 per gallon. And you have to add in costs of broken lines, torn bait nets and wear and tear on the boat, he said.

"Some days you work all day just to pay for the fuel," said Dunn.

— Nancy Davis

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 offices in Raleigh (919/737-2454). For copies of publications, write UNC Sea Grant, NCSU, Box 8605, Raleigh, N.C. 27695-8605.



There's never a better time for gazing up at the stars than a cold, clear winter night. And if you happen to be at the coast, you have an even better chance at a good view of the constellations, says Mark Joyner, education specialist for the N.C. Office of Marine Affairs.

"The coast is a very good place for stargazing because you certainly don't have lights coming in from out at sea—especially if you're lucky enough to get out in a boat and get away from the coast so the lights coming from the cities and towns don't interfere with your stargazing," says Joyner.

You don't have to be an expert astronomer to enjoy the sights in the sky. Joyner recommends a star guide for beginners and a pair of binoculars; a telescope isn't necessary. Before long, you'll be able to find your way around the night sky.

Joyner says you can begin with a few well-known constellations such as the Big Dipper and Orion. "With just a few major constellations, we can find our way around," he says. "We can tell direction. We can tell the season of the year. And in fact, early navigators used the stars for directions and finding their way across vast stretches of ocean."

A guide to assist landowners with coastal development projects is available from the N.C. Division of Coastal Management. *A Handbook for Development in North Carolina's Coastal Area* is a guide to the permit program of the

Coastal Area Management Act. It includes where and when a CAMA permit is required, how to apply for a permit, the standards that are used to review a permit application, and how those standards are used to protect the public interest in the coast.

Coastal Management officials say that by following the standards outlined in the book, you will protect the quality of North Carolina's estuarine and barrier island resources so that they can continue to support the diversity of life in the coastal area.

For a free copy of the book, write to the Division of Coastal Management, NRCM, P.O. Box 27687, Raleigh, N.C. 27611-7687, or call 919/733-2293.



For Lundie Spence, teaching marine science doesn't take a classroom and a blackboard. Instead, she uses a trunk full of activities and a good dose of enthusiasm to spread her knowledge of the coast throughout the state. Recently, the North Carolina Science Teachers Association recognized Spence's efforts as UNC Sea Grant's marine education specialist by presenting her the "Distinguished Service Award" for 1985. This award, the second given by the NCSTA, honors one educator who is not affiliated with a school system but is supportive of the education process. Judy Spitsbergen, curator of education at the N.C. Maritime Museum in Beaufort, received last year's award. The NCSTA presented Spence with a plaque at the annual conference, which met in Raleigh Nov. 7 to 9.

Marine advisory agent Bob Hines is gearing up for the sixth annual Commercial Fishing Show. This year the show, which is free to the public, will be held March 14 to 16 at the Crystal Coast Civic Center in Morehead City.

Dealers and manufacturers will display the latest in fishing boats, nets, motors, traps, pots, engines and accessory gear. And seminars will be of-

fered on topics such as shrimping, hydraulics and aquaculture.

The show is cosponsored by UNC Sea Grant, the Carteret County Watermen's Association, and the N.C. Agricultural Extension Service. Merchants interested in participating should contact Hines at 919/247-4007.

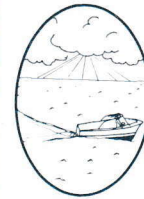


Chart your course to spend a day at the Southern Sport and Outdoor Show April 4, 5 and 6 at Raleigh's N.C. State Fairgrounds. This year, the show will feature an expanded exhibit focusing on saltwater sport fishing. UNC Sea Grant, the Crystal Coast Charter Boat Association and the Carteret County Sportfishing Association will sponsor booths displaying sportfishing gear and equipment. In addition, you can learn how to charter a boat or fish offshore in a series of seminars offered on topics relating to sport fishing. Bob Hines, Sea Grant's Marine Advisory Service agent at Bogue Banks, is coordinating the sportfishing groups and seminars for the show.

For more information, or if you would like to have an exhibit at the show, write Hines at UNC Sea Grant, Box 896, Atlantic Beach, N.C. 28512. Or call, 919/247-4007.

Rich Novak, Sea Grant's marine recreation specialist in Manteo, is helping the N.C. Marina Association establish a quarterly newsletter, *Marina Messages*. The newsletter will include a legislative update, a calendar of events, a message from the association president and other news pertaining to the marine trades industry.

Although the newsletter is written especially for marina operators, others interested in this industry can subscribe to this free newsletter. To receive a subscription, write Novak at the N.C. Marine Resources Center on Roanoke Island, P.O. Box 696, Manteo, N.C. 27954.

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Meet the Sea Grant team. Howard Kerby in the laboratory as he genetically manipulates fish stocks. Bob Christian, Hans Paerl and Don Stanley as they test the waters for blue-green algae. Lundie Spence as she ignites the marine education fire. These Sea Grant team members and others are pictured in the pages of *Sea Grant in North Carolina 1983-1984*, the program's biennial report.

The 40-page report covers two years of Sea Grant research and Marine Advisory Service efforts and accomplishments. You'll learn how researcher Mark Sobsey perfected his method for detecting hepatitis A in shellfish, how food scientist Tyre Lanier developed an edible minced fish product from the lowly menhaden, and how advisory agent Wayne Wescott helped the soft-shell crab business boom in northeastern North Carolina.

For a free copy of this report, write UNC Sea Grant. Ask for UNC-SG-85-05.

Joyce Taylor, Sea Grant's seafood agent at the NCSU Seafood Laboratory in Morehead City, has received an award from N.C. State University for distinguished performance. Taylor was among 23 recipients of the award this year. In a letter to Taylor, J.E. Legates, Dean of the NCSU School of Agriculture and Life Sciences, commended Taylor for her "dedicated service to the university."



Each year, thousands of North Carolinians enjoy reeling in catches on the state's 34 fishing piers. And these piers contribute significantly to the local economies where they are located.

For years, the pier owners have grappled with the idea of improving pier fishing by concentrating fish near the pier. But traditional artificial reef development hasn't been feasible. In 1984, Sea Grant Marine Advisory Service Director Jim Murray and UNC at Wilmington biologist David Lindquist

tested a new idea in artificial reefs. They placed fish aggregating devices, or floating reefs, off of piers at Wrightsville Beach.

Murray and Lindquist gathered data for each pier before and after the devices were installed. Now, the researchers have published their findings in a report, *The Use of Midwater Fish Aggregating Devices to Attract Marine Fish at Two North Carolina Fishing Piers*. For a copy of the report, write Sea Grant. Ask for UNC-SG-WP-85-1. The cost is \$2.

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