

LOAN COPY ONLY

NCU-G-73-001

c. 3

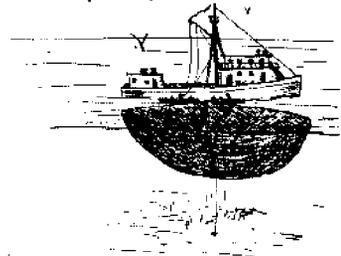
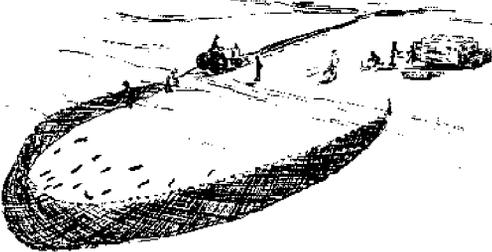
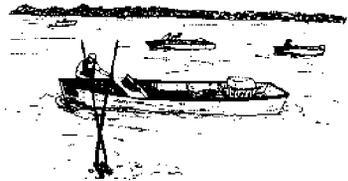
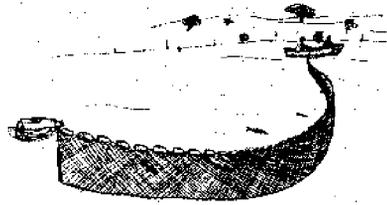
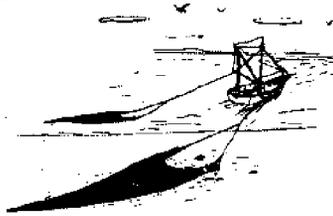
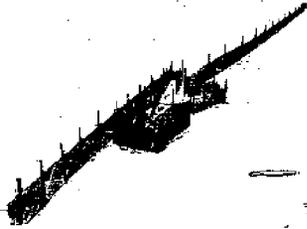
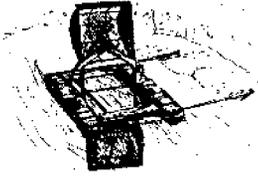


CIRCULATING COPY

Sea Grant Depository

To Catch A Million Fish

NORTH CAROLINA COMMERCIAL FISHING GEAR AND METHODS



CIRCULATING COPY
Sea Grant Depository

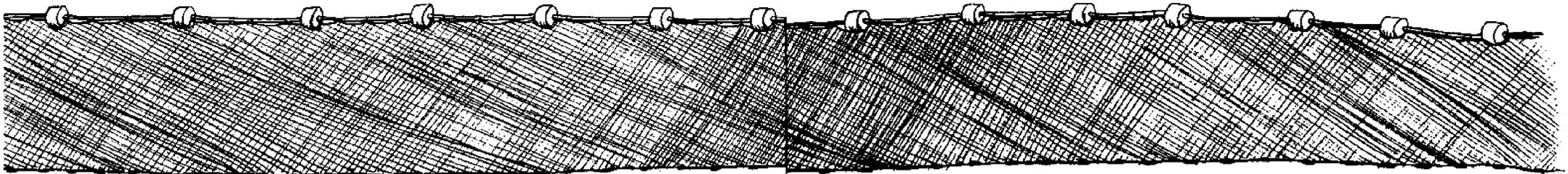
Published By
Division of Commercial and Sports Fisheries
N. C. Department of Natural and Economic Resources
1969
2nd printing 1973

By
Jim Tyler
Mike McKenzie

Illustrations
Doris King

Partial support for the publication was provided by NOAA Office of Sea Grant, U. S. Department of Commerce under Grant No. 2-35178 and the State of North Carolina, Department of Administration. The grant is administered by the Sea Grant Program, School of Public Health, University of North Carolina, Chapel Hill, N. C.

Sea Grant Publication UNC-SG-73-05.



To Catch A Million Fish

When the words COMMERCIAL FISHERMAN come up, most people probably think of a man with a net, and he is out on the water in a boat. A simple, uncomplicated, and usually picturesque scene. But this is only a part of the real picture.

Commercial fishermen along coastal North Carolina use many different sizes and shapes of nets, dredges, trawls, traps, and tongs to fish on the bottom of the ocean, on the top of the ocean, in the bottom of sounds, in deep water, in shallow water, in rivers, and off beaches. They fish from little boats, big boats, and giant boats, and sometimes they wade to gather shellfish.

From this variety of gear and effort they catch and dock approximately 200 million pounds of fish, oysters, crabs, shrimp, and scallops each year.

There is much more to catching N. C. saltwater fish for market, therefore, than meets the casual eye. This booklet can be your guide to understanding North Carolina commercial fishing gear and fishing methods.

BIG FISH, LITTLE FISH – LOOK AT THE MESH SIZE

A confusing term is MESH SIZE. If a commercial fisherman wants to catch big fish he will use a net that has large holes, or using the proper word, large meshes. With a net of large mesh he will keep big fish in his net. If he wishes to catch smaller fish, he will use a net with a smaller mesh size.

North Carolina fishermen speak of mesh sizes as bar mesh or stretched mesh. Bar mesh size is determined simply by measuring along a strand the inside distance from one knot to the next knot. To determine stretch mesh size you *stretch* an individual mesh by grasping two diagonal knots and pulling the webbing taut. The stretched mesh measurement is twice the bar mesh measurement.



Bar Mesh Measurement



Stretched Mesh Measurement

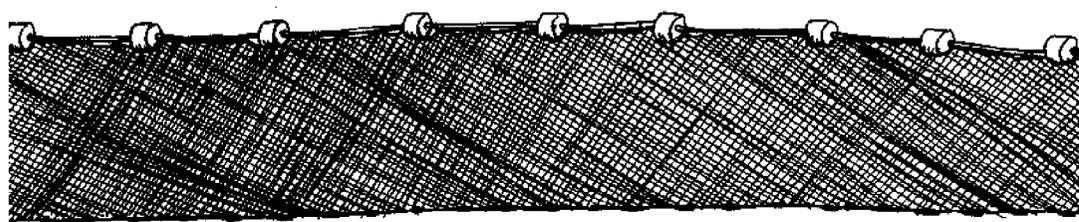
FLOATS AND LEAD HANG A NET

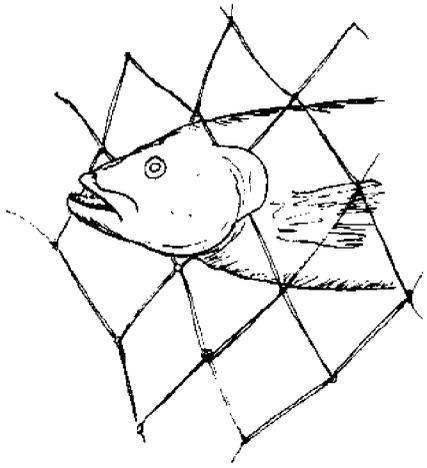
Along the top line of a net, pieces of cork, or wood, or plastic, are attached at intervals. And along the bottom line of a net, chain or pieces of lead are attached at intervals. With floats holding the top of a net up and weights pulling down, a net spreads out and hangs properly in the water.

Net depths in North Carolina are expressed in feet, yards, and fathoms, but more often in number of meshes. But net depth measurement by meshes will not give the actual fishing depth of the net. For instance, a net 120 meshes deep of three inch stretched mesh will not measure 360 inches when it is in the water because the net never hangs completely stretched out.

INDEX

GILL NETS	4	TRAWLS	11
Drift Gill Net	4	Try Net	11
Anchor Gill Net	4	Shrimp Trawl	11
Floating Gill Net	4	Fish Trawl	11
Stake Gill Net	4	Crab Trawl	11
Run-Around Gill Net	4	Scallop Trawl	11
SEINES	7	DREDGES	13
Beach Seine	7	Bay Scallop Dredge	13
Long Haul Seine	7	Oyster Dredge	13
Long Seine	7	Clam Dredge	13
Menhaden Purse Seine	7	LINES	14
Small Purse Seine	7	Longline	14
TRAPS	8	Trotline for Catfish	14
Pound Net	8	Trotline for Crab	14
Hoop Net	8	Turtle Line	14
Fyke Net	8	OTHER GEAR	15
Pots	8	Oyster and Clam Tongs	15
Crab Pot	9	Oyster and Clam Rake	15
Eel Pot	9	Channel Net	15
Fish Pot	9	Fish Wheel	15
Sea Bass Pot	9	Flounder Gig	15
		Skim Net	16





GILL NETS

A gill net *gills* fish. Swimming fish come upon a gill net set in the water and try to swim through the openings. The openings, or meshes, are large enough to allow a fish to get its head through but not its body. When the fish tries to

back out of a mesh it is usually caught behind the gill covers. The size of mesh determines the size of fish caught.

North Carolina fishermen use many methods to fish gill nets. They know which method is best to catch certain fish. A DRIFT GILL NET is set across the direction of water current and allowed to drift. It is not anchored. A fisherman in a boat periodically lifts portions of the net and checks for captured fish. An ANCHOR GILL NET, sometimes called a sink net, is anchored at both ends and only the buoys attached to both ends of the net are visible above water. In deeper water when the net doesn't touch bottom and the floats are on the surface, this set is called a FLOATING GILL NET. A STAKE GILL NET is supported at various points along the net by stakes. A RUN-AROUND GILL NET is pulled by a motor boat and closed around a school of fish; fishermen then use various methods to frighten the enclosed fish into the net.

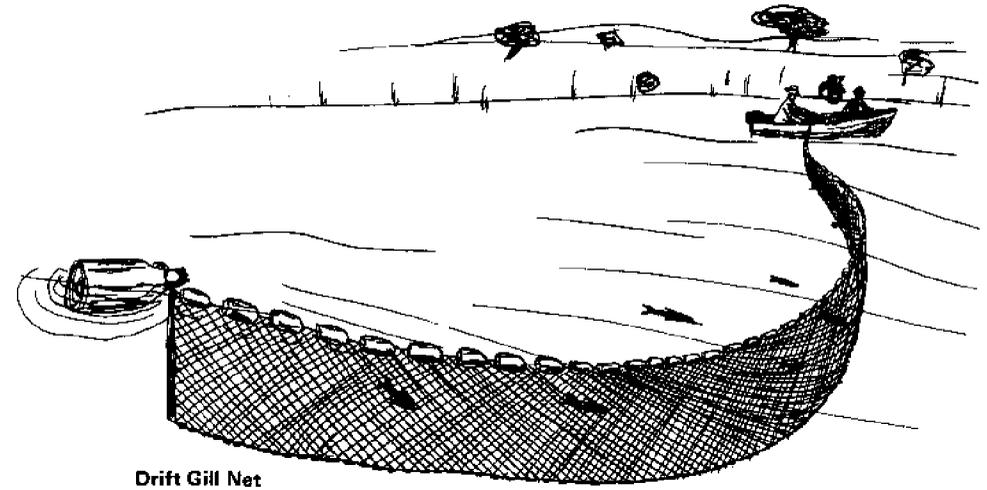
Gill net mesh size: 2½ to 5½ inch stretched mesh

Length: 50 to 1200 feet

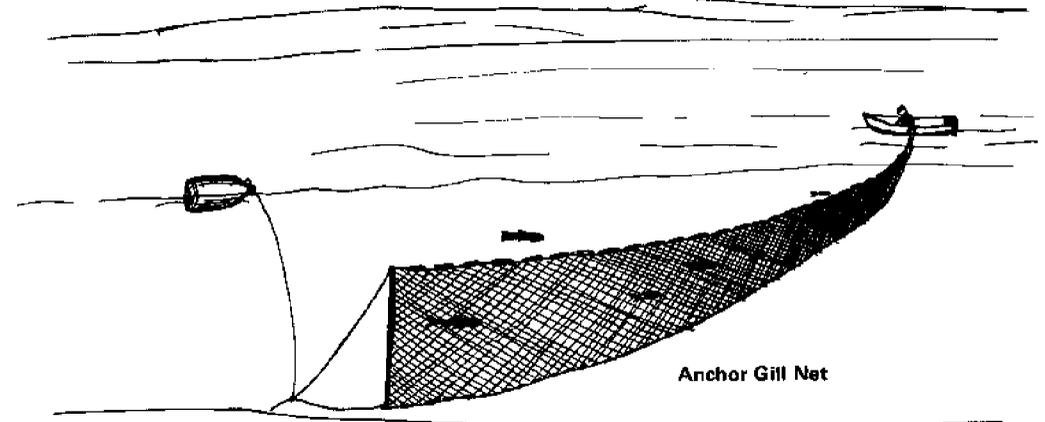
*Fish commonly caught in gill nets:

shad, *striped bass*, *sea trout*, *catfish*, herring, bluefish, hickory shad, sturgeon, croaker, flounder, jumping mullet, sea mullet, spanish mackerel, spot, white perch, yellow perch.

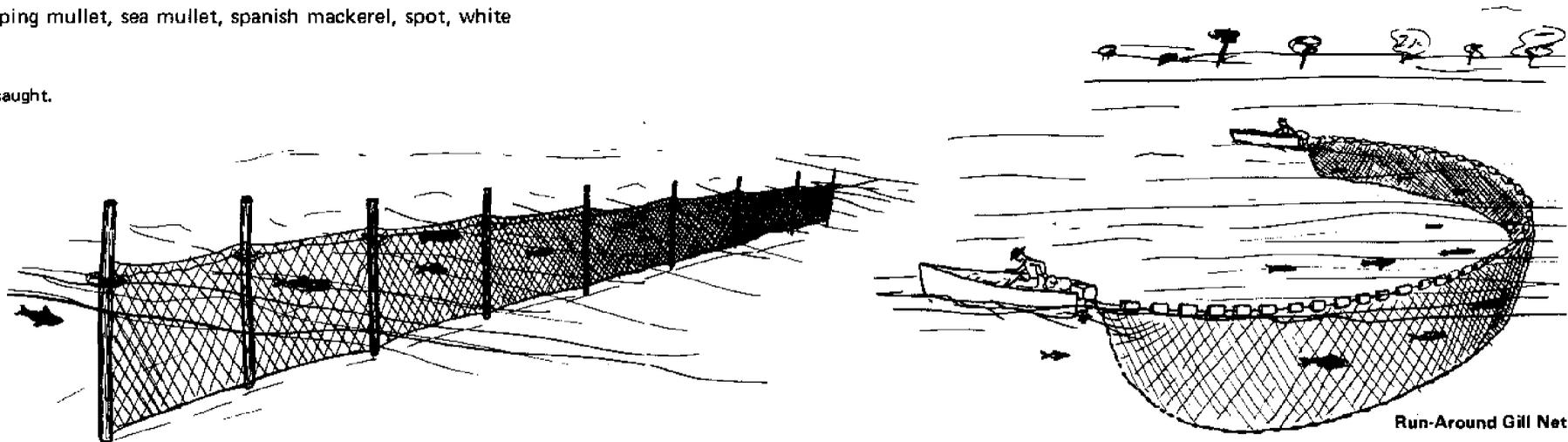
* Italicized fish are main species caught.



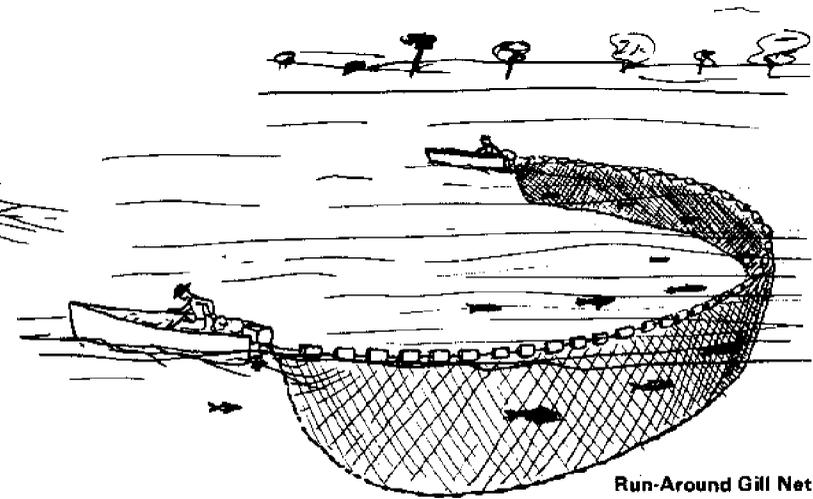
Drift Gill Net



Anchor Gill Net



Stake Gill Net



Run-Around Gill Net

SEINES

Seine nets are used to encircle fish and close all escape routes. The circle of net is pulled smaller and smaller until the trapped fish are concentrated.

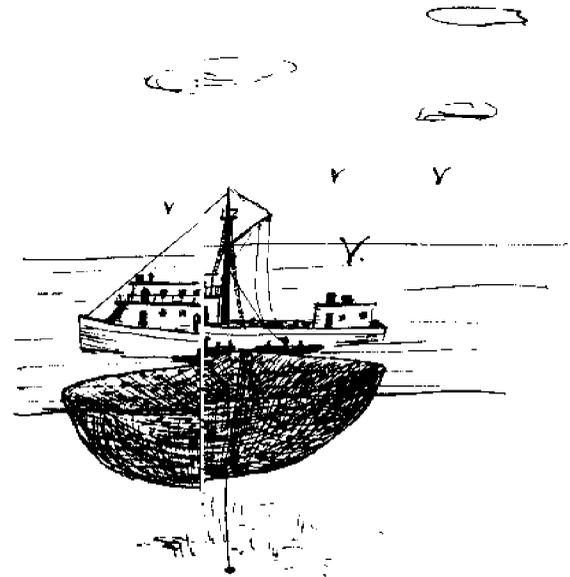
Seines have small mesh and are used to trap rather than gill fish.

A **BEACH SEINE**, or common haul seine, operation starts from a beach or a river bank. The seine is in a boat; one end of the seine is fastened to a stationary object. As the boat travels straight out from the shore and angles in an arc until it completes an elongated semi-circle, the net is *payed out* over the stern. When the boat reaches shore the unfastened net end is then attached to a power winch or a tractor and the net is pulled in and up onto the beach.



Beach Seine

A **LONG HAUL SEINE** operation starts with two boats floating side by side in the water. Each boat has half of a complete long haul seine piled on a smaller boat (skiff) tied off the stern. Fishermen connect the two halves. The boats separate and travel straight away from one another. Net is payed out from each skiff. When the net is all out, the boats turn toward the same direction and pull the seine. The two boats come together again after pulling the seine for a distance. The resulting circle of net is pulled smaller and smaller. Captured fish are removed. And the seine is set again.



Net Pursed

One end of a **LONG SEINE** is fastened to a stake while the other end, pulled by a motor boat, is swept in a circle so it will pass by the end fastened to a stake. This encircles fish within the area.

A **MENHADEN PURSE SEINE** is set from two boats, each carrying half the seine. The boats separate, pay out net, and encircle a school of fish. When the boats meet, the net is joined. The bottom of the net is closed, or pursed, by pulling a rope through rings attached on the bottom net line. This works like a string on a lady's purse. Net is pulled into the two boats until the catch is concentrated. The the carrier vessel steams up alongside and captured fish are mechanically pumped directly into the big ship. Purse seines are used to catch menhaden.

A **SMALL PURSE SEINE** is set by smaller boats and no carrier vessel is used in the fishing operation.

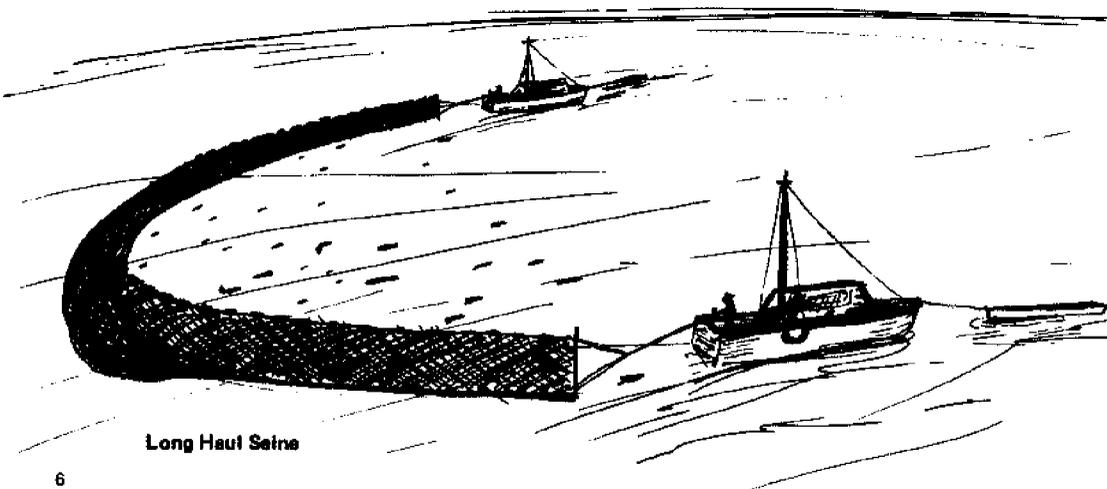
Seine net mesh size:	1 to 5 inch stretched mesh
Length:	45 to 5400 feet
Menhaden purse seine size:	1½ - 2¼ inch stretched mesh
Length:	950 to 1100 feet
Depth:	50 to 100 feet

Fish commonly caught in seines:

menhaden, herring, flounder, spot, mullet, bluefish, striped bass, sea trout, croaker, shad, sea mullet, drum, butterfish, spanish mackerel, sturgeon, pompano, pigfish, catfish, harvestfish, king mackerel, white perch.*

*Purse seines encircling menhaden usually account for more than 90% of the total seine catch.

Purse Seine Encircled



Long Haul Seine

TRAPS

Traps are placed in likely spots and their success depends on fish swimming, or crabs crawling, into an enclosed area and then finding it difficult to get back out of the trap through the small entrances.

A POUND NET has three sections: the leader, the heart, and the pound. A length of net, or leader, hanging properly in the water, extends straight out from shore and ends at the entrance to a pound, or trap, area. Fish swimming along the shore are turned by the leader toward the pound. There is an intermediate heart area between the leader and the pound. The heart serves as an additional guide to funnel fish into the trap area. There can be two to six hearts in front of one pound. Fish enter the pound through a funnel. The bottom of the pound is enclosed netting, cutting off all avenues of escape.

Several pound nets are sometimes set in a continuous row so the entire distance covered by a series of leads, hearts, and pounds may be more than a mile.

To remove their catch, fishermen maneuver their boat inside a pound, then gradually pull the side and bottom netting into their boat until the trapped fish are concentrated in a small portion of the net left in the water. The fish are then removed with hand held dip nets.

Pound net mesh size:	Pound—1¼ to 4 inch stretched mesh
	Heart—3-inch stretched mesh
	Lead—5 to 24 inch stretched mesh
Length:	Pound—20 to 50 feet
	Heart—60 to 150 feet
	Lead—150 to 1200 feet

Fish commonly caught in pound nets:

herring, shad, catfish, flounder, striped bass, white perch, butterfish, croaker, sea trout, harvestfish, spanish mackerel, sturgeon, hickory shad, carp, spot.

A HOOP NET is constructed of wooden or steel hoops covered with netting. One or more internal funnels direct fish to the inside. Once inside, fish are trapped. The net is collapsed when transported and is stretched out and anchored when set. A FYKE NET is a hoop net with wings, and sometimes a leader is attached to direct fish to the entrance.

Hoop and fyke nets may be fished with bait to entice fish to enter, or without bait. Fish are removed by lifting the back portion out of the water and loosening a rope which allows an opening in the end.

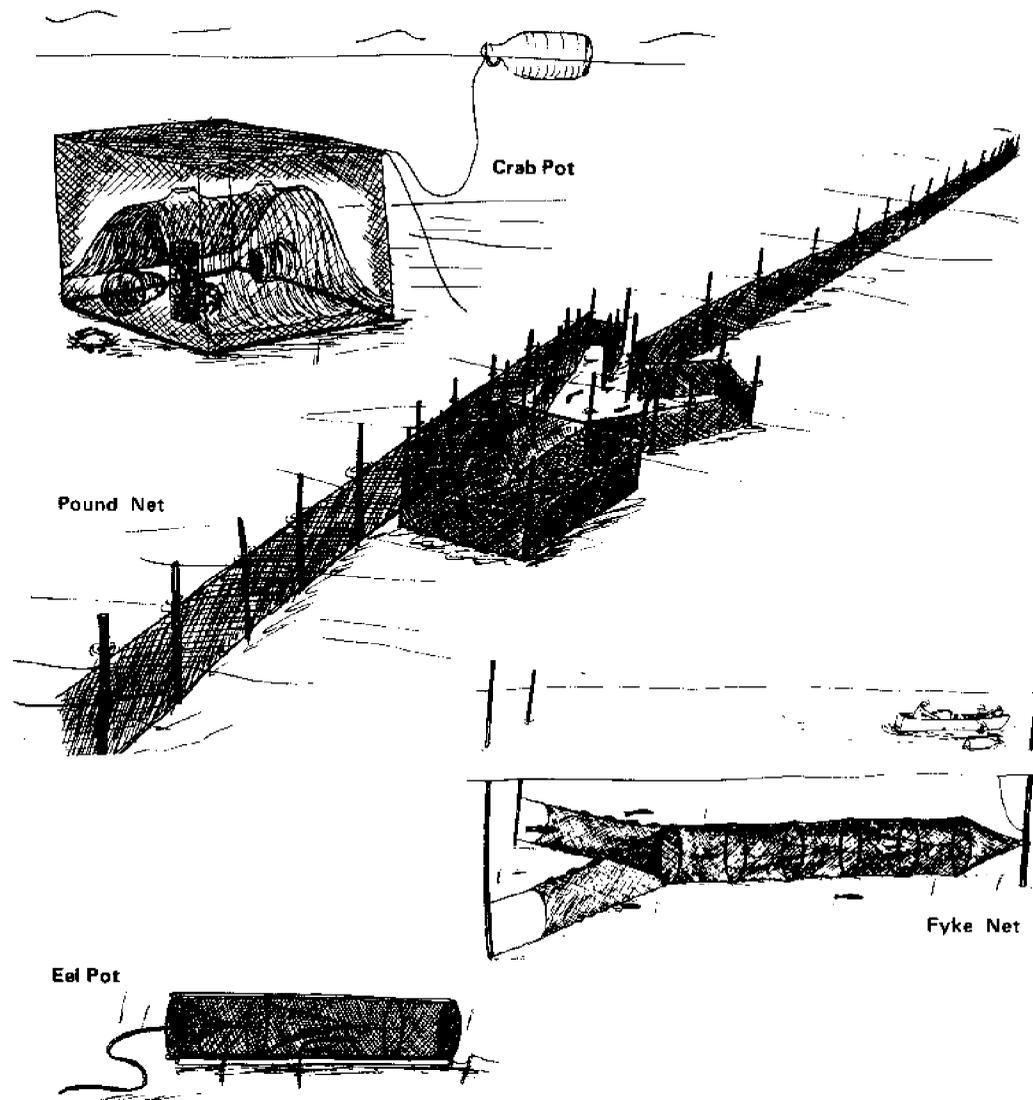
Hoop net mesh size:	average 2¼ inch stretched mesh
Length:	8 to 16 feet

Fish commonly caught in hoop and fyke nets:

Catfish, herring, striped bass, shad, white perch, carp.

A POT is a small trap constructed of wood or wire. Each pot is baited with pieces of fish or meat placed inside. Fish or crabs enter the trap seeking bait and have difficulty getting back out. Pots are placed on the bottom and are lifted and lowered by a buoy line attached to each pot. Pot fishermen often set a string of several pots.

There are several variations in design and construction of pots fished in North Carolina waters.

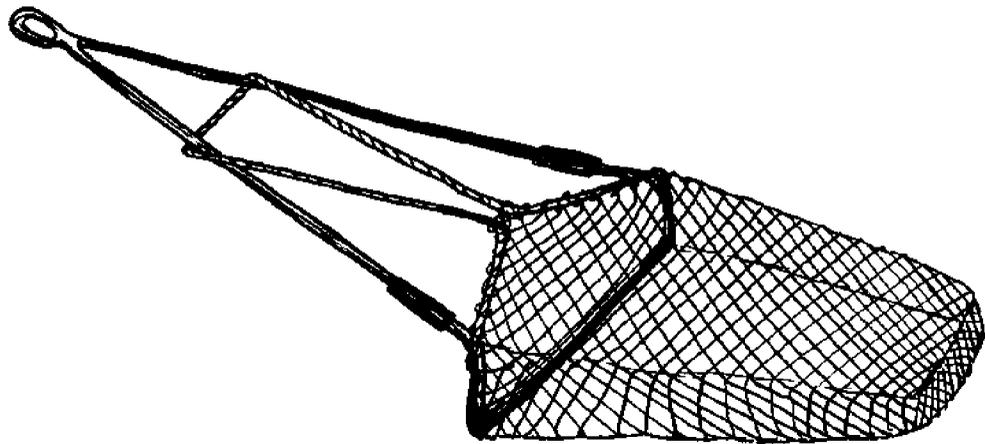


A two-level CRAB POT is a wire-mesh, rectangular box measuring about 2x2 feet. The pot is divided into two chambers. Crabs enter the lower chamber through one of the funnel shaped openings seeking the bait enclosed in a small, wire mesh container located in the center of the lower chamber. Unable to reach the bait they move upward into the upper level trying to find an approach avenue. Once in the upper level, escape is difficult. Crabs are removed by spreading an opening in a seam along the top of the trap, and then shaking.

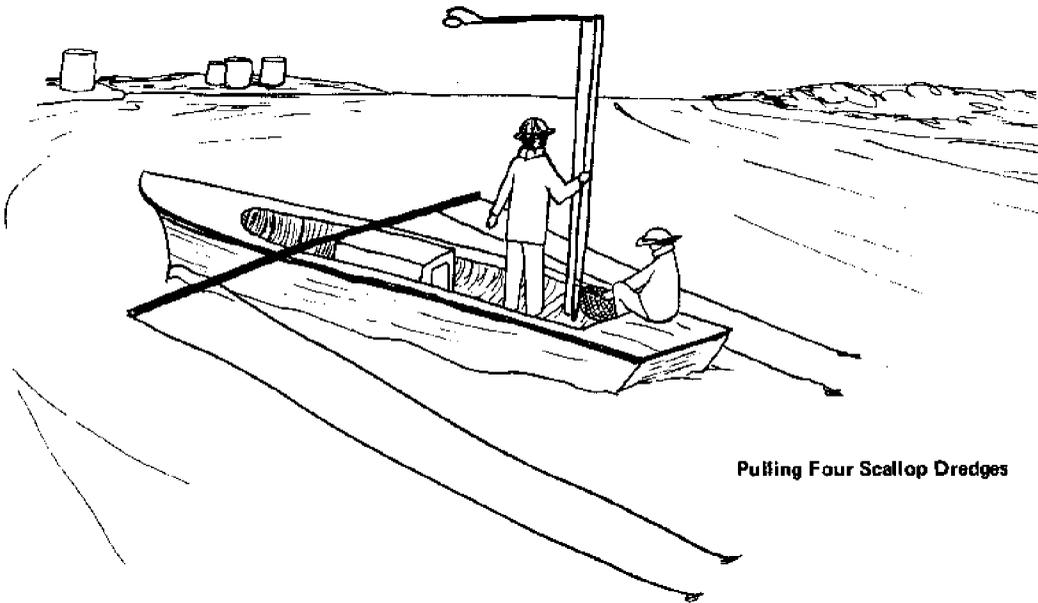
A FISH POT is similar to an eel pot in design and the way it catches fish, but is constructed of larger meshes and is usually larger in size. Fish pots are used primarily to catch catfish and white perch.

An offshore SEA BASS POT is similar to a two-level crab pot in size and design and the way it catches fish.

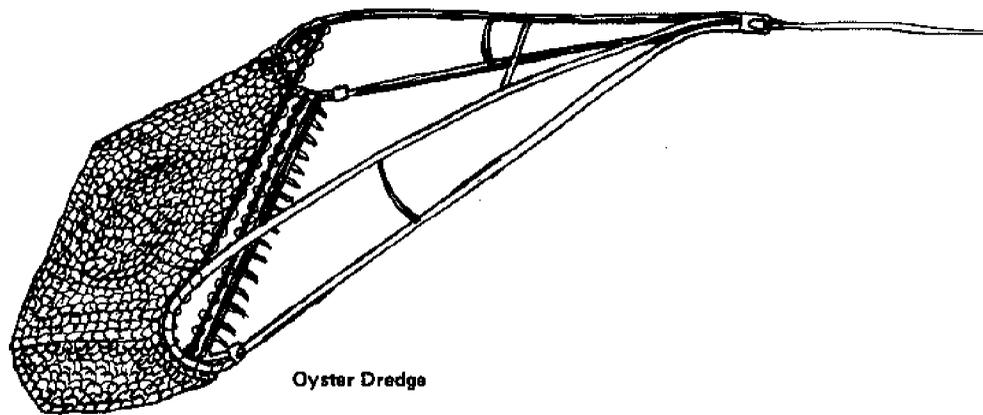
An EEL POT can be similar to a two-level crab pot or it can be made of wooden lathe supports, wood or metal hoops, and covered with galvanized wire.



Scallop Dredge



Pulling Four Scallop Dredges



Oyster Dredge

DREDGES

A dredge is a metal framed basket with a bottom of connected iron rings and a top of nylon webbing. Sometimes the basket is made entirely of connected iron rings, or entirely of nylon webbing. A dredge is lowered to and dragged along the bottom by the power of a boat. Shellfish are forced into the basket. The lower edge of a dredge has a raking bar with or without teeth. After a dredge has been pulled for a period of time it is hauled on deck, either by hand or power winch depending on the size of the dredge, and the catch emptied.

A BAY SCALLOP DREDGE has no raking teeth. Scallops lie on the bottom and do not burrow like clams.

Length: 6 to 8 feet

Width: 3 to 5 feet

An OYSTER DREDGE has raking teeth. Oysters can be found partially buried in the bottom.

Length: 3 to 6 feet

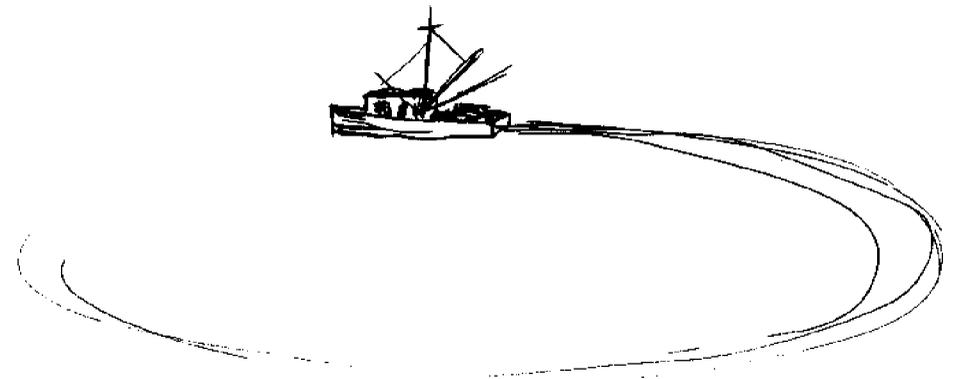
Width: 2 to 4 feet

Teeth: 2 to 4 inches long

A CLAM DREDGE is similar to an oyster dredge but has longer teeth.



Oystermen Drag Oyster Dredges Around And Around To Dislodge Oysters.



LINES

A hook and line is the basic gear used by some North Carolina commercial fishermen; however, to catch quantities of fish they use many hooks at the same time.

LONGLINE fishing takes place in offshore waters 50-100 fathoms deep and a large vessel is used. A long line is the backbone of the gear. Attached at intervals along the longline are leaders with hooks. Each hook is baited, usually with whole fish or squid. Floats are attached at intervals along the longline.

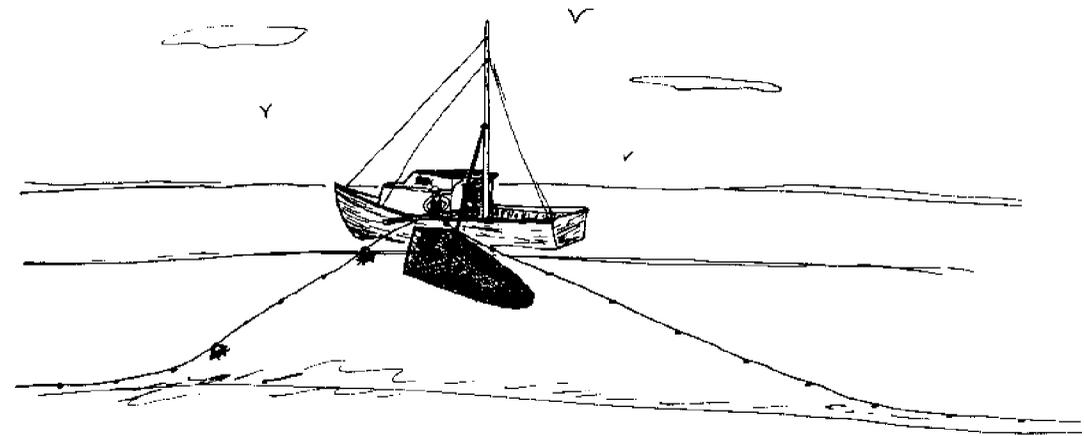
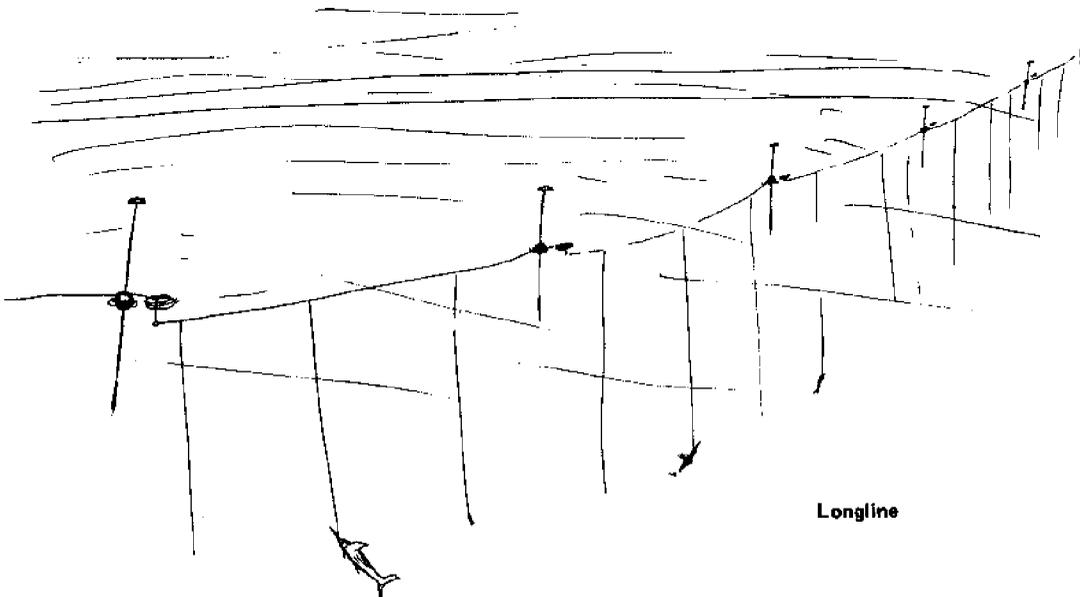
The longline, with its hooks and floats attached at intervals, is strung out from the boat into the water as the vessel moves along. Fishing depth is controlled by length of individual leaders, and by varying the spacing between floats and allowing the longline to sag. Longlines are usually set before dark and taken up the following morning. The gear is left drifting. A well equipped vessel and skilled crew can set and work 1500 hooks attached to 90,000 feet of line.

To take in the line a power reel is used. As the line is reeled in and a hooked fish appears, the fish is brought alongside, gaffed, and pulled aboard with a power hoist. Longliners catch swordfish and tuna.

A **TROTLINE FOR CATFISH** and striped bass is a long line strung out between two wooden poles or from a river bank to midstream. Leaders with hooks are attached at intervals and baited. As many as 100 hooks can be used. A fisherman in a small boat checks his trotline one or more times a day, removing fish and rebaiting hooks.

A **TROTLINE FOR CRAB** is strung out and laid along the bottom. Each end is anchored and buoyed. As the line is being set into the water, bait is fastened to the line every two to five feet. A fisherman checks his crab line by moving his boat slowly along the line. The line is placed over a roller or a lineguard attached to the boat; the roller protrudes over the water. When the line comes to the surface and a crab is clinging to a piece of bait — the crab is knocked from the bait by an obstruction near the roller and falls into a net.

A **TURTLE LINE** is a short nylon line attached to a cane pole, rigged with a single hook and bait, and fished in fresh and brackish waters. One person usually sets and tends 150-200 turtle lines.



Fisherman Working Crab Trotline

OTHER GEAR

OYSTER AND CLAM TONGS consist of two, long, wooden handles joined together like scissors. Attached to each handle end is a small basket with teeth on the bottom edge. Tongs are lowered to the bottom and worked back and fourth, the teeth digging out oysters or clams and the baskets holding them.

An **OYSTER AND CLAM RAKE** is a rake with a small piece of wire or net webbing attached to help pick up shellfish that are dug out.

A **CHANNEL NET OR BAG NET** for shrimp is similar in design to a trawl net, but it is not pulled by a boat. It is attached to stakes or buoys in sound areas of fairly strong tidal currents, usually near the inlets. Tidal currents cause the net to fill out and maintain its shape. The currents carry migrating shrimp into the non-moving net. Channel nets are fished only on ebb tide. Fishermen use a buoy line to lift the cod end out of the water and periodically remove the catch.

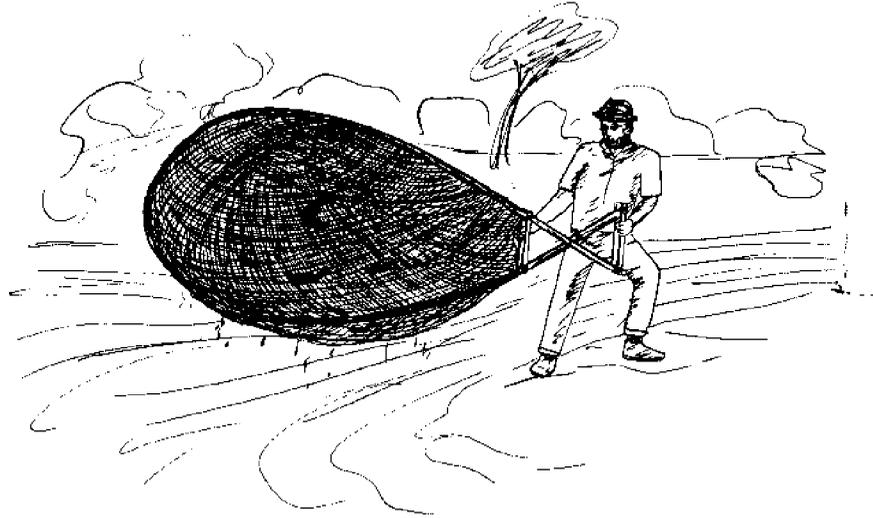
Channel net mesh size:	wings and body—1 to 1½ inch stretched mesh
	cod or bag end—1 to 1½ inch stretched mesh
mouth width:	75 to 150 feet

A **FISH WHEEL** functions somewhat like a water wheel. The structure consists of two large scoops and two paddles. Strong currents force the paddles to rotate; the scoops rotate too. The scoops dip up fish migrating up-stream and as they come out of the water, captured fish fall onto boards and slide down into water-filled holding troughs. Fishermen normally check the troughs once a day. The wheel is supported on floats and anchored to shore. The catch is primarily herring. Occasionally shad and striped bass are taken.

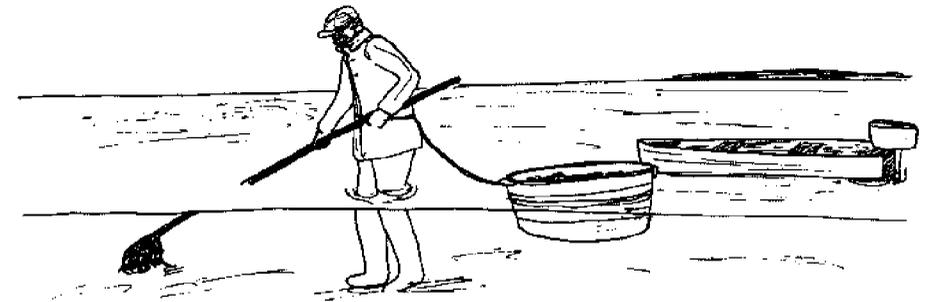
A **FLOUNDER GIG** is a two to five pronged spear head attached on the end of a long stout pole. Fishing at night, a gig fisherman poles his boat through shallow water, with the tide, looking for flounder lying on the bottom. The bottom is illuminated by surface lanterns or underwater lights attached to his boat. When he sees a flounder lying motionless on the bottom, he gigs, or spears, it.

A SKIM NET, or bow net, is a broad, shallow, hand net used to dip herring from shallow upstream waters during their spring migrations. The hoop and handle are made of wood. The netting can be nylon or galvanized poultry wire.

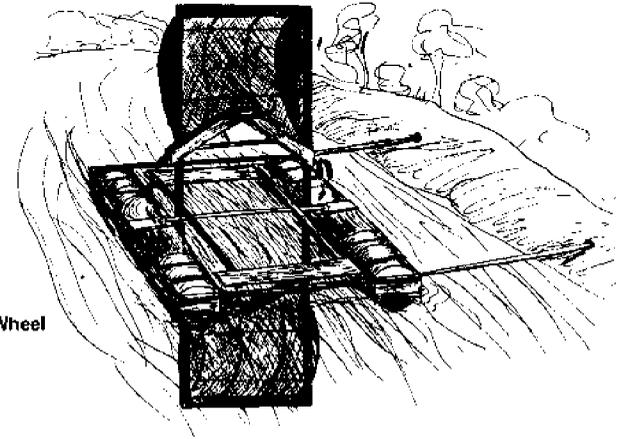
Length: 8 to 10 feet
Width: 5 to 6 feet



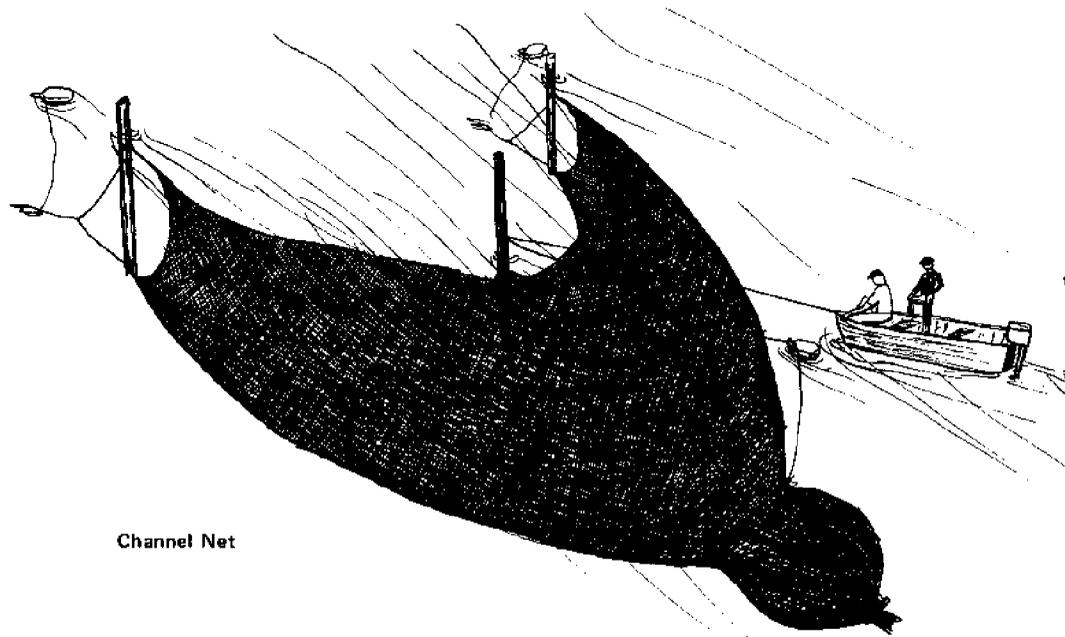
Skim Net



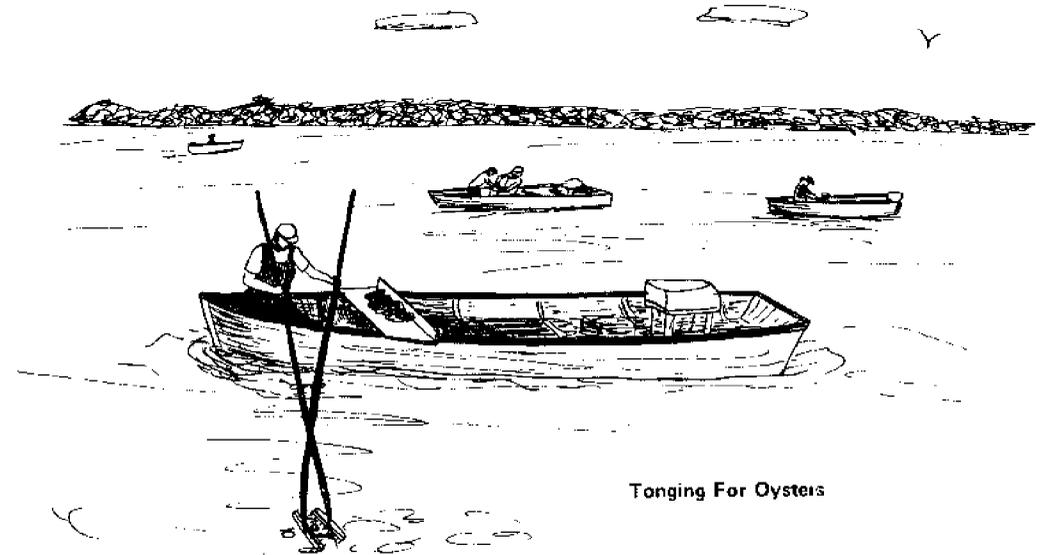
Raking For Scallops



Fish Wheel



Channel Net



Tonging For Oysters



MILL MARINE SC...
OF R. I. NA...
NAGRAGANBETT, R...
BAY CA...

RECEIVED

MAY 8 1973

GRANT
POSTERY