UNC Sea Grant

August, 1981

COASTWATCH

Photo by Mark Hooper

"For Robert" is a photograph by Mark Hooper, a Carteret County shrimper. The photograph is dedicated to Robert Willis, Hooper's neighbor, who heads shrimp for Hooper each morning during shrimping season. The photograph won first place in black and white prints, best in show, and the N.C. Marine Resources Center Purchase Award in the 5th Annual Bogue Banks Nature Photography Competition and Exhibit

Shrimp

Talk of shrimp gets thick in coastal North Carolina about the beginning of June. Shrimpers speculate about the coming season, always hoping it will be better than the last. Biologists and managers at the North Carolina Division of Marine Fisheries work day and night to check shrimp nursery areas. Seafood dealers and marketers begin checking prices and supplies of shrimp in other states.

Shrimp are the most valuable seafood crop North Carolina waters offer. Last year, 9,823,000 pounds of shrimp, valued at $17 million, were landed in the state. But last year's nettings were a record catch. North Carolina shrimpers hadn't seen such large quantities of shrimp in over 25 years. The average catch for the past 25 years stands at just over six million pounds a year.

Three species of shrimp are netted in North Carolina—pink, white and brown. Brown shrimp are the most numerous. Shrimpers trawl for "browns" July through September. Pink and white shrimp are less abundant. They are netted in the fall.

This month and next, Coastwatch will look at the shrimp fishery in North Carolina—the story of its shaky beginnings, the people who study and manage it, the people who depend on it for their living.

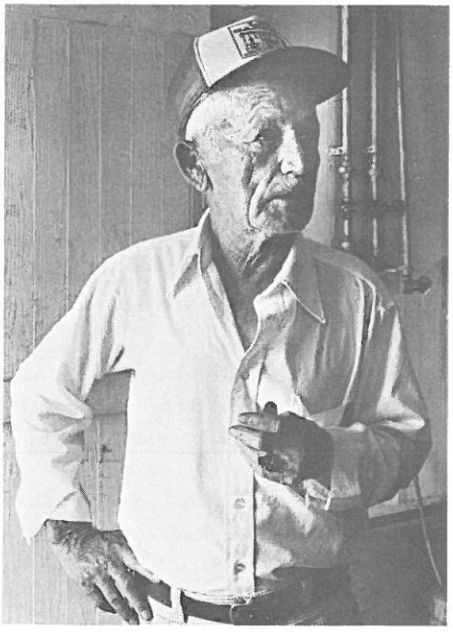
The delicacy they used to call 'pests'

A large sign on a roadway in Carteret County reads: SHRIMP $3.25/LB. Many a shrimp lover turns out his pockets for a handful or so of those spiny crustaceans. But not long ago, 60 years or so, a fisherman could hardly give shrimp away in coastal North Carolina. Shrimp were considered "pests" that littered fishermen's nets.

Luther Lewis, a 70-odd-year-old Carteret County fisherman, remembers when nobody wanted shrimp at all. "There was nobody catching 'em then. Nobody wanted 'em," he says. "You could take the rigs they have now and load a boat in a few minutes.

"I went long-hauling when I was a kid," Lewis says in a low, raspy voice. "We'd see a big school of bluefish out in the sound, all right thick. But one day I had something on the boat to throw in, to the gulls. And the gulls went in after it and came up hauling these big shrimp. It wasn't a thing in the world but those big shrimp going through the sound."

Photo by Cassie Griffin



Luther Lewis

The findings of two Sea Grant researchers, East Carolina University sociologists John Maiolo and John Bort are proving Lewis' recollections right. With historian William Still, Maiolo and Bort have compiled a history of the North Carolina shrimp fishery. The study is designed to give state management officials an understanding of a fishery colored by tradition.

The shrimp fishery got a slow start in North Carolina. Inadequate refrigeration facilities and poor transportation methods were devastating obstacles for a fishery depending on such a perishable product as shrimp. And, fishermen had obstacles of their own. Boats were small and gear was simple—gill, cast, dip, fyke and pound nets were used.

The shrimp fishery had its beginnings in North Carolina's southeastern counties—Brunswick and New Hanover. Maiolo and Bort learned from R. E. Earll's 1887 account of the North Carolina fisheries that Wilmington was the "most northern city on our Atlantic coast where the shrimp fishery assumes the importance of an actual industry." Earll also reported that shrimp were plentiful north of Wilmington in the Pamlico Sound, but there was no local interest in the crustaceans or any interest in exporting them out of the area.

But two developments in the shrimp fishery prior to World War I gave the North Carolina fishery a needed boost, Maiolo and Bort found. Several shrimp canneries were established about 1915 in Brunswick County. This created the first need for large quantities of fresh shrimp in this state.

But perhaps more important to the shrimp fishery nationally was the development of the otter trawl. An otter trawl is a cone-shaped net held open by two boards called otter doors. The otter trawl allowed fishermen to fish deeper water and offshore areas for the first time. It netted a greater catch and was more efficient to use. With the development of the otter trawl came a change in boat design. The first "trawlers" were much like the boat Lewis shrimped from in the waters of Core Sound.

"I started shrimping in a small skiff with a little gasoline motor," Lewis says. "It was a thirty-footer and I drug a thirty-two-foot trawl net with two doors. I had my first big trawler built in the mid-thirties. I had it made by a man here in Davis, Stanton Davis I believe. It was a single rig."

By the thirties, two types of trawlers were used to shrimp in North Carolina. The Florida trawler, developed in the state that bears its name, carries the engine room toward the front of the boat and the hold in the stern. It stands high out of the water, with the bow two or more feet higher than the stern. The "Core Sounder," built in the Core Sound area of North Carolina, has a flared bow and rounded stern. It works particularly well for trawling inside waters.

The otter trawl revolutionized shrimp fishing and after World War I, the fishery prospered, both nationally and in North Carolina. Refrigeration and North Carolina's easy access to the Fulton Fish Market in New York benefited this state's fishery, Maiolo says. Brunswick County, and in particular the Southport area, led the state in shrimp landings most of the 1920s and 1930s.

Southport's population mushroomed during shrimp season as migrant fishermen arrived to net their share of the crop. Most of the shrimping in those days was carried out during the day. Boats would pull out of their docks early in the morning and return during the afternoon. Then the fun came, according to Southport's *State Port Pilot*. Several hundred "pickers" headed the shrimp, sometimes long into the night, singing as they worked. You could hear "a real melody floating up from the picking houses," the *Pilot* reported. The pickers were paid a nickel a bucket for their efforts.

But Brunswick County's near monopoly of the shrimp industry ended during the 1930s as Carteret County fishermen took to shrimping the Bogue, Core and Pamlico Sounds. It was a poor time though for fishermen to cash in on shrimp, Maiolo and Bort report. During the depression years of the 1930s shrimp were bringing only about three cents a pound. To help fishermen help themselves during these bleak years, the federal government loaned fishermen, who wanted to join, the money to gear up a cooperative that would pay higher prices for their catches. But competition from independent dealers and the inability to establish an in-state market led to a quick demise for the cooperative.

During the years of World War II, manpower shortages presented problems for the shrimping industry, but the war had several positive advan-

Travel and Tourism photograph

In this 1948 photograph, single-rig trawlers head toward Southport

tages for the fishery. Demand for shrimp rose as it was one of the few meat products not on the ration lists. The technology for quick freezing was established and shrimpers began to "night" shrimp.

Prices shrimpers were paid for their shrimp nearly tripled between 1940 and 1945, Maiolo and Bort report, and did triple between 1945 and 1950. Even then, fishermen were getting paid only 24 cents a pound and prices would fall again before beginning the steady increase of the 1960s and 1970s.

"The year of (Hurricane) Ione, right after (Hurricane) Hazel washed my shrimp house away," Luther Lewis says, "I was getting fifteen cents a pound with the heads on and eighteen cents with the heads off. We headed 'em right on the bank. Sometimes we'd get fifteen hundred to eighteen hundred pounds for the night. That was several boats, then. That was mighty cheap when you were paid only eighteen cents a pound with the heads off."

North Carolina's shrimp production reached a record high in 1953 with landings totaling more than 14 million pounds. That year, North Carolina's contribution to the South Atlantic regional catch (excluding the Gulf) was 36.48 percent, the highest ever, according to Maiolo and Bort's findings. Biologists are unsure exactly why shrimp were so plentiful that year.

During the 1950s a trend toward larger boats began and it continues today. Many trawlers were equipped with diesel engines, onboard refrigeration facilities, better net-hoisting gear and improved nets. Trawlers were capable of going farther offshore and making longer trips.

In 1955, Maiolo and Bort report, 2,000 North Carolina residents were employed in the shrimp industry. Some 1,200 vessels of all sizes and types were being fished. Between 1945 and 1950, the number of otter trawls doubled from 500 to more than a thousand. Since 1950, the number of otter trawls has remained between 800 and 1,000.

While the state's shrimp industry developed, so did the state's management system. The state Board of Conservation and Development made early shrimp regulations. Before the shrimping "heydays" of the late forties and early fifties, very little challenge was mounted to their regulatory practices. But after the shrimping boom, demands were heavier and controversy rampant. In the late 1940s, a controversy erupted between fin-fishermen and shrimpers. Fin-fishermen maintained that shrimping was destroying valuable bottom area and killing premarketable finfish. They wanted shrimping curtailed, Maiolo says. In 1950 the Board, as a compromise move, closed inside waters to shrimping January 1 to July 1. But the controversy's flames ignited again when, in 1951, the Board agreed to allow "night" shrimping.

While fishermen and management officials were battling over regulations in public hearings, some Carteret County fishermen were establishing some informal, but rigid rules for another kind of shrimping—channel-netting. Carteret County fishermen developed this method of shrimping in the late 1930s. It was thought that channel-netting was unique to North Carolina, but recent research has uncovered evidence that some Texans also channel-netted. It appears the developments were independent.

Channel-netting is basically stationary trawling. A net, very similar to a trawl net, is set in a channel with a strong tidal current. The ebb tide moves the shrimp into the net. Only a limited number of areas are prime spots for channel netting. Consequently, informal but firm rules have been established by the netters to govern the areas and use of the nets.

In their best hauls, channel nets have harvested over a thousand pounds of shrimp on one ebb tide. But normally a channel-netter expects much less, 50 to several hundred pounds. Channel netting contributes very little to the overall state shrimp landings, but it continues to survive as a tradition and as a low cost, energy-efficient form of shrimping.

The last major development in the shrimp industry occurred, Maiolo and Bort report, in 1955 with the development of the double rig. It allowed trawlers to net even larger quantities of shrimp. Since then, other improvements in gear have continued—nylon nets, automatic pilot and loran navigation systems.

When Luther Lewis was a child, the idea of a winged trawler fishing the sounds and offshore waters for shrimp would have received scoffs and jeers. But those trawlers are a reality, netting thousands of pounds of shrimp just 60 years after Luther Lewis watched gulls pick shrimp out of Core Sound.

—Kathy Hart

Managing fish and fishermen

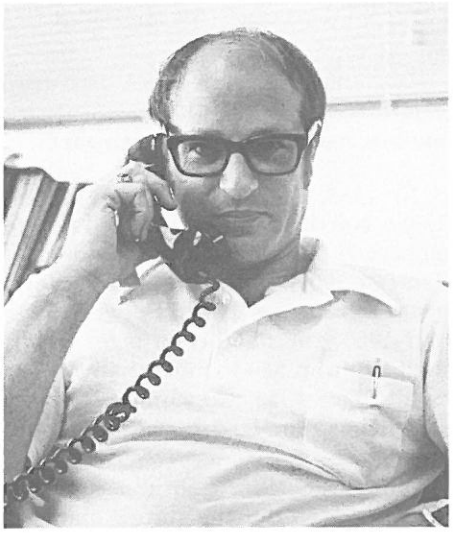
When it comes to managing a commodity as precious as shrimp, everyone has an opinion. "That creek off Core Sound should be opened to shrimping," laments one fishermen. "It should stay closed," says another. The season should be shortened, gear restricted, areas opened, areas closed—all complaints and opinions funneled into a building in Morehead City that houses the managers, the North Carolina Division of Marine Fisheries (DMF).

Mike Street, part of the fisheries management team, says they hear it all—good and bad. "Our philosophy for management of the shrimp fishery is to get the best yield, biologically, economically and socially, from the crop available," Street says. "That's the only way everyone can benefit."

For the DMF, shrimp is the most valuable seafood crop they manage. They spend countless hours and thousands of state dollars to do the job. They intensely sample the primary nursery grounds in May and June for numbers of brown shrimp present and for environmental factors like salinity and temperature that will affect the shrimp's survival rate. For division biologist, Dennis Spitsbergen, 12-hour days are common as the shrimp crop begins to ripen. He may spend eight to 10 hours aboard a DMF trawler sampling some remote nursery area, then another four hours in Morehead City headquarters computing figures and meeting with other management officials to advise them on current situations.

"North Carolina's fisheries management system is unique," Street says. "It's a very active, responsive system." The state legislature delegates all authority for making regulations to the state fisheries commission, which meets at least four times a year. But for a fishery such as the shrimp fishery, where conditions vary quickly, Connell Purvis, the division's director, can issue regulations via proclamation. For the shrimp fishery, most of the proclamations announce openings and closings of secondary nursery areas where shrimp have reached a marketable size. (Primary nursery areas are never opened to shrimping.) Proclamations are posted by DMF enforcement officers and can take effect as soon as 48 hours later. Usually, Street says, the division tries to give fishermen more notice.

Photo by Kathy Hart



Mike Street

Under North Carolina's management system, shrimpers can fish offshore and inside waters—bays and sounds—year round. These are areas Marine Fisheries call "migration routes" or paths by which shrimp exit the nursery areas for their offshore spawning grounds. Fishermen fish these migration routes as the shrimp begin trickling out of the shallow nursery areas.

Street admits that under this system daily catches may be lower, but he says, the overall catch for everyone will be greater. He points to last year's record catch (the largest in over 25 years) as evidence the plan works. "The same drought we had last year, that helped us, resulted in good crops in South Carolina and Georgia," Street says. "But their management is quite different from ours. Their management is for the big boats. Very few of their inside waters are open for shrimping. So their boats stayed out in the ocean waiting for the shrimp to come out. Waiting and waiting and waiting. It stayed dry and they didn't come out until late in the year and then all at once. They couldn't get them all. Their landings were low. I think our approach to management was justified by conditions last year."

Besides preventing the problems Street says plagued Georgia and South Carolina, the present management system also put an end to the traditional "opening day" for shrimping. Prior to the 1970s, shrimp season opened every year around July 1. Fishermen and fisheries personnel alike say every shrimper in North Carolina had his boat in the water that first day. "You could see as many as 500 boats in New River on opening day," Street says. "You could fly over almost any bay in the state and it would look like one big mud roll. Then there would be a huge fish kill several days later. They were catching some areas out in that one day, not to mention that they were physically disturbing bottom areas. The system we have now allows for better utilization of the fishery and a calmer situation. It's better for the environment, and no place

Photo by Kathy Hart

DMF samplers check the sizes of shrimp just brought from a sampling area

"Our philosophy for management of the shrimp fishery is to get the best yield, biologically, economically and socially, from the crop available." —*Mike Street*

is emptied in a single day of fishing."

The year-round season also allows fishermen to cash in on the pink shrimp that overwinter in the state's sounds and bays. If the winter temperatures aren't too cold, a sizable crop of pink shrimp will emerge from the mud when the temperatures turn warm. Shrimpers can net the "pinks" and some extra income in May and early June while they're waiting on the "browns" to grow fat in their nursery.

Managing for the good of all also means managing areas differently. Street says there is no single overall count range (count is the number of shrimp per pound) for the state's coastal waters. Each area is managed separately according to its capabilities. The DMF doesn't open all its secondary nursery areas when the shrimp in Pamlico Sound reach 45 count. Instead they sample in all areas and open creeks and bays when the count is right for that area's normal production. Street says the DMF expects 41- to 45-count shrimp from the Pamlico Sound in early summer and 20- to 25-count shrimp in the fall, sometimes larger. Normal production for the New River is 60-count shrimp, while Brunswick shrimping grounds produce 70- to 80-count shrimp.

Besides predicting the count sizes of shrimp from various coastal waters, the DMF also predicts each year's expected yield of shrimp for the state. The prediction is based on sampling that begins in early May. DMF trawlers are sent to the nursery areas where they take short samples and calculate the catch per minute. "If the catch is hundreds of the one- to three-inch shrimp per minute it will be a good year," Street says. "In a bad year, we may only see ten, fifteen, twenty a minute. Of course there is tremendous variability among different areas. For one nursery 30 per minute may mean a good year, for another area it's practically no shrimp at all."

Street says this year's crop is running later than usual. DMF samples show smaller shrimp in fewer numbers than last year. A late cold snap in early May that dropped water temperatures below 68° F may have damaged this year's crop, Street says.

Some fishermen grumble that the DMF shrimp prediction affects the prices they receive from seafood dealers. But Street says the prediction can help fishermen decide whether to rig out for shrimping. Street and others say the price of fuel is causing many fishermen to think twice about trawling for long hours unless they are certain of a "netted" return—shrimp.

Management officials feel maintaining the nursery areas is vital to the fishery. In the mid-1970s the division closed primary nursery grounds to shrimping to keep fishermen from netting the small, yet unmarketable shrimp and to protect the natural habitat shrimp need to nurture. But Spitsbergen and Street stress that protecting the nursery grounds from fishing isn't enough. Freshwater intrusion from agriculture and industrial development is lowering the salinity in some nursery areas, thus destroying the habitat the shrimp need to survive.

Street says that while rising costs—especially for fuel—may someday make shrimping prohibitive for some fishermen, the fishery cannot be overfished. He explains that shrimp are an annual crop. They are born and they die in a year's span. The survivors of this year's crop—those not netted by fishermen or killed by natural causes—return to the ocean to spawn next year's shrimp. "Trillions of tiny larvae are spawned annually and ninety-nine percent die naturally," Street says. "As long as the shrimp can spawn in reasonably clean waters, come through a sound that is reasonably clean to a nursery areas to grow that has the environmental conditions they need, there will be shrimp."

—*Kathy Hart*

Fishermen on management

At the request of the Division of Marine Fisheries, Maiolo and Bort asked fishermen about the agency's management efforts. They surveyed 97 full-time commercial shrimpers and 78 part-time commercial shrimpers. Maiolo and Bort asked the fishermen how they would evaluate the assistance provided themselves and other fishermen by DMF personnel. "The results are surprisingly favorable, given the fact that such agencies are usually the target for everything that goes wrong," Maiolo says.

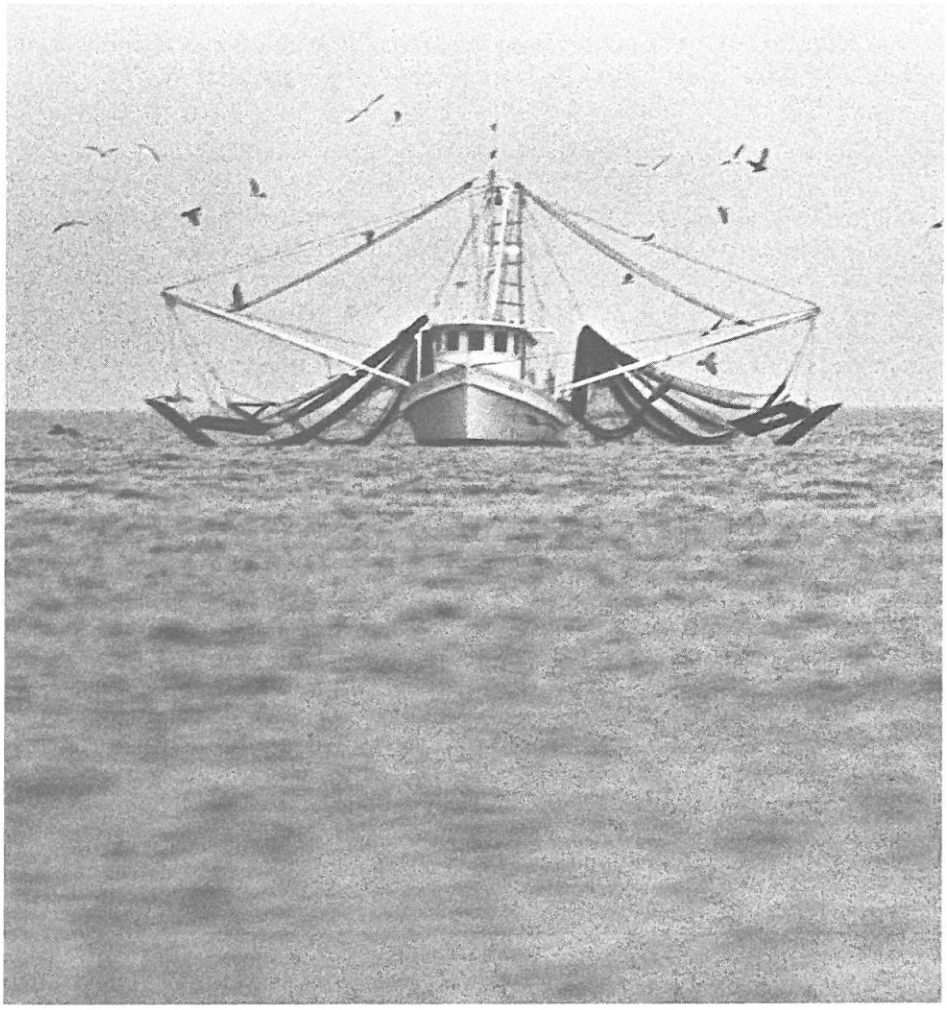
	all fishermen	full-timers	part-timers
poor rating	25%	51%	13%
satisfactory rating	36%	29%	39%
high rating	39%	20%	48%

Maiolo says most of the fishermen who gave DMF a poor rating did so because they felt the agency was not helpful. But when asked about specific DMF policies, most of the shrimpers gave the agency a favorable nod.

	% full-timers approving	% part-timers approving
geographical restrictions on shrimping	82%	78%
restricted seasons for shrimp	63%	85%
restricted gear for shrimp	72%	74%

Better policies Rely on research

Photo by Steve Murray



Shrimper readies nets for a day of trawling

Managing the shrimp fishery is complicated, and demands good information. And that's where UNC Sea Grant projects can help management agencies like DMF.

During 1979 and 1980, George Fishman, a researcher in the Curriculum in Operations Research and Systems Analysis at the University of North Carolina at Chapel Hill, developed a computer model that will evaluate alternative management policies for the shrimp fishery. Plugged into the model are the biological features of shrimp such as migration habits, mortality rates, distribution in the estuaries, length-weight relationships. The model also takes into account characteristics of the shrimp fishery—number of fishermen shrimping, the intensity of their shrimping efforts. Finally the model figures in the price structure of the fishery which varies according to the season and availability.

Using this model the North Carolina Division of Marine Fisheries, or a fisheries management agency in another state, can plug in different management schemes to see which works best. A management agency may want a policy that provides the most profit per unit of effort by the fishermen. Or perhaps they want a scheme that would result in greater pounds landed. Whatever the needed results, the model can test proposed and present policies to see how they stack up against one another.

Another model for fishery management that will include some work with shrimp is being developed now by Sea Grant researchers Jim Easley, Thomas Johnson and Frank Benford, all of North Carolina State University. They will be setting up a model to consider individual problems within fisheries—for example, the impact of fuel costs, market effects—and to consider problems that arise as seasons for various fish overlap.

Easley, along with two other researchers, conducted an earlier study that took a look at overlap in the shrimp fishery. While fishermen are still trawling for brown shrimp in August and September, juvenile pink shrimp are moving into the sounds in large numbers. Many pink shrimp are netted as a byproduct of trawling for brown shrimp and most are killed in the landing and sorting process. What is the cost of this incidental catch to later pink shrimp harvests? Should shrimping for brown shrimp be curtailed in these months?

Easley determined that 15 to 16 pink shrimp must be killed for every brown shrimp harvested for it to be economically feasible to curtail or close brown shrimp season. Sampling data found the ratios far below this level in most areas. Based on this data, the DMF decided to continue to allow fishermen full trawling privileges during August and September.

While Fishman and Easley map out management policies, John Maiolo and John Bort are talking to the people involved in the fishery. Maiolo and Bort are surveying shrimpers to find out why they shrimp, their views on management, their relationships with seafood dealers and marketers and their family ties to the fishery. They are surveying dealers and marketers to determine the intricacies of the marketing system and its relationship to the fishing communities. Lastly they are compiling the fishery's history, already mentioned. Some of the information they have gathered will appear in this and the following issue of *Coastwatch*.

While some people cast a cloud of skepticism over the need for such "soft" research, Mike Street is quick to defend its value to the Division of Marine Fisheries. "We need the kind of research John (Maiolo) is doing so we can know and understand the approach of the fishermen to the resource and to its management," Street says. People don't often understand, but its not the fish we manage, it's the people. John's work helps us know those people better."

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).

In the Pamlico Sound during June and July, it looked like a jellyfish invasion. Fishermen found them clogging their nets. Swimmers were leaving the water. Water-skiers were complaining of being stung, and residents were asking, "Why so many jellyfish this year?"

Frank Schwartz, a jellyfish expert and biologist at the UNC Institute of Marine Science in Morehead City, says that the "moon jellies" and "summer jellies" that people are seeing are normal summertime visitors, but that their numbers this year are "huge."

Schwartz says the unusual concentration of jellyfish has been caused by higher-than-normal salinity in Pamlico Sound, a condition favorable to jellyfish growth and reproduction there. Also, strong southwesterly winds have pushed many jellies into the upper reaches of the sound. Schwartz says the jellyfish will probably stay around until late August or September.

Although they do sting, moon jellyfish are the less pesky of the two. Their disk-shaped bodies are about 18 inches in diameter, but their tentacles are short, only a few inches long. The summer jellyfish is usually about six inches in diameter, but its tentacles are several feet long and its sting can cause pain, a red rash and, in some people, an allergic reaction.

Over on the beaches, the jellyfish to watch is the Portuguese man'o war, Schwartz says. The man'o war prefers the warm waters of the Gulf Stream, but southeasterly winds before summer thunderstorms occasionally push the jellyfish toward the beach.

Dennis Regan, a Sea Grant marine advisory agent on Roanoke Island, says that jellyfish tentacles retain their sting, even after the jellyfish is dead or washed ashore. If you do get stung, Regan recommends that you use a towel, seaweed, sand, or a knife to gently brush away the tentacles. Cool vinegar, diluted bleach or household ammonia on the affected area will help neutralize the sting, and a paste of meat tenderizer, monosodium glutamate or sodium bicarbonate can help reduce the pain. Regan says that if the pain persists, or if there is any sign of shock or serious reaction, a doctor should be consulted. Severe stings have caused cardiac and respiratory arrest, Regan says.

Ronald G. Hodson will be joining UNC Sea Grant August 1 as its new associate director, replacing William L. Rickards, now director of the Virginia Marine Science Consortium. Hodson has been with North Carolina State University since April 1973 as a research associate in the zoology department. Along with his appointment as Sea Grant associate director, Hodson will also be named as assistant professor in the zoology department.

Hodson, who has a keen interest in estuarine ecology, received his doctorate from Texas A&M University in wildlife and fisheries sciences. He received his undergraduate degree from Manchester College in North Manchester, Indiana, and his master's degree from the University of Arkansas at Fayetteville.

Besides performing administrative duties at Sea Grant, Hodson will work closely with the Aquaculture Demonstration Project in Aurora and continue to pursue his interests in estuarine research.

UNC Sea Grant marine advisory agent Dennis Regan, who works out of the Marine Resources Center on Roanoke Island, will be leaving his post August 14th. Regan, during his four years with Sea Grant, has organized an annual summer lecture series about the Outer Banks, developed a method for using hickory shad as bait, worked extensively with diving groups and associations, co-authored a Sea Grant publication, *Wreck Diving in North Carolina,* and worked closely with Dare County officials and emergency personnel to improve their awareness of beach safety problems and emergency procedures.

You may be able to name the plants in your own backyard, but how about plants in the salt marsh? To help you identify the herbs, vines, grasses and shrubs you encounter on your next trek through the marsh, Sea Grant has published *A Guide to Salt Marsh Plants Common to North Carolina*. Written by Elizabeth Jean Wilson of the Hampton Mariners Museum, the guide characterizes the salt marsh and the plants that live there. An illustrated working key helps readers discover each plant's identity.

Especially designed as a field trip guide, the 32-page booklet can be helpful to educators. To obtain a copy of the salt marsh guide, write UNC Sea Grant, Box 5001, Raleigh, N.C. 27650. Ask for UNC-SG-81-04. The cost is $1.50.

A fisherman, whether recreational or commercial, relies on good weather to get the job done. But to make sound decisions about weather a fisherman needs accurate, up-to-date information.

Jerry Davis of the Department of

Continued on next page

Marine, Earth and Atmospheric Sciences at North Carolina State University has conducted a Sea Grant study looking at the kind of weather information fishermen in this state are provided. Davis has published his findings in a new Sea Grant technical report. The report includes a listing of the marine weather services available in the state, an evaluation of these services and recommendations for improving the delivery of weather data to fishermen.

To obtain a copy of this technical report, write UNC Sea Grant. Ask for publication UNC-SG-81-07. The cost is $1.50.

You're swimming in the surf when suddenly you're pulled out to sea by a rip current. What do you do? Many swimmers panic and try to swim against the powerful current, an effort that sometimes results in tragedy. Rip currents along the Outer Banks killed five people last August and one this June.

Common in North Carolina, rip currents form when water which normally moves along the shore rushes out to sea in a narrow path. These currents can extend as far as 3,000 feet offshore, reach 90 feet in width, and travel up to four feet per second, which is faster than the average swimmer.

How do you spot a rip current? Watch for these telltale signs: a difference in color from surrounding water, a gap in the breakers where the rip is moving seaward, or a floating object that moves steadily to sea.

If you do get caught in a rip current, don't panic and don't try to swim against the current. Swim parallel to the shore until you can get out of the current and then swim back to shore. If you can't get out, float calmly with the current until it dissipates, then swim diagonally to shore.

For more information on rip currents, write for Sea Grant's colorful poster, "Rip Currents." The poster is available free from Sea Grant, Box 5001, Raleigh, N.C. 27650.

For sports fishermen ready to lure in dolphin, wahoo, tuna and marlin, UNC Sea Grant has some suggestions for a new kind of bait. Sea Grant agent Dennis Regan on Roanoke Island, along with R. C. Harriss of the N.C. Division of Marine Fisheries, worked out a method for preparing hickory shad to be used as a trolling bait for some of the large gamefish. Regan and Harriss tested the hickory shad by asking fishermen to bait their lines with the fish. The results were good.

Now Sea Grant has a Blueprint, "Using Hickory Shad as a Trolling Bait," that will tell you how to gut, brine and rig your own hickory shad for use as bait. For a free copy of this leaflet, write UNC Sea Grant and ask for UNC-SG-BP-81-5.

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Coastwatch is a free newsletter. If you'd like to be added to the mailing list, fill out this form and send it to Sea Grant, Box 5001, Raleigh, N.C. 27650.

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__Commercial fishing	__Mass media
__Educator	__Seafood processing/marketing
__Farming	__State government
__Homemaker	__University professor/researcher
__Lawyer	__Other _____

Coastal property owner __yes __no Boat owner __yes __no

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