UNC Sea Grant

March 1989

COAST WATCH

Netmaking

Photo by J. Foster Scott

A Stitch in Time

BY KATHY HART

Almost without thinking, Neal Harvey whips his needle in and out of the webbing. His nimble fingers tie knot after knot in a time-honored craft that is as synonymous with fishing in coastal North Carolina as the fish themselves.

Harvey is a netmaker.

He slipped into the profession. He used to fish and mend nets, his own and others, on the side. But he decided to combine his knowledge of how nets fished with how nets were made.

He and his son set up business and hung a sign proclaiming their profession outside an old building in Davis.

But Harvey joined a profession, what many consider a craft, that is on the wane.

Many older fishermen know how to construct, or hang, their own nets. And any good fisherman knows how to repair a net, says Sea Grant agent Jim Bahen.

But many of today's year-round fishermen are too busy to make their own. Instead, they turn to a skilled, professional netmaker to hang the most valuable piece of equipment on their boats.

In Brunswick County that means fishermen often turn to Steve and Sabrina Parrish, owners of a net shop in Varnamtown.

The Parrishes began making nets with the help of Sabrina's grandfather, Crawford Fulford, and Steve's uncle, who taught the couple about meshes, floats, chains and, most importantly, net designs. Steve designs and cuts the nets; Sabrina sews them and runs the business.

"I helped Granddaddy do the chafers and thread the needles when I was young," Sabrina says. "I guess you could say netmaking was in my blood."

Neal Harvey

Photos by Scott Taylor

Fulford hung nets for over 60 years. He kept notebooks scrawled with descriptions and drawings of each net he made.

"When Granddaddy stopped making nets, he asked his customers to use us," Sabrina says. "If we were making a net for one of the customers he recommended, he would come over here and count the meshes to make sure it was right before we sold it."

Sabrina says when her grandfather began hanging nets, the mesh and roping were made of cotton or other natural fibers. To make them sturdy and long-lasting, the nets were dipped in tar.

By then, machines wove the cotton webbing. But prior to mechanization, fibers were spun into twine and the twine was knotted into webbing. It was a long and tedious process, but one fishermen used for centuries.

Before motor power, Tar Heel fishermen used gill nets, pound nets, fyke nets and seines that were either staked in the water or dragged by hand.

Watermen in the Northeast had pulled the funnel-shaped trawls behind sail-powered boats. But trawls didn't gain wide acceptance until the advent of motor power at the turn of the century.

As transportation improved and refrigeration became prevalent, fishermen began targeting more species of fish. And to catch the different species, nets became more specialized. Netmakers varied the size, shape and webbing in their nets to catch different fish.

Even today, netmakers continue to modify their nets, says Harvey.

"Netmaking is an everlearning process," Harvey says. "The bigger boats that go up North bring back new net designs, and every four or five years shrimp nets are redesigned."

Harvey says netmakers learn about new net designs from publications such as *National Fisherman* or by word-of-mouth.

"You can bet if one fisherman sees another fisherman bringing in more boxes of fish he's going to find out what kind of net that fisher-

man is using," Harvey says.

And even the same type of net will vary from netmaker to netmaker. For example, the Parrishes' mongoose will be slightly different from Harvey's.

"Mine may be cut a little different," Harvey says. "Or I may add a little extra to the wing or the belly.

"Netmaking is like sewing. If you change the length of the sleeve, you change the look of a shirt," he says. "If you change a net by one or two meshes, you change the way everything fits together and how the net catches."

And nets aren't just tailored to differentiate between species of fish and shellfish. Shrimp nets can actually be cut and hung to distinguish between pink, white and brown shrimp.

"Brown and pink shrimp are caught more along the bottom," Steve says. "White shrimp are caught in the water column. We design the nets to take care of those differences."

Besides species information, netmakers must also know other basic facts before they design a net. They need to ask about the size of the boat, the horsepower of the engine, whether or not the boat is equipped with a winch, where a fisherman intends to fish and whether the fisherman is a full-timer or part-timer. Each factor affects the design, Steve says.

And nets vary from region to region in North Carolina not only because of species differences, but because of bottom conditions and water clarity. As a result, a net that catches well in Brunswick County waters may not catch well at Sneads Ferry, Beaufort or Hatteras.

With so much to consider, it takes a smart netmaker to build today's more sophisticated nets, Bahen says. Netmakers have to be willing to experiment with net designs and materials.

And like designs, net materials change. Almost everything used to make today's net is synthetic.

Webbing is made of nylon, polyethylene or polypropylene and imported from Taiwan, Hong Kong or Korea. Sabrina says she must order and pay for her webbing as much as a year in advance. And this can create problems if special needs arise.

For instance, last year a brown algae appeared in Southeastern coastal waters that clogged nylon shrimp nets. But the same trawls made of polypropylene didn't snag the algae. As fishermen learned about the change, demand for the polypropylene exceeded supply.

The Parrishes quickly sold out of the material with no hope of getting new supplies from the Far East.

The roping used for towlines, leadlines and floatlines is also synthetic and sometimes reinforced with steel. All corks or floats are Styrofoam or plastic.

All this synthetic material adds up to a more durable net that requires less maintenance.

Even the netmakers who hang gill nets or small shrimp nets in the backyards of Harkers Island and Hatteras use synthetic webbing. The netmakers who comprise this small cottage industry are usually women or retired part-time fishermen.

These folks hang small nets for relatives who fish or for larger net shops. And often they do repair work.

They stretch the webbing between two trees, stakes or sometimes the front porch posts to sew on leads or floats or mend holes. Netmakers hang these traditional nets just the way their fathers and grandfathers did.

And there will continue to be a need for this cottage industry and its craftsmen as long as fishermen continue to set gill nets or pound nets. But for larger, more sophisticated nets, commercial fishermen turn to full-time netmakers such as Harvey or the Parrishes.

When it comes time for a fisherman to choose a netmaker, it's what is not said that counts, netmakers say.

"Fishermen don't brag on you," Steve says, "because they don't want others to know their secrets."

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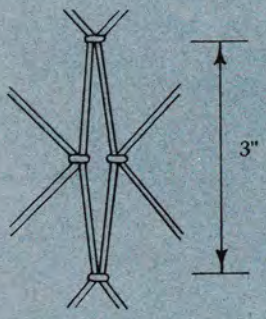
Dennis Harvey

Netting Knowledge

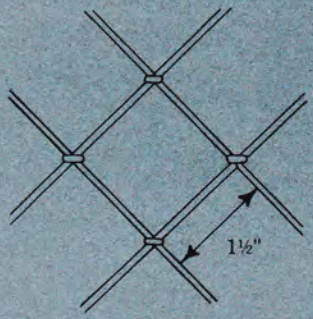
BY KATHY HART

Like any craft, the art of netmaking has its own unique terminology. Here are a few of the words, phrases and types of nets that pepper a netmaker's language.

Mesh—Netmakers and fishermen often measure their nets in meshes (sometimes pronounced "marshes"). Meshes refer to the size of the diamond-shaped hole in the webbing. A net with large meshes will hold only big fish. To catch smaller fish, a smaller mesh is needed. The N.C. Division of Marine Fisheries sets mesh size limits for nets so that fishermen don't catch too many young fish or non-targeted species.



stretch mesh



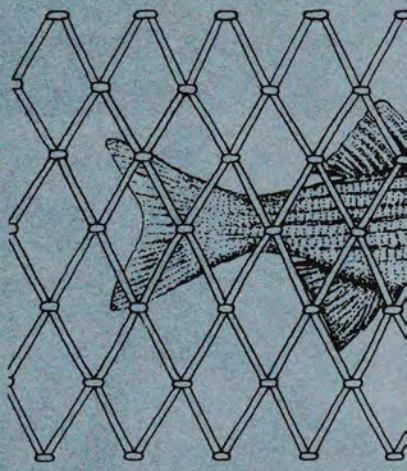
bar mesh

Fishermen speak of mesh sizes as bar mesh or stretched mesh. Bar mesh is measured along a strand from one knot to the next. Stretch mesh size is the distance between two opposite knots.

Doors—"Otter" doors, or trawl doors, are door-like structures that spread the mouth of the net and keep it open while the net is being towed. Doors are configured according to the species being caught and may be wooden or metal.

Floats—Along the top line of a net, corks made of plastic are attached at intervals to give a net buoyancy.

Leads—Along the bottom line of net, pieces of lead or chain are attached to weight the net down and spread it.



Gill nets—To catch striped bass, mullet, trout, croaker and flounder, fishermen often set gill nets in the state's shallow estuaries. These nets have openings large enough to allow a fish's head to pass, but not its body. When the fish tries to back out of the webbing, it is caught behind the gills.

A Stitch in Time

continued

In fact, some fishermen are almost superstitious about their netmaker.

"My son has a reputation for clam nets," Harvey says. "When fishermen bring their clam nets in, they tell me not to touch them. They only want him fooling with their nets."

But if a fisherman is dissatisfied with his net, others will hear about it, Harvey says.

"If fishermen aren't catching anything, they always blame it on the net," Harvey says. "You'll hear them talking about it on the VHF radio while they're out fishing. It could be that there's something wrong with the trawl doors or the length of the towlines. But they'll blame it on the net every time."

Steve emphasizes that fishermen shouldn't place all the burden for a net's performance on the netmaker.

"Today's nets make it easier for inexperienced fishermen to catch fish," Steve says. "But a good fisherman has to know his gear. He has to know how to fine-tune it, and he has to be willing to learn through trial-and-error."

But regardless of fishermen's complaints, netmakers stand behind their nets. "If you do good quality work, it will speak for itself," Harvey says.

Gill nets, which are several feet deep and more than 20 feet long, can be anchored at various points (stake gill net),

staked only at the ends (an anchor gill net or sink net) or allowed to float (floating gill net).

Pound nets—Pound nets are intricate nets that have a leader, heart and trap. The leader is a long expanse of webbing that extends to the shore. It bars fish from swimming downstream and directs them toward the heart. It is this heart-shaped funnel that channels fish into the trap. The trap is a webbed box with no top. It offers no means of escape for the shad, herring or flounder that swim into its midst.

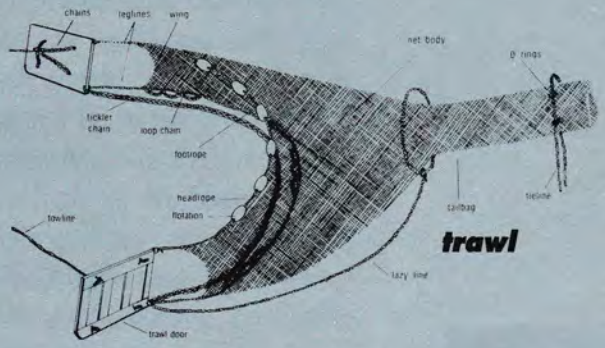
Fyke nets—Like pound nets, fyke nets are traps. They are set in channels where water flow is strong. A fyke net is a hooped net with wings and sometimes a leader to funnel fish to the entrance.

Seines—To encircle schools of finfish, fishermen use seines. A circle of netting is pulled tighter and tighter until the catch can be concentrated and scooped out. Seines have a small mesh that trap rather than gill fish. They can be set in a semi-circle against a beach or bank (a beach seine). Or, in deeper waters, two boats can be used to encircle a school of fish (long-haul seine). If the bottom of the seine is closed, or pursed, the net is a purse seine.

Seines are used to capture menhaden, river herring, flounder, spot, croaker, gray trout and striped bass.

Trawls—A trawl is a flattened, V-shaped net that is pulled behind a boat. Fish and shellfish are swept into the wide mouth of the net and accumulate in the tailbag.

Fishermen may tow from one to four trawls behind their vessels. Periodically, the trawl is winched aboard the boat to empty the catch. Trawls can be rigged to catch shrimp, crabs, scallops, flounder, spot, croaker and squid.



Designing a Better Excluder

BY KATHY HART

Varnamtown netmaker Steve Parrish called Sea Grant agent Jim Bahen with an idea.

He'd been giving this TED contraption some thought. Now TEDs, short for turtle excluder devices, had been designed by the National Marine Fisheries Service to let endangered sea turtles out of shrimp nets.

The 2½- by 4-foot PVC frame excluders worked. But the problem was fishermen didn't like them.

They were cumbersome and kind of expensive, grumbled fishermen. But most of all, they were worried that anything that put a hole in a net big enough to let out a 500-pound turtle would let out shrimp, too.

Parrish understood their concerns, and he had some ideas and designs of his own. He called Bahen, who had been putting the word out about TEDs at the local docks, to see what he thought.

Bahen added a few ideas of his own. Then, several sketches and a few yards of mesh later,

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A Better Excluder

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Parrish had a new TED—the Parrish soft TED.

"There were other soft TEDs out there," Parrish says. "But we were the first to make one that pushed the turtle out the bottom of the net."

The Parrish TED is made of 8-inch stretch webbing. It is sewn in the net between the main body and the tailbag. The webbing deflects turtles downward through a 40-inch hole in the bottom of the net. The opening is held rigid by a rectangular bar and closed with an elastic cord.

Pressure from a large object such as a turtle will cause the opening to gap and allow the turtle to escape.

But some folks had their doubts.

"People told us it couldn't be done," Bahen says. "They questioned whether a soft TED would really exclude turtles. And others said our version would let out too many shrimp."

A test in North Carolina waters proved that nets equipped with the Parrish TED still caught plenty of shrimp. And a rigorous NMFS test in turtle-infested waters near Cape Canaveral proved the device excluded the large reptiles.

After the Canaveral test in October 1987, the Parrish TED seemed destined for federal certification.

But fishermen weren't always appreciative of Parrish's efforts. To some, it looked like Parrish was siding with the enemy.

"Fishermen think that we (netmakers) like TEDs because we can make more money off them," Parrish says. "I don't like TEDs any more or less than they do. I just wanted to design something that was easier and cheaper for the fishermen to use."

After the Florida test runs, Parrish waited for federal approval of his design and hoped it would receive a favorable nod before the May 1, 1988, deadline for mandatory TED use in North Carolina. But a maze of bureaucratic paperwork slowed the certification process.

Steve Parrish

Meanwhile, Louisiana fishermen, who were required to TED-up earlier than their Southeastern counterparts, took the issue to court in early 1988.

As the case was arbitrated, the mandatory use of TEDs was put on hold and so was the certification of the Parrish TED.

Finally, one year after it passed federal tests, the Parrish TED was approved. Its design specification and the regulations governing its use appeared in the Federal Register in October.

And after an appeals court ruled in favor of the federal government's right to require TEDs, the excluders are again slated for use this year.

But Bahen has his doubts. Rumblings among fishermen's groups in Louisiana and Texas have it that another suit will be filed.

As fishermen stall, Parrish and Bahen work to modify their design. Using a grant from NMFS, the pair will team up again in March to test various TED designs in a flume tank at the U.S. Navy Testing Facility in Bethesda, Md.

In preparation, Parrish has made a trawl net one-fourth the size of a usual net. In it, he will inset small TED replicas to test. A mock turtle also will be used to see how the TEDs expel the reptiles.

"In the flume tank, we'll see how the trawl and TED actually react under water," Parrish says. "We'll be looking at how different things affect the TEDs."

The data Parrish and Bahen gather will be fed into a computer model for final analysis and comparison. A scientist from the Massachusetts Institute of Technology will assist the duo with the computer analysis.

While Parrish looks toward future designs, he still must think about today's TED demands. Many Tar Heel shrimpers haven't bought a single excluder, hoping that litigation may prevent them from ever having to own one. But Bahen believes sooner or later both shrimpers and Parrish will have to TED-up.

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.

In the fall of 1987, clams were bringing record prices at the seafood dealer. And that got folks thinking about culturing the valuable mollusks.

So in February 1988, Sea Grant sponsored a workshop to teach fishermen how to handle young "seed" clams and how to rear the older clams in beds, or gardens.

More than 200 people attended the workshop. And so far, at least six prospective growers have purchased seed clams to begin culture operations. And many more folks are interested in setting up operations. Sea Grant marine agent Skip Kemp gets an average of 10 inquiries a week about raising clams.

Sea Grant Director B.J. Copeland estimates the new growers could contribute as much as $100,000 to the state's economy. And the N.C. General Assembly appropriated $90,000 to test the feasibility of double-cropping scallops with hard clams.

New Yorkers are dining on farm-raised hybrid striped bass from the Tar Heel state. The hybrid is a cross between a striped bass and a white bass. And for the past two years, Lee Brothers has been raising the fish on his Beaufort County farm.

Brothers is the first aquaculturist in North Carolina to produce a commercial crop of the fish and the first in the country to produce hybrids raised in ponds.

Brothers' harvest represents the success of a 10-year Sea Grant research effort that proved the commercial culture of the hybrid was feasible.

Ron Hodson, Sea Grant's associate director and coordinator of the program's aquaculture research, expects the hybrid to become a big cash crop for North Carolina.

Sea Grant's research on the hybrid began when wild populations of the savory striped bass dwindled. Scientists tried to raise the striper in captivity, but that proved difficult. Then they figured out how to cross the striper with a white bass. The result was a hardy hybrid.

At first, the hybrid was only stocked in recreational ponds and lakes. But Sea Grant researchers proved the hybrid could be farm-raised, like catfish.

Brothers put the hybrid to its toughest test. And in November, he began harvesting fish for market. They average 1½ pounds. So far, he has marketed his crop in New York where the fish are being served primarily in upscale restaurants.

Hodson believes that Brothers' operation is just what the state's fledgling aquaculture industry needs. A successful harvest will encourage others to try fish farming.

For more information on aquaculture, contact Hodson at Sea Grant, Box 8605, NCSU, Raleigh, N.C. 27695-8605.

When it comes to the test of taste, the hybrid striped bass is getting rave reviews. Sea Grant seafood education specialist Joyce Taylor performed a series of taste tests with an informal consumer panel. She treated the panel to such delicacies as poached bass with caper sauce and barbecued bass.

And the hybrid scored well. In fact, the taste panel preferred the pond-raised fish over the wild striper in most of the recipes.

The panelists scored the hybrids higher on freshness, flavor and firm texture.

But those high scores could be attributed to the hybrid's freshness. The wild stripers had been on ice for several days before use.

The pond-raised hybrids also fared well in the lab. Sea Grant seafood extension specialist David Green and NCSU food scientist Leon Boyd evaluated the hybrid's composition.

They found that wild stripers were meatier than the hybrid, but the hybrids were leaner. And they found that the pond-raised hybrids were higher in the more desirable polyunsaturated fats.

For more information about the lab tests on the hybrid striped bass, call David Green at 919/726-7341.

Just a reminder: Proposals for Sea Grant's 1990-1991 funding period are due April 14. If you're a researcher and would like to submit a proposal, call the Sea Grant office in Raleigh.

Commercial and recreational fishermen seek out the Gulf Stream and its eddies because of the fish that travel its path. But finding this meandering corridor of water isn't always easy.

So Sea Grant agent Jim Bahen came up with a program that may make your fishing trips more fruitful.

The Gulf Stream Information Program provides fishermen with up-to-date readings on the Gulf Stream. Subscribers receive weekly charts that plot its width, average speed and path.

The charts are relayed from the National Weather Service's National Environmental Satellite Service each Wednesday morning. By noon, Bahen has shipped copies of the chart to his more than 200 subscribers, and they have the information in time for their weekend fishing trips.

To cover the cost of handling and

Continued on next page

postage, Sea Grant charges fishermen a nominal fee to subscribe to the program. For a six-month subscription from March to October, the cost is $8. A year's subscription is $15.

If you'd like to subscribe to the Gulf Stream Information Program, send a check payable to UNC Sea Grant to Jim Bahen, N.C. Aquarium/Fort Fisher, P.O. Box 130, Kure Beach, N.C. 28449. For more information on the program, call Bahen at 919/458-5498.

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Browsing the Sea Grant Bookshelves

It's springtime, and warmer weather signals the beginning of the tourist migration to the Carolina coast.

If you're one of those folks, shop around Sea Grant's bookshelves before you head to the shore. This month, we're featuring a few of our most popular publications of the season.

To order, write Sea Grant, Box 8605, NCSU, Raleigh, N.C. 27695-8605. Make checks payable to UNC Sea Grant. Please indicate publication numbers.

Seashells Common to North Carolina is an illustrated guide to the state's shells. UNC-SG-72-09; 36 pages; $2.

A Guide to Soft Shell Crabbing instructs laymen on blue crab biology, identifying and handling peelers, harvesting and shedding methods, and more. UNC-SG-84-01; 32 pages; illustrated; $3.

How to Buy a Used Boat provides tips and a checklist for evaluating small recreational boats. UNC-SG-81-10; 16 pages; illustrated; $2.

A Guide to Ocean Dune Plants Common to North Carolina describes and illustrates the herbs, vines, grasses, shrubs and trees found on and near the North Carolina dunes. UNC-SG-87-01; 80 pages; $4.50.

Your Place at the Beach: A Buyer's Guide to Vacation Real Estate addresses the environmental hazards, ownership options and costs associated with coastal real estate. UNC-SG-87-04; 28 pages; illustrated; $2.50.

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