

COAST WATCH

Scallops

The luxury seafood. Scarce, and so rich in flavor, it even tastes expensive.

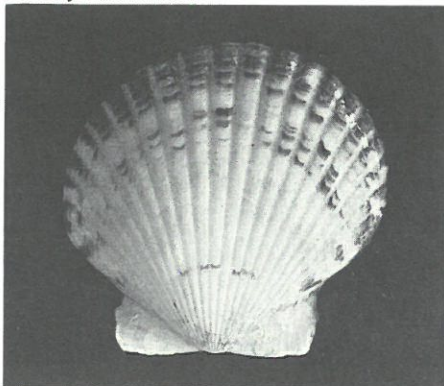
In the past, scallops have held a distinguished but modest place in the bottom half of fisheries-landings lists. Bay scallops were few and seasonal. Sea scallops and calicoes appeared and disappeared with mysterious irregularity. Processors handled what few scallops they got with some of the same laborious methods they had been using for generations.

In 1980, things changed. The East Coast fishery landed \$10 million worth of scallops. In 1981, that figure rose to \$40 million. Word is out that the industry may triple those dollars in 1982.

There were several reasons for the boom: Opportunistic fishermen, often from North Carolina, were using big, steel-hulled boats with increasing skill. New machines multiplied the

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Photo by Steven Wilson



The calico scallop

Photo by Neil Caudle



A hopper of calicoes heading for the steam box

processors' output. And, an aggressive entrepreneur, retired from the North Carolina pulpwood industry, made inroads into the world scallop market.

But the main reason was the calico scallop itself. Prolific and fast-growing, the calico can grow to commercial size in six months. It spawns year-round, and in-

dividual calicoes can release more than a million eggs and 25 billion sperm cells in one spawn. It matures and dies in about two years, sometimes disappearing almost overnight. Its limits are still unknown.

So when the calico showed up in force off Florida last year, the seafood industry mobilized like

never before. Fishermen hustled to catch as many loads as they could before the scallops disappeared or died. Even an unpleasant bout with parasitic nematodes failed to spoil the fun.

This month, Coastwatch looks at the calico scallop fishery, and some of the North Carolinians who have helped to build it.

Machines haven't quite replaced hand-shuckers

In a back room at Homer Smith Seafood in Salter Path, Hancy Marshall shucks scallops by hand, turning out about five gallons of the sweet-tasting mollusks a day. But in the front room of the processing plant, things are mechanized. Scallops ride conveyor belts from steam box to packing table. Depending on the size, 150 to 500 gallons of scallop meats may roll off the conveyor belt each day.

Homer Smith Seafood contrasts the old and the new. The old, hand shucking has been around for years. Marshall says she's shucked scallops since she was 15 years old—some 37 years. Today she's turning out bay scallops her son harvested along the North Carolina coast.

Marshall stands by a concrete tray and plucks a bay scallop from a massive pile of the bivalve mollusks heaped there. With a scallop cupped in her left hand, Marshall pries open the shell with a quick twist of her knife. Discarding the top shell, Marshall scoops the viscera out of the bottom shell and scrapes the adductor muscle, the part that is eaten, into a paper cup. As the paper cup fills, she empties it into a plastic gallon bucket.

Marshall says she learned to shuck scallops by watching others. She shucks scallops from December through May. During the summer Marshall works in Homer Smith's fish market.

According to John Maiolo, an East Carolina University sociologist and UNC Sea Grant researcher, most of North Carolina's hand shuckers are women. For many, shucking supplements their families' incomes.

Hand shuckers usually combine shucking with other seasonal processing activities such as heading shrimp,

picking crabs, filleting fish and shucking oysters and clams. A fast hand shucker can earn \$50 a day. An average shucker will earn about \$1000 a season, Maiolo says.

Today most hand shuckers turn out only bay scallops harvested from North Carolina estuaries. Mike Fiorini of Homer Smith Seafood says processors don't run the bay scallops on the machines because the freshly caught bays don't open as readily as calicoes in the steam box. Processors retrieve more meat if the scallops are hand shucked.

Also fishermen prefer that their bay scallops are hand shucked, Fiorini says. The machines are not 100 percent efficient, so some of the meat is lost. For a fisherman being paid per gallon shucked, every piece of meat means

more money in his pocket.

While the hand shucker may be efficient, you can't beat the mechanical shucking machines when it comes to processing the thousands of pounds of calicoes trucked into Carteret County each day. The mechanical shucking machine has been around for almost 30 years, Maiolo says. Elmer Willis claimed to have developed the first mechanical shucker in Carteret County. Willis received the first patent on the machine, but others contested his claim to the invention.

Sam Thomas, Sea Grant's seafood specialist with the NCSU Seafood Laboratory in Morehead City, says mechanical shucking equipment was a combination and adaptation of machines already in use in food technology. The eviscerator, for exam-

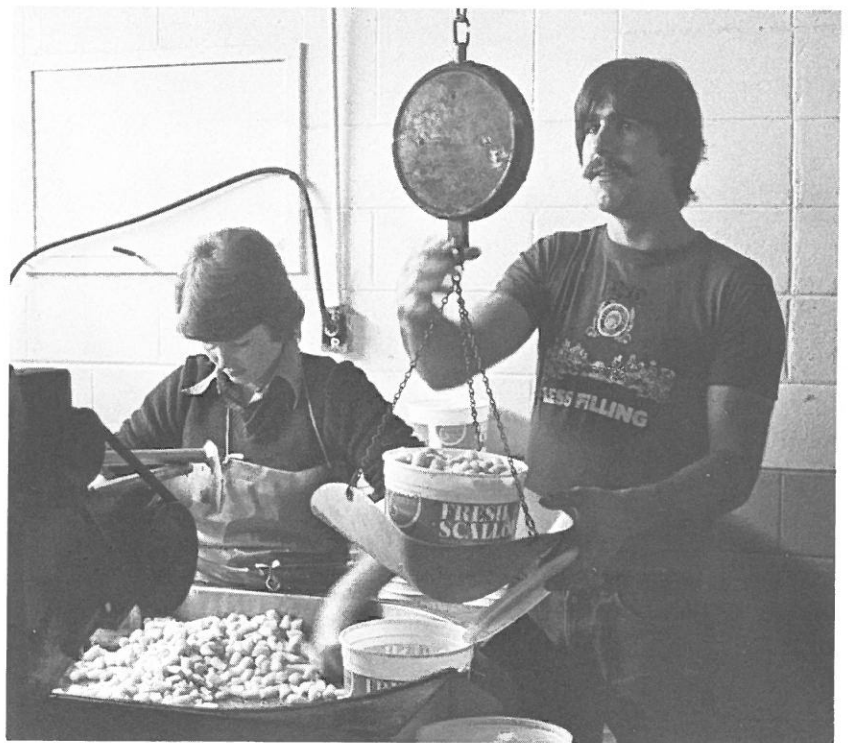
Photo by Neil Caudle



Hancy Marshall shucks bay scallops by hand



Hand-sorting calicoes



Weighing scallops at the packing table

ple, was an adaptation of a machine used to stem cherries.

The mechanical shuckers have been used sparingly since their invention. Mechanical shuckers saw some use during the boom of calico scallops off the North Carolina coast in the late 1960s. And some sea scallops were processed on the mechanical shuckers, but Thomas says many of the shucking machines lay idle during the 1970s.

Idleness isn't a problem today. North Carolina processors are cashing in on the calico lode in Florida just as fast as their trucks can deliver. With equipment already in place, this state's processors were able to jump in on the scallop market quickly, once they saw the profits were substantial and steady. After North Carolina processors entered the market in 1981, they shucked almost half of the \$40 million of calicoes processed in the U.S.

Six or more scallop-shucking plants are operating in North Carolina now. Technology is advancing rapidly as processors work constantly to improve their equipment. Much of the shucking equipment is built in local shops since there is no manufacturer of scallop-shucking equipment. A new eviscerator may cost a processor \$20,000 to \$25,000.

Thomas says there are added costs to processing the calicoes in North

Carolina. Processors here must pay freight costs from Florida and larger ice bills to keep the scallops cold along the way. "With North Carolina processors, the yield per load of scallops is more critical because processors must pay some added costs before they make a profit," Thomas says.

Fiorini says it takes the tractor-trailer trucks about 12 hours to make the trip from Cape Canaveral to Carteret County. The calicoes are iced before they leave Canaveral and, during warmer months, may be iced again along the way. As soon as the trucks arrive at Homer Smith Seafood, the ice is washed out and the truck backed up to the off-loading ramp, Fiorini says. A front-end loader scoops up calicoes and dumps them into the hopper.

"They go up a conveyor belt to a shell-trash separator," he says. "It takes the trash fish and broken shell out. And then the scallops leave there and go into a steam tank. We have a boiler and about fifty pounds of pressure. And we have steam pipes; I think we have eight of 'em in there. The steam sprays on the scallops and that causes their mouths to open."

After leaving the steam tank, the calicoes fall onto a large pan that shakes the meat from the shell. From the shaker the scallops go through a de-sheller, which removes the smaller

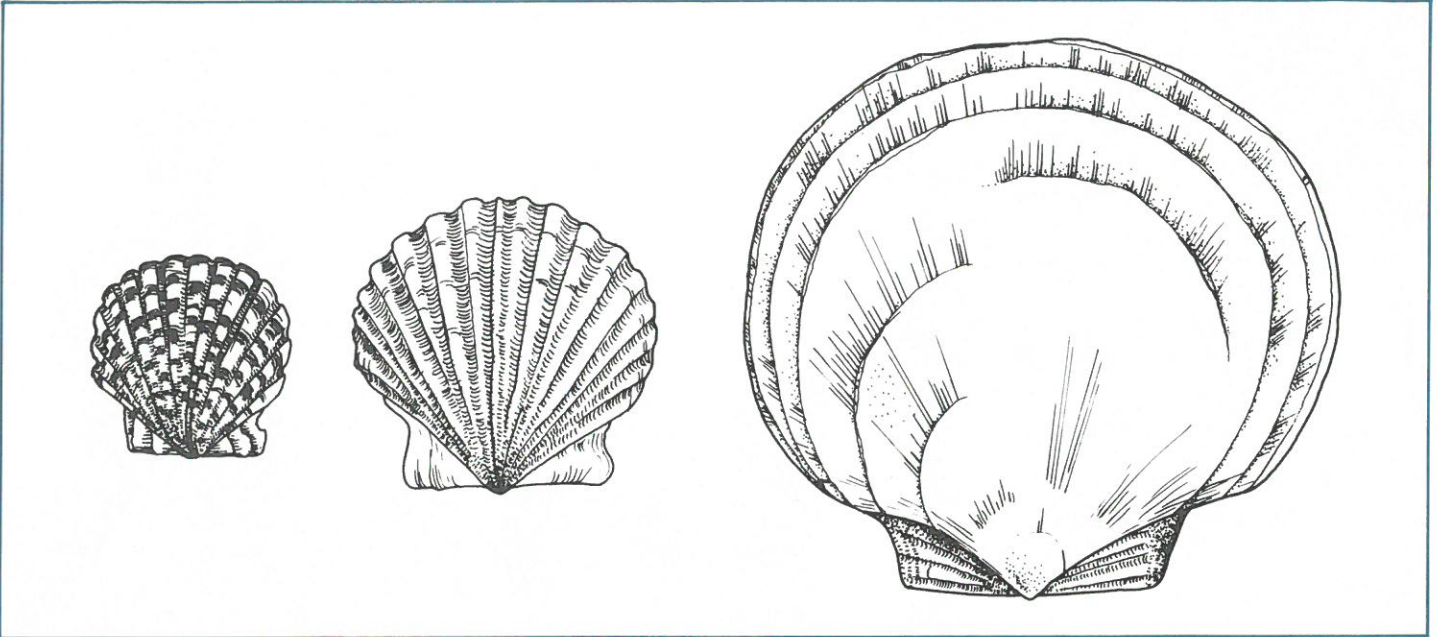
pieces of shell that slipped through the shaker. When the scallops fall onto the eviscerator, a series of rubber-coated rollers pinch the loose viscera away from the meat of the adductor muscle.

The scallops, looking more like the food we know, now roll down a wide conveyor belt used as the picking table. About four people, usually women, stand on either side of the conveyor picking out scallops not completely cleaned by the eviscerator. Unclean scallops are whisked back to the eviscerator for another try. Clean scallops roll on to the packing table where they're weighed and packed in gallon tubs.

Fiorini says most of Homer Smith's scallops are shipped to New Jersey, New York and Boston, while a few are sold to state retail markets. Most North Carolina processors ship their calicoes to northern seafood markets. Currently, they are getting a price of about \$21 a gallon.

Which tastes better, the bay scallop or the calico? Unless you have the most discriminating taste, you probably can't tell the difference, seafood experts say. "There's definitely a southern preference for the smaller, sweeter bays and calicoes over the sea scallop," says Maiolo.

—Kathy Hart



The calico, bay and Atlantic deep-sea scallop, drawn about half their adult sizes

When the Carolina crews blow in, watch out

If there's a bonanza in fishing along the East and Gulf coasts, whether it be in scallops, shrimp or fish, then you can bet your last dollar that North Carolina fishermen are there. Characterized as opportunists, they seem always to be aboard when the ship comes in.

But to be an opportunist in the fishing industry you have to be good at what you do and versatile at the same time. "They're always a force," says John Maiolo. "Whenever something happens the North Carolinians get in there and they seem to outfish everybody. They fish the pants off people. They work harder. The labor is a little bit less expensive. They make more sacrifices.

"And they're so flexible. They say OK, New Bedford is down, shrimp aren't so hot, so let's go knock the hell out of calicoes in Florida. They're remarkable. These are the guys willing to live on their boats, not in fancy motels. They're willing to defer a lot of gratifications. They're hard-working, honkey-tonk-loving sons-of-guns. And they're really neat people."

Today the bonanza is calico scallops and North Carolina fishermen have swarmed the Cape Canaveral docks, making up about half of the 100-plus boats in the Florida scallop fleet. But not so long ago it was the New

"I watched sea scallops go from a bonanza to an empty shell. By the time we left it wasn't worthwhile to be there."

—Ron Tillett



England sea scallop they were after.

Fishing the waters off the Georges Bank, Tar Heel fishermen stocked their boats with sea scallops and returned home to sell them to North Carolina processors. As stocks declined, New England fishermen became more and more angry about the intrusion from their southern counterparts. New Englanders began clamoring to their fishery management council to regulate the fishery. They wanted a 30-meat-count (30 meats per pound) limit set for the sea scallops.

North Carolina fishermen felt the lower meat count favored the New Englanders' dredge/shuck-at-sea fishing methods. They turned to the South Atlantic Fisheries Management Council for help. In a study funded by

UNC Sea Grant, Maiolo found that many smaller boats from this state and most of the shoreside personnel (hand shuckers) would be pushed out of the industry if the 30-meat count were adopted.

But while the councils haggled over the management of the fishery, sea scallop stocks continued to dwindle. "I watched them (sea scallops) go from a bonanza to an empty shell," says Ron Tillett, a Wanchese fisherman. "By the time we left it wasn't worthwhile to be there."

As North Carolina fishermen hit a dead end with sea scallops, news of large calico beds in Florida began to filter back to North Carolina.

"We kept hearing little pieces of information about these scallop beds in

Florida, so I decided to go down and take a look for myself," Tillett says. "It didn't take me long to figure out what was going on."

Tillett quickly moved his three 85-foot, steel-hulled boats from Wanchese to the Canaveral docks in September 1981. "The first three months we were there, we were making big money," he says. "But like every good thing, it comes to an end, and now things are starting to dry up." Tillett says that initially fishermen working his boats at Canaveral were earning \$1,200 to \$1,500 a week, while now they earn \$300 to \$400.

Each boat carries a four-man crew. Originally all of Tillett's crewmen were from North Carolina, but a few tired of being away from home, he says. Each crewman makes four to five trips a week, working continuously from the first trip to the last with crewmen spelling each other for meals and rest during the five- to six-day period.

A boat geared for scalloping looks much like a shrimp trawler. It pulls two heavy twine nets, heavier than those used for shrimping because of the increased weight and sharp shells of the calicoes. Scallop boats also pull a heavier tickle chain (the chain which precedes the net and "tickles" the catch off the ocean floor) because they must dig deeper into the muddy bottom to stir up the calicoes.

Tillett says he usually harvests 25 to 30 bushels of calicoes per net for each 10- to 20-minute tow. Over a single trip to the calico beds, lasting about 24 hours, one of Tillett's boats will bring in two tractor-trailer loads of scallops, taking three hours to unload from the boat. Like other North Carolina fishermen in the Canaveral fleet, Tillett sells his scallops to North Carolina seafood processors, who truck them home for processing.

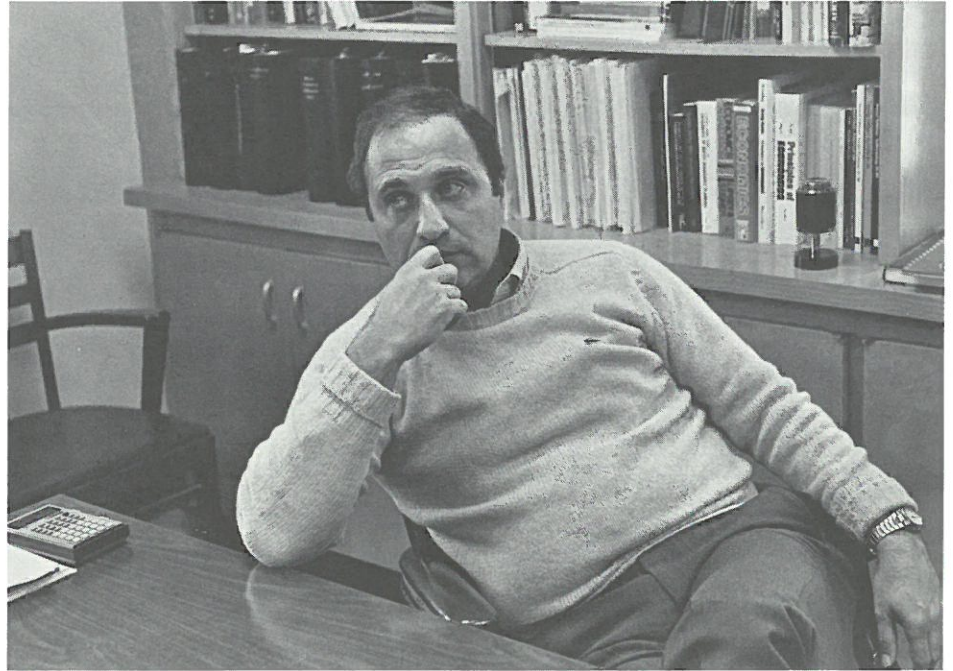
Tillett is paid according to how many gallons of meat his catch yields. During late March, he was collecting eight dollars a gallon from the processors, an increase of one dollar a gallon from the previous month. During winter months, scallops get watery and the meat content drops, much the same as oysters do in North Carolina during the summer, when they are spawning. Biologists believe calico scallops spawn during the winter. Tillett says his yield per catch decreased during the winter, but is on the rise again now.

Another reason for smaller yields during the past winter came when fishermen had to move from the larger, older beds of calicoes to the smaller, younger beds because of nematodes. "The Florida Department of Agriculture came in and started checking our catches," Tillett says. "It really slowed things down for a while.

They showed the fishermen what the nematodes looked like so when my men went out, they could make a short tow of a bed, open up a few of the scallops and decide if the beds were infested. What we finally settled on were the small, young beds of calicoes."

But what worries Tillett and others
Continued on next page

Photo by Neil Caudle



John Maiolo



Crew sorts sea scallops for on-board shucking off New England

about dipping into the younger beds is the waste of tomorrow's catch. Many small scallops from each haul, too small to process, go to the dump after being sorted from the catch that is trucked to North Carolina or processed in Florida. "Since Christmas we have been bringing in today's catch and throwing out tomorrow's," says Ronald Earl Mason, Carteret County seafood processor and boat owner. "That's one thing that offends me right now is that we should be leaving

those small scallops at sea."

Mason, whose 88-foot steel-hulled boat, the *Carteret Pride*, is fishing the Canaveral waters now, says he would like to outfit his boat to prevent the waste. He wants to install an on-board separator to cull out the smaller scallops at sea, where they can be deposited alive back into the ocean. Mason would also like to devise a way to store the scallops in his boat's refrigerated hold so the boat could make longer trips.

But Tillett feels the boom of calicoes is almost over. Already part of the fleet (about 17 boats) is planning to pull out to give sea scalloping a renewed try, he says. "I expect that we'll clean it up down here before the summer's over," Tillett says. "Things are going to happen the same way here they happened in New England. Mother Nature can make plenty of something but when enough of mankind is out there after it, they can wipe her out in no time."

—Kathy Hart

Nematodes threaten calico market, but not health

There are nematodes everywhere—in the soil, in the sea, in plants and animals, and in food. So nobody in the seafood industry was especially surprised when nematodes turned up in processed calico scallops this winter.

The telltale sign—a small, brown spot on the adductor muscle, where the parasite was encysted—was hard to detect. If there were nematodes visible, they were tiny and hairlike.

The affected scallops came from huge beds off Cape Canaveral. By mid-December, nematode levels were

that no more than 20 percent of the scallops in any one lot could be infested with nematodes. North Carolina officials seized several truckloads of scallops when higher numbers of parasites were found.

"It was a patrol-type activity," Sitko says. "There was no danger to health, but aesthetically the nematodes are objectionable in high levels. If you're paying for scallops, you should be getting a reasonably clean product."

Sitko says the 20-percent standard

a raw scallop, any nematodes in it would be killed almost immediately by your gastric juices. It is not a parasite to man and it could not live in the intestine."

Thomas points out that nematodes are not new to the seafood industry, and that they are getting more attention now because of the great increases in scallop production.

"In any kind of food product, you have defects of this kind," Thomas says. "The idea is to keep the defects to a minimum, for the sake of the consumer."

The South Atlantic Fisheries Management Council is considering a plan for managing the calico-scallop stocks. Proposed regulations would address the nematode problem and also attempt to decrease the harvests of juvenile calicoes, which have been taken in great numbers from the same beds as older, nematode-infested scallops.

Meanwhile, officials in Florida and North Carolina report that the trouble with parasites may have corrected itself. Since the crackdown this winter, they say, fishermen have been sampling beds first, then moving on if the parasites are there.

"We haven't had a call on this in about three or four weeks," Sitko says.

Thomas says that even though the nematodes problem seems to be under control, processors are afraid some inaccurate reports and misinformation have already cooled the public's love affair with the scallop.

"It would be a shame," he says, "if this took away from any of the joy people get from eating scallops."

"There was no danger to health, but aesthetically the nematodes are objectionable in high levels. If you're paying for scallops, you should be getting a reasonably clean product."

—Daniel Sitko

running so high that the Florida Department of Agriculture stepped in and began monitoring scallops as they landed at Canaveral. Some of the samples showed 60 out of every 100 scallops were infested. Several shipments were embargoed, and the state of Florida, which had an interest in the reputation of its product, asked the U.S. Food and Drug Administration (FDA) to help monitor shipments into North Carolina processing plants.

Daniel Sitko, supervisory investigator with the FDA office in Raleigh, says that his agency tested samples and advised North Carolina officials of infested calico shipments. The agency set a standard requiring

helped ensure a good product without imperiling the scallop fishery. He explains that many of the nematodes in scallops can be eliminated during routine processing. Setting a tougher standard would not necessarily have improved the quality, but it might have made fishing scallops too costly for fishermen to harvest, he says.

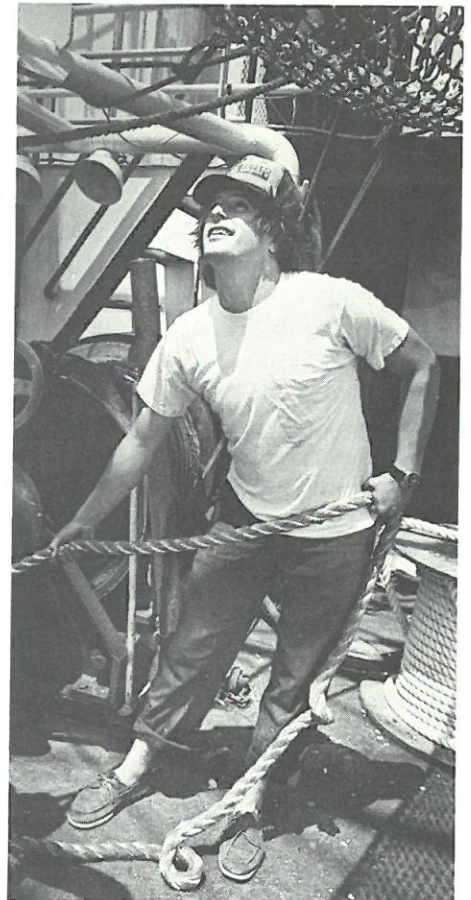
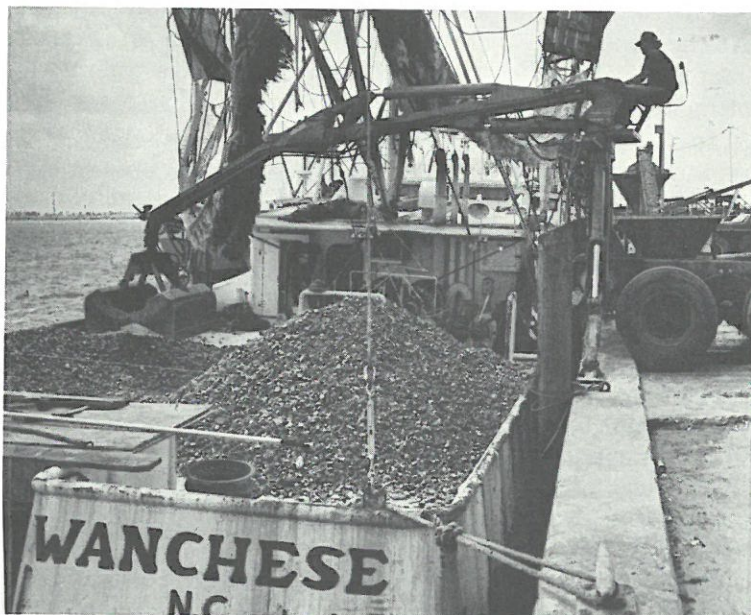
Sam Thomas, a Sea Grant seafood specialist at the North Carolina State University Seafood Laboratory in Morehead City, says that the nematodes are "totally harmless" as far as human health is concerned.

"These parasites are killed by low cooking temperatures, or by freezing," Thomas says. "Even if you consumed



Working the Cape

North Carolina boats crowd the docks at Cape Canaveral (above) while Kenny Brown (right) of Broad Creek hoists scallop nets aboard the Miss Sophie. Using a crane-like "cherry-picker," a worker scoops calicoes from the deck of a Wanchese boat (below).



Of lions, pulpwood And the scallop king

Stretched across the foreground in a borderless color photograph is the body of a large male lion. Its eyes are closed. Its head rests undisturbed between two paws, as if the King of the Forest were only sleeping.

But kneeling over the shape is William R. Lambert. His jaw juts, his smile is cocked and rakish as his hat. His right hand is gripping a gunstock.

If there exists another photograph of Bill Lambert, he won't admit it. He's a moving target, and he says photographers don't often get a clear shot at him.

He has sent the photograph along, though, because he hunts big game and shellfish for some of the same reasons. "I've got to have a challenge," he says. "I always have."

So Bill Lambert's story has a lion in it. It also has pulpwood, calico scallops and no small amount of controversy. The setting is first North Carolina, then Cape Canaveral, Florida, where NASA launches the space shuttle and Bill Lambert launches this story:

"Ten years ago, I didn't know a scallop when I saw one," he says. "I was in the lumber and pulpwood business in Greensboro, and coming down to Emerald Isle for vacations. At the time, I owned the Southern Pulpwood Company. We sawed a lot of trees and made a lot of money, but after a while I just ran out of things to do. So I retired at forty-two, sold the company, and moved on down to Emerald Isle."

Retirement didn't take, and Lambert began hanging around the docks and seafood plants on Bogue Banks. Nobody paid the outsider much mind when he came around to study a shucking machine or ask a few questions.

"After six months, I learned you just can't go sit down with a rod and reel," Lambert says. "I got to looking around and saw that the scallop industry then was in the dark ages. The machinery was no good, they were losing half of what they tried to shuck, and about twenty-five gallons a hour was the best they could do. Well sir, I was businessman enough to see a dollar sign."

Today, at 52, Lambert is being called the King of Scallops. His Southern Seafood Company is thought to be the largest producer of scallops in the world. Last year, Lambert sold a million gallons of scallops, about 7.2 million pounds. This year, he'll most likely sell more.

His shucking machines work around the clock, six days a week, each at a rate of about 200 gallons of scallops a day. His payroll carries 180 dockworkers and processors, and his contractors keep 30 boats and some 190 crewmen busy fishing, day and night. The crews hail from Florida, North and South Carolina and Georgia. Three of the boats are his own.

Since early last year, Lambert has been riding the crest of big landings from calico scallop beds off Cape Canaveral. His \$3 million processing plant at the Cape runs three complete sets of patented machines, designed and constructed in Lambert's own machine shop. If the Florida beds give out, Lambert's confident he'll find scallops elsewhere. Two mobile processing plants, built into tractor-trailer trucks, are ready to roll anywhere scallops are being landed.

From the first, Lambert saw that machines could make scalloping pay. He began with a small plant on the waterfront on Bogue Banks, tinkering with his equipment and hiring some old friends. Later he built newer, better machines into a plant near Cape Carteret. He operated two years there, until the calico beds off North Carolina quit producing, and he left to set up shop in Florida. The North Carolina plant now takes the overload his Florida plants can't handle.

During a string of years when scalloping was off-and-on, others in the industry swung toward different quarry. Lambert kept chasing his scallops, paying bounties to East Coast fishermen willing to tip him off to new scallop beds.

"In the last eight years, I've only been out of scallops two months," he says. "I've kept looking for them, and I've found scallops where there wasn't supposed to be any."

When he found the scallops, his new-fangled gear could turn them out in a hurry. Before Lambert, unshucked scallops were hand-shoveled from the decks of fishing boats into bushel baskets, then winched slowly toward the dock. Lambert borrowed a crane-like tool from the pulpwood industry, fitted it with a scoop, and could soon make

Illustration by Neil Caudle



Bill Lambert

fast work of a loaded boat.

"I took that cherry-picker right out of the woods and adapted it for scallops," he says. "Now, you can unload in one hour what it took ten people to do in six or eight."

It was such efficiency, he says, that turned the scallop fishery around. Scalloping, once a sideline people took up when shrimping was down, became a year-round industry.

"In nineteen-seventy-three, this industry was worth sixteen-hundred dollars," Lambert says. "Last year it was worth around forty million."

His share of that figure? "Up until a year ago, we were probably about seventy percent of the American market," he says. "Now that all these new people are in it, we're probably not over thirty-five or forty percent."

But Lambert hasn't made all that money without also making enemies. Some accuse him of pushing the limits of legality, and rumors surface regularly that Bill Lambert is "being run out" of one place or another. North Carolina fishermen who don't work for Lambert complain that he has deliberately locked them out of prime docking space at Cape Canaveral. Floridians aren't happy

about the fact that Lambert's work force is mostly imported from the North Carolina pulpwood industry—some of Lambert's key people have been with him 25 years. And, competitors claim Lambert has been manipulating the market—flooding it with low-priced scallops to drive out rivals, then holding frozen scallops off the market to wait for higher prices. At least one new processing plant, owned by a Japanese firm, failed when it stood in against him.

"They lost over a million dollars and went bankrupt," Lambert says. "This is one time we outdid the Japanese."

He does have thousands of gallons of scallops waiting in the deepfreeze, but Lambert denies that he is out to force competition from the marketplace. "Really what I've done is open things up," he says. "Eight years ago, it was hard to sell a calico scallop because you couldn't supply them through the year. I've worked through several dry spells to keep them on the market, and I'm the only man who's stuck with it through the years, good times and bad. Now, I can take one machine and support a dozen boats a-catching. There are new processing plants all the time, where there used to be just a few. So how can you say I'm locking people out?"

Lambert blames political opposition to his operations for the legal troubles he's been having with the U. S. Army Corps of Engineers. At issue is Lambert's practice of piling empty scallop shells into hills around his plants. Others have done the same, but Lambert's plants have for years run into trouble over the question of waste disposal. Even in North Carolina, the issue helped nudge him off the waterfront and inland to the Cape Carteret site. There, he installed a machine to process wastewater as it left the plant.

In Florida, the Corps has determined that Lambert's shells are jeopardizing wetlands. Lambert says they don't, and the fight has taken him through a series of court battles.

Three times, judges have found in Lambert's favor, and each time the decision has been appealed.

"Every time they appeal it that way it costs me about fifty thousand dollars," Lambert says. "I've spent a quarter-of-a-million dollars on this fight."

Lambert takes umbrage at all this heat from the government, not only for business reasons, but be-

Continued on next page

cause he believes himself to be squarely on the side of the American Dream. He spurns imports and refuses to drive a Japanese car.

"I guarantee you we have cut scallop imports in half, and we're producing the best scallop in the world," he says. "Any time somebody can affect world markets, and help decrease the trade deficit, I'd say he's doing a little good for his country."

But however much he might like some regulations off his back, Lambert is at the same time looking for more government involvement in the scallop fishery. He wants the South Atlantic Fisheries Management Council to find a way to prevent a re-run of last year's problems with parasites and wasted juvenile scallops. And, he wants to see more university research into the calico scallop's behavior. He credits Steve Otwell, a Florida Sea Grant seafood specialist trained at NCSU, with helping steer fishermen out of parasite-infested

calico beds.

Nematodes did turn up last year in one of the shipments to Lambert's North Carolina plant. The staff then buried several hundred gallons of the affected shellfish, and Lambert's boats moved to new grounds.

"There for a while, it looked like the industry was trying to kill itself," he says. "Then the Florida Department of Agriculture and the Food and Drug Administration stepped in. I'm glad they did."

Now that he's conquered pulpwood and scallops, is he ready to move on? Lambert won't offer his competitors much hope.

"I expect to be here a while yet," he says. "I've been the biggest scallop producer in the world and I reckon I still am. When a challenger comes along, he's got a fight on his hands."

—Neil Caudle

Recipes

If the price of scallops has kept them off your shopping list, try stretching them with fish flakes. The NCSU Seafood Lab and the Carteret County Nutrition Leaders have tested several new recipes using scallops and flaked finfish. (To learn how to make and use fish flakes, write for Sea Grant's brochure, "Fish Flakes: Seafood Stretchers." Ask for publication UNC-SG-79-01.)

Joyce Taylor, research technician at the lab, says the following recipes scored very high marks with the taste-test panel:

Scallop Cakes/Stuffed Scallops

1 cup minced scallops	1 small onion, minced
1 cup fish flakes	¼ lb. margarine, melted
2 cups bread crumbs	½ tsp. parsley
2 eggs	Pepper to taste
3 Tb. mayonnaise	Salt to taste
2 Tb. Worcestershire sauce	½-¾ cup fish broth
Juice of ½ lemon with scraping of rind	Paprika

Mix bread crumbs, eggs, mayonnaise, Worcestershire sauce, onion, lemon juice, margarine, parsley, salt and pepper. Add scallops and fish flakes to mixture. Use fish broth to adjust consistency. Shape into cakes and sprinkle with paprika. Bake in moderate oven, 350°F, for 20-30 minutes or until slightly browned.

Mixture may be stuffed into boiled and cleaned scallop shells and baked, as well as being made into cakes.

(Alternate cooking method for cakes: Place in skillet containing about ½ inch of fat, hot but not smoking. Fry at moderate heat. When brown on one side, turn and brown on other. Cooking time approximately six to eight minutes. Drain.)

Scallops Baked in Shells

1 lb. scallops	¼ tsp. sugar
1 lb. fish flakes	2 cups cracker crumbs
¼ cup margarine, melted	Small onion rings
¼ cup catsup	1 Tb. butter, melted
½ tsp. salt	Paprika
Dash pepper	

Cut scallops into ¼-inch pieces. Combine margarine, catsup, salt, pepper, sugar, crumbs, scallops and fish flakes. Place in well-greased individual shells which have been cleaned and boiled. Combine butter and onion; place on top of each stuffed scallop. Bake in moderate oven, 350°F, for 25-30 minutes or until brown. Garnish with paprika.

Deviled Scallops

2 cups scallops	2 tsp. Worcestershire sauce
2 cups fish flakes	2 tsp. lemon juice
½ cup butter	6 drops Tabasco sauce
1 Tb. prepared mustard	Saltine crackers
1 tsp. salt	¼ cup cracker crumbs

Chop scallops and heat. Drain off liquid. Mix scallops with fish flakes and put in baking dish. Beat softened butter, creaming in mustard, salt, Tabasco and Worcestershire sauce. Add to scallop-fish flake mixture. Cover with layer of crackers, then sprinkle with cracker crumbs. Bake in moderate oven, 350°F, for 20-30 minutes or until browned.

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).



Aquaculture, once the province of science and business, is now finding its way into backyard gardens and greenhouses. People are learning to "farm" fish as a hobby, as a source of food, and for extra income.

That's why more than 40 aquaculture enthusiasts from across the country gathered this March near Waynesville, in the North Carolina mountains, for four days of instruction in fish-farming techniques. The course was sponsored by Haywood Technical Institute, and was prompted by the success of trout farms in the area.

Johnny Foster, from Sea Grant's Aquaculture Demonstration Project in Aurora, told the group about Sea Grant research work with rainbow trout, striped bass hybrids and tilapia, an African food fish well-suited to culture. He also offered advice about equipment, feeding and water-quality management on fish farms.

Foster taught the course along with Steven Van Gorder, a biologist from Rodale Research in Emmaus, Pennsylvania. Van Gorder outlined Rodale's design for using vinyl-lined wading pools and a biofiltration system to raise large quantities of fish on prepared feeds. Van Gorder emphasized the simplicity of the design, which he said could be built for under \$600.

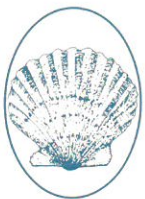
Want to know more? Watch for the May issue of *Coastwatch*, which will include several stories on aquaculture. Or, contact Foster at the NCSU Aquaculture Demonstration Project, Rt. 2, Box 305, Aurora, N. C. 27806.



The word was out. UNC Sea Grant was sponsoring its second annual Workboat Expo in Morehead City, March 13 and 14, and everyone was invited. Around 4000 people attended the two-day event, which drew over 50 exhibitors showing boats (less than 25 feet), winches, nets, reels, outboard motors, diesel engines, radios, electronics and more.

Besides things to look at, there were things to learn. Seminars held both days—taught those who were interested about peeler crabs, gill netting, sail power, financing, net-mending, eel-fishing, fiberglass repair, marine insurance and more. Collington crabber Murray Bridges drew such a crowd to his peeler-crab seminar that some folks had to settle for listening outside the door.

The expo was organized by the Sea Grant Marine Advisory Services staff, with some help from the N. C. Agricultural Extension Service. Bob Hines, Larry Giardina and Penney Lewter, from the Sea Grant marine advisory office at Bogue Banks, handled many of the arrangements. Giardina says it was community support and hard work that made the expo a success.



Two years ago, Sea Grant initiated funds to introduce marine education into the State 4-H Program. B. J. Copeland, director of UNC Sea Grant, thought the 90,000 young people involved in this program could enhance their understanding of the land by learning more about the sea and marine resources. The result of this grant is the 4-H Marine Awareness Program which offers statewide activities and project materials on marine education.

Jayne Medlicott, who works with the program, says, "You don't have to live on the coast to get involved with

the marine awareness program or the activities." This spring, she will be introducing the program's project materials to 4-H agents across the state who will contact the leaders and clubs in their county. Subjects range from fishing and seafood to salt marsh ecology.

If you are interested in information on the program or on how to start a club in your area, contact your local county extension office or Jaynee Medlicott at the State 4-H Office. Single copies of the project materials are available free by writing to Medlicott at N.C. State 4-H Office, P. O. Box 5157, NCSU, Raleigh, N.C. 27650.

The cadet girl scout troop from Friendship, with a little help from UNC Sea Grant Director B. J. Copeland, won a trophy at the Girl Scout Expo held March 6 at the Cary Village Mall. The theme for this year's expo was water. Copeland says the troop's winning exhibit was among 40 to 50 exhibits displayed at the expo.



Two UNC Sea Grant publications have won awards in an international competition sponsored by the Society for Technical Communications (STC). *Coastwatch*, UNC Sea Grant's newsletter, won the society's highest commendation for "distinguished technical communication." *Coastwatch* is published ten times a year and has a circulation of 18,000. It is edited by Neil Caudle. Kathy Hart and Cassie Griffin are staff writers.

UNC Sea Grant's two-year report, *Sea Grant in North Carolina, 1979-1980*, won the society's second-highest award for "excellence." The 32-page report was written by Neil Caudle and designed by Mary Margaret Wade.

The two awards will be made during the 29th International Technical Communications Conference, to be held May 6 in Boston, Massachusetts. Both

Continued on next page

publications qualified for the international competition by first winning similar awards in regional competition conducted by the STC's Carolinas Chapter. Seven other UNC Sea Grant publications won awards at the regional level.

The Society of Wetland Scientists will hold its Third Annual Conference May 17-19 at Wrightsville Beach. The agenda includes field trips to marshes and pocosins, a technical-paper session, a poster session and a banquet. For more information on the conference, contact Bill Adams, secretary, P. O. Box 296, Wilmington, N.C. 28402.



Coastal North Carolina is a wreck-diver's paradise. Hundreds of shipwrecks, from blockade runners to modern trawlers, found in this "Graveyard of the Atlantic" make this area one of the most exciting dive spots on the East Coast. Some of the most popular shipwrecks are listed in Sea Grant's *Wreck Diving in North Carolina*.

Wreck Diving, written by Dennis Regan and Virginia Worthington, identifies and describes 43 of North Carolina's undersea shipwrecks. In addition, this 16-page booklet includes safety tips, a bibliography and a list of

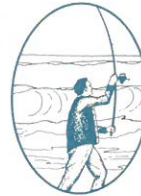
nearby decompression facilities. To obtain a copy of this free publication, write UNC Sea Grant, Box 5001, Raleigh, N.C. 27650. Ask for publication number UNC-SG-78-13.

With spring comes an urge to explore the outdoors. And what better place to explore than a coastal salt marsh or estuary?

Among the things you can see during a salt-marsh excursion are the special plants that grow there—plants that can stand up to changes in tides and salinity, and to wind and wave action. To deal with their environment, salt marsh plants have special built-in features. The waxy leaves of the yaupon resist salt damage and retain moisture, while the leaves of the marsh pennywort rotate to avoid the sun's hottest rays.

Many of these plants were used for household aides, food and drink in the homes of the colonial settlers who lived in the coastal zone. Blackrush needles were cut for sewing needles, marsh mallow thickened soups and stews, and yaupon was brewed for tea.

If you would like to learn more about marsh plants, and have a guide to their identification, then write UNC Sea Grant. Ask for "A Guide to Salt Marsh Plants Common to North Carolina" (UNC-SG-81-04), written by Elizabeth Jean Wilson of the Hampton Mariners Museum. The cost is \$1.50.



Spring is the time of year sportsfishermen drag their gear out of storage and start making plans for weekend fishing trips. But unless the gear was stored properly after last season, they may be in for a big disappointment. Rods, reels and tackle need regular cleaning and maintenance to give first-rate results.

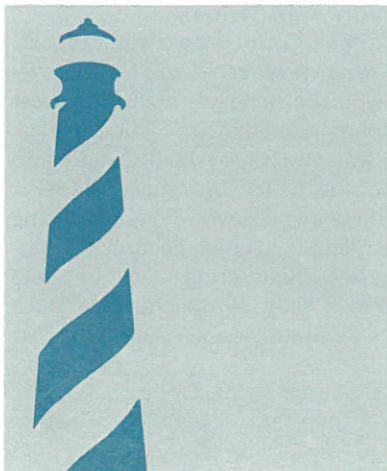
Sportsfishing Gear Maintenance, a Sea Grant Blueprint, gives tips on protecting and storing fishing gear. Special instructions for protection against saltwater corrosion are also included. For a copy of this free leaflet, ask for publication number UNC-SG-BP-81-1.

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