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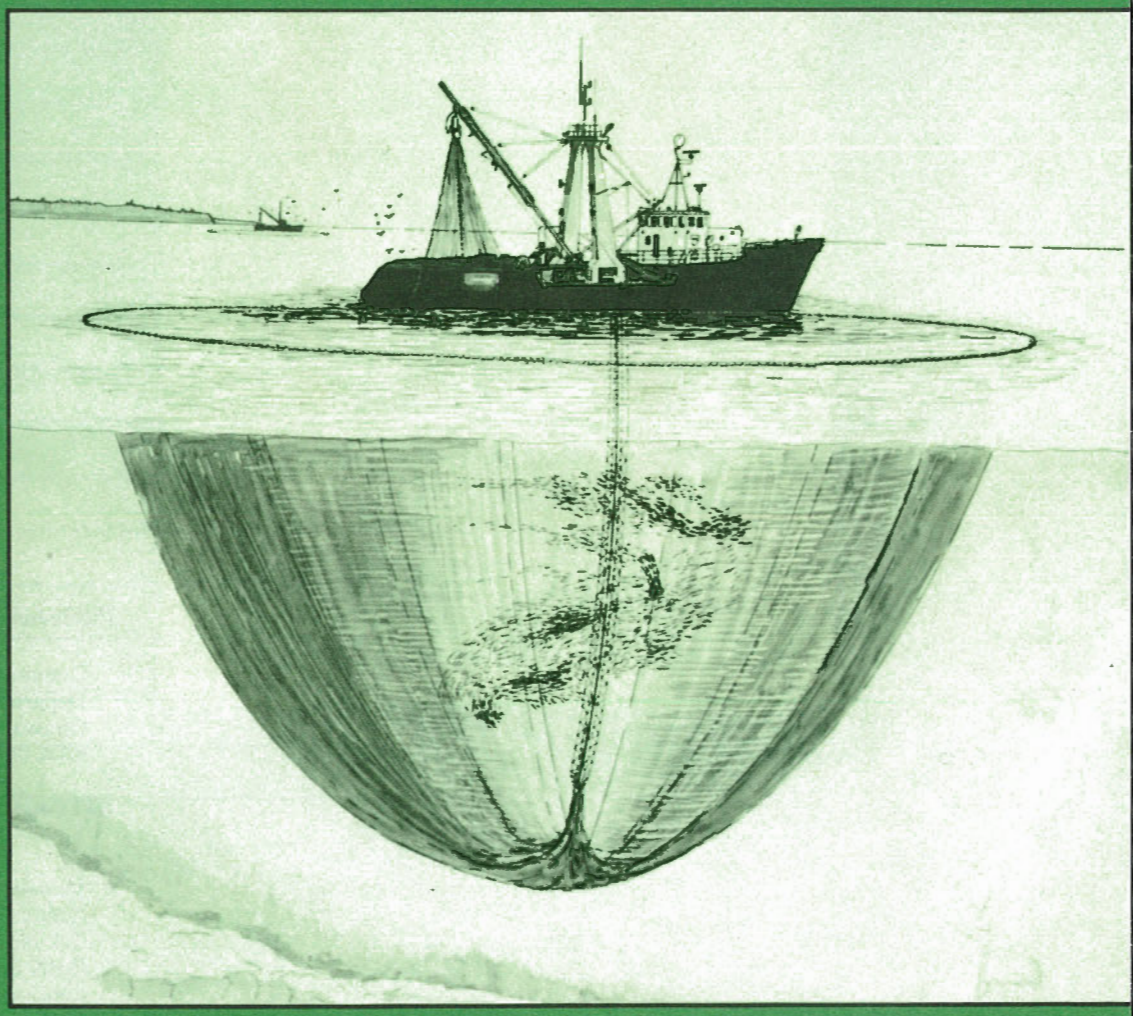
UNDERWATER WORLD



Atlantic Fishing Methods

Fisheries and Oceans
Pêches et Océans

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Introduction

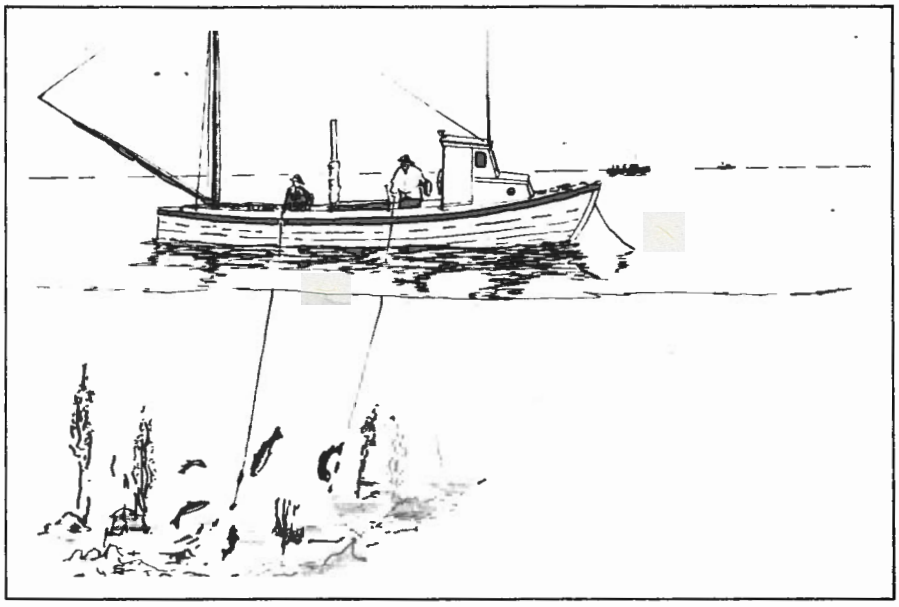
Commercial fishing on Canada's Atlantic coast is conducted by thousands of fishermen operating with many varieties of vessels and gear.

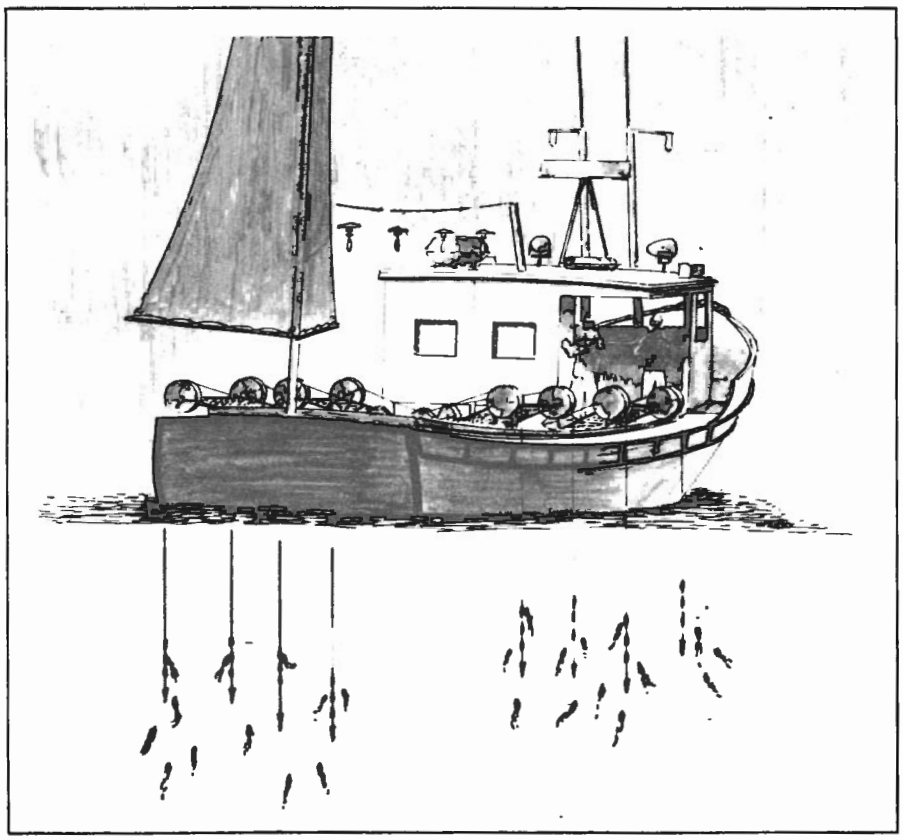
Marine resources of the sea are harvested from fishing craft of widely differing sizes, shapes and origins, ranging from inshore boats and dories to large stern ramp trawlers plying the outer waters of the Continental Shelf.

Fishing methods illustrated in this booklet are among the most commonly used on Canada's Atlantic coast.

Handlining and Jigging

Handlining and jigging are two of the oldest forms of fishing and are still common, single-line methods used by many inshore fishermen on the Atlantic coast. Handlining utilizes a line to which a weight and baited hook is attached. Jigging operations involve the use of lure-like hooks attached to a line which is 'jigged', or moved up and down in a series of short movements in the water at a level where fish are present. The motion attracts the fish, which are hooked as they move close to the lure. The line is then hauled onboard and the fish removed. In some cases, fishermen use manual jigging reels which reduce the labour involved in the process. Handlining and jigging are primarily used to catch groundfish, although pelagics, squid and other species are sometimes caught.



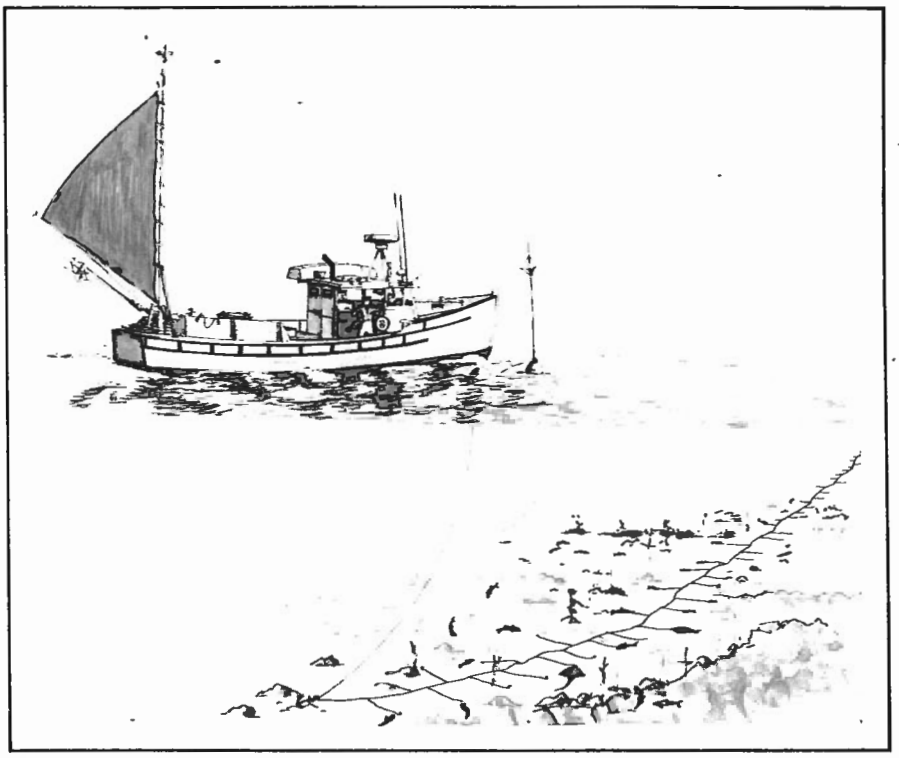


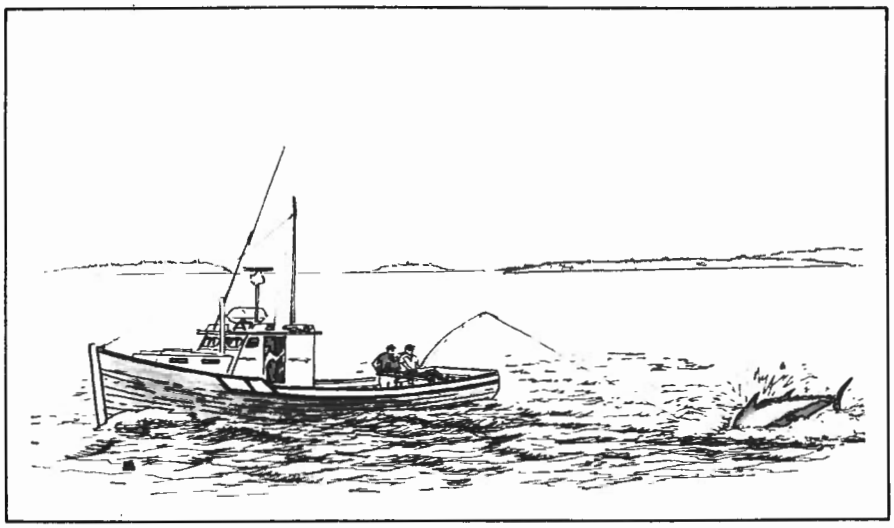
Jigging Machines

Jigging machines have recently become a popular form of fishing for groundfish and squid. These machines work on the same principle as jigging by hand but are made less labour intensive by the use of electric or hydraulic motors which automatically move the line up and down in a jigging motion and retrieve the line when fish are hooked.

Longlining

Longlining, as the name implies, involves the use of a 'long line' with a series of baited hooks spread along the ocean floor. Initially retrieved manually, this system has now become mechanized and uses automatic hauling, baiting and shooting machines. These improvements have made longlining an increasingly popular form of fishing. Fishermen are able to fish more gear, and in many other ways can compete with other forms of fishing. They can be more selective, landing a higher quality of fish, and also require less fuel for the operation. Longlining is used primarily in the Atlantic provinces to catch groundfish such as cod, hake, haddock and halibut.



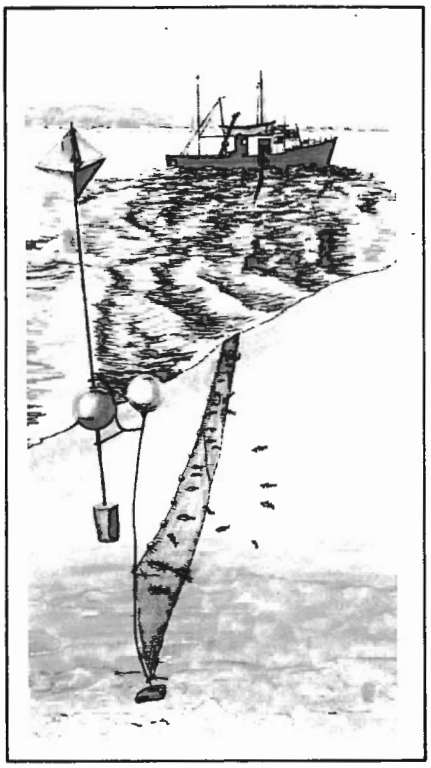


Bluefin Tuna Fishing

Bluefin tuna are taken in both the commercial and sport fisheries. For example, in St. Margarets Bay, N.S., bluefins are a by-catch for fishermen engaged in operations such as mackerel trapping. When captured alive, the tuna are placed in corral-like pens and fed mackerel and other fish until a desired weight and fat content is reached, in preparation for sale.

Fishing for bluefins is also conducted in big game style, employing rod and reel manipulated by a fisherman strapped to a chair fixed to the rear deck. Fishing line of breaking strength no greater than 60 kilos (130 pounds) is required. Landing of a bluefin by this method can take several hours.

Bluefin tuna is marketed in Japan and Europe.



Gillnetting

Gillnets are used on the Atlantic coast to catch many species of fish, especially groundfish and pelagics and such anadromous species as salmon, smelt and gaspereau. They are constructed principally of monofilament netting and may be either secured to the bottom of the sea with the use of weights or left to drift. Fish are caught as they attempt to swim through the webbing, entangling their gills.

Nets which are anchored to the seabed to keep the gear stationary have buoys on each end which float on the surface. These buoys indicate the location and ownership of the gear and provide a line from which the gear can be raised to the surface to harvest the catch.

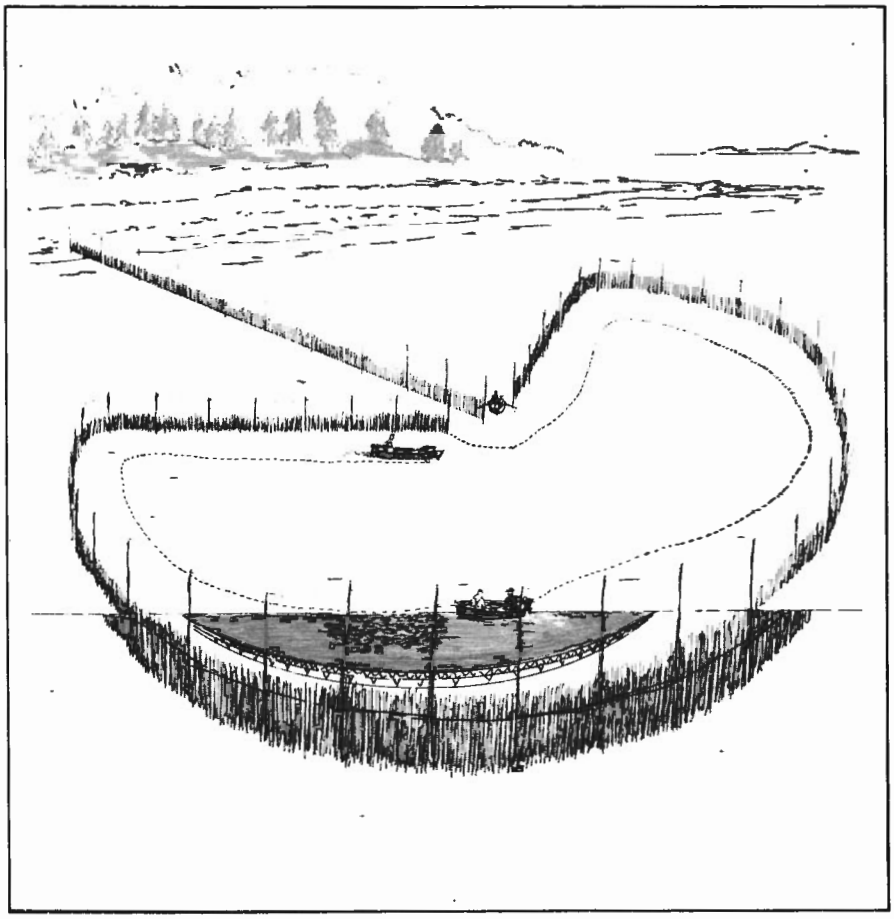
The nets may be positioned in varying water depths, depending on the location of the species. It is common for fishermen to join a number of nets together to increase the efficiency of the operation.

The size of the mesh used in gillnets may differ, depending on the species and size of the fish sought.

Weir Fishing

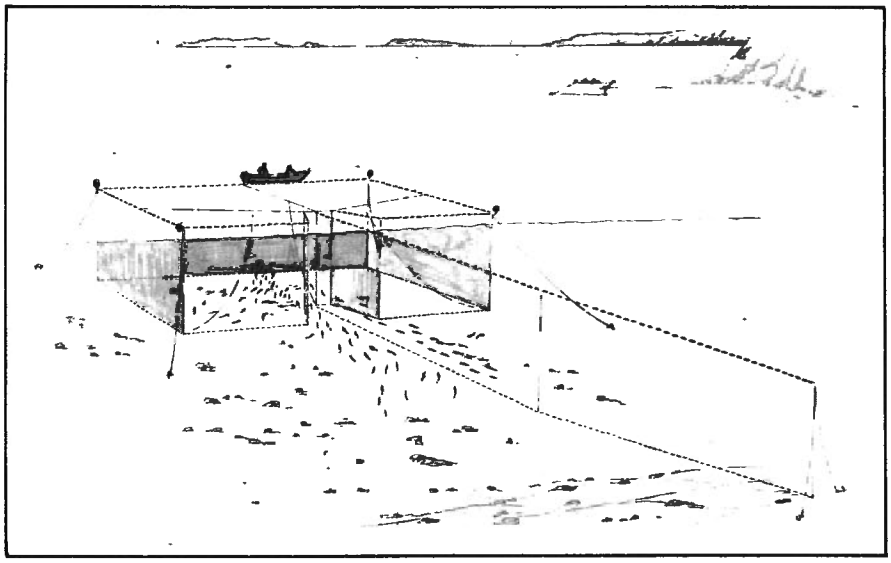
The weir method of fishing is used in the Bay of Fundy and its approaches, where the extraordinary height of the tides prevents the use of other traps. Weirs are also used on both sides of the St. Lawrence River in Quebec.

Rigid poles are driven into the mud bottom in a heart-shaped configuration. A straight line of poles is then placed from the shoreline to the weir. This line acts as a barrier to the fish, which follow it into the weir. Once inside, they become disoriented and swim in circles. To remove the catch, fishermen place a purse seine inside the weir. The seine is pursed and gradually made smaller; the fish are then either pumped or brailed (scooped out with a special dip net) from the weir into a boat.

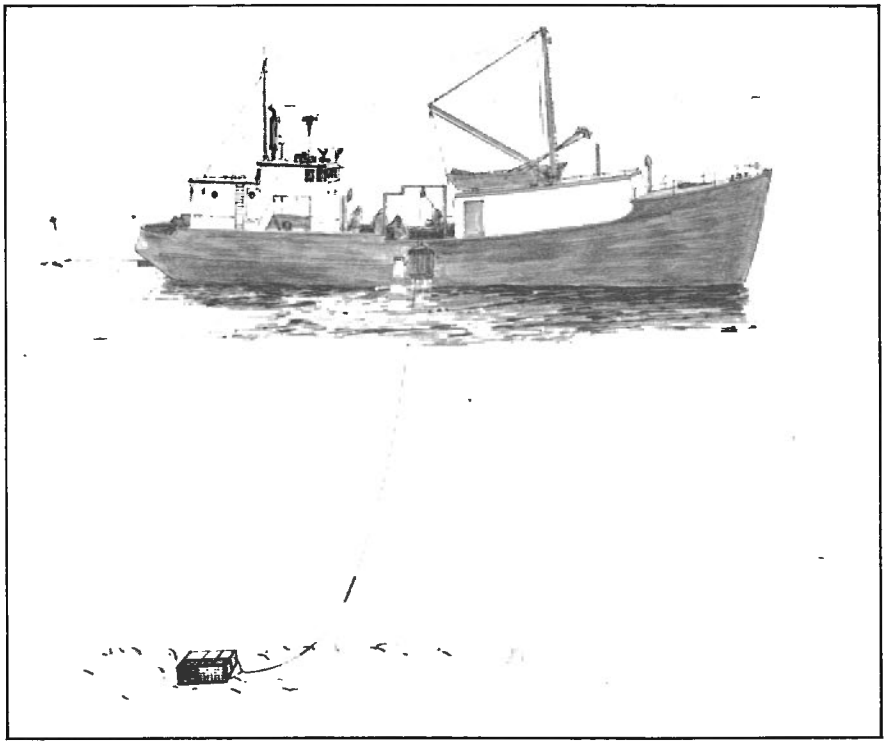


Cod Traps

Cod trap fishing is somewhat similar to weir fishing and is primarily used in Newfoundland. The traps resemble open-topped box nets, measuring 11-22 metres around the perimeter, with a vertical opening or 'door' on one side. The trap is set on the ocean bottom, usually close to the shore, with the door facing shallow water. It is buoyed on the top and anchored on each corner to maintain its position. A long net fence or 'leader' extends from shallow water into the mouth of the trap. When the cod, feeding on fish such as capelin along the seashore, confront the leader, they instinctively shift direction, swimming through the open doors into the trap. Once inside, they tend to swim in circles, trying to avoid the leader, and so fail to locate the doors.



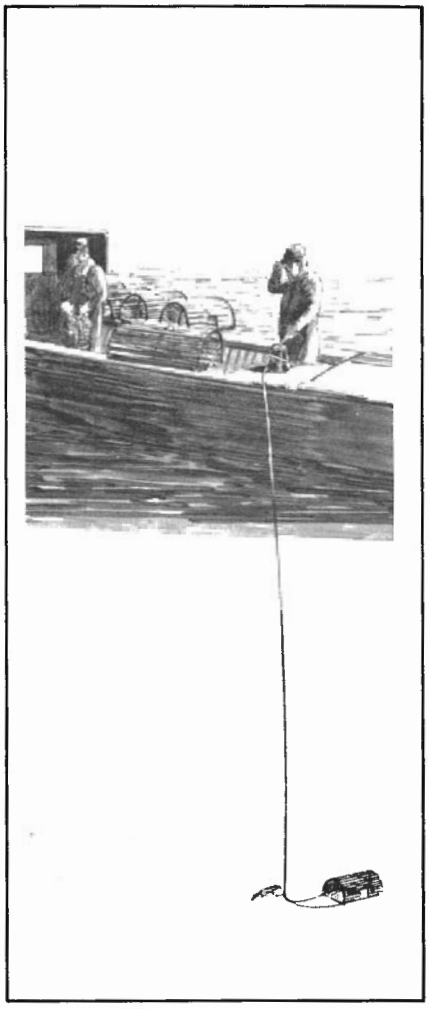
Fishermen then close the doors and bring the trap to the surface, hauling it across the boat. The fish are concentrated in one corner of the trap and collected with a dip net. One cod trap vessel may tend up to four or five traps, although three or four are more common.



Offshore Lobster Traps

Offshore lobster traps are constructed of a metal or heavy wooden frame covered with wire mesh, and are considerably larger and sturdier than inshore traps. Lobsters caught offshore are bigger than those landed in inshore areas and average from 1.36 to 2.26 kilograms (3 to 5 pounds), with a few reaching 9.07 kilograms (20 pounds) and over.

Vessels of the offshore fleet measure between 18.2 and 34.12 metres (about 60-115 feet) in length and are based in southwestern Nova Scotia. These offshore vessels are not permitted to harvest lobsters closer than 80 kilometres from shore.



Inshore Lobster Fishing

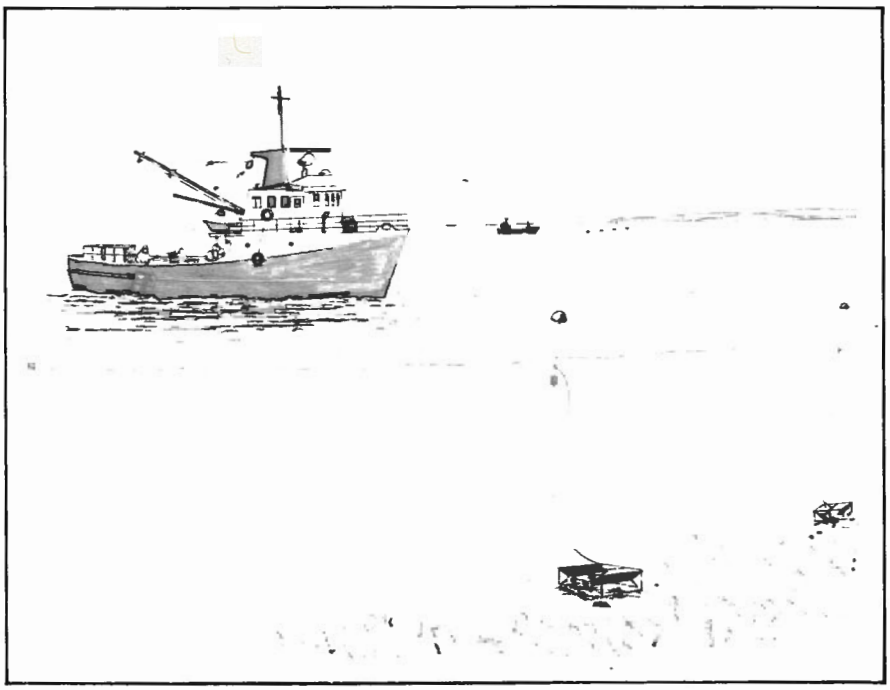
Lobsters are caught by inshore fishermen using traps (or pots) set on the ocean floor, either individually or in groups on a line. The size and design of these traps differ somewhat in various localities but they are usually constructed of curved pieces of wood, laths, and cotton or nylon twine, and often weigh in excess of 40 kilograms. Every trap has one or more funnel-shaped openings fashioned from twine, which allow the lobster to enter the trap but prevent it from escaping. They are baited with either fresh or salted fish, commonly herring, mackerel or gaspereau.

Traps are set in waters of varying depths, but usually near a rocky bottom, which lobsters prefer. In recent years, fishermen have begun to make greater use of electronic equipment to determine water depth and bottom type. Traps are ballasted with flat stones or concrete slabs to sink them and reduce their movement on the ocean floor. Marked buoys allow the gear to be easily located and identified.

The traps are hauled up on the boats using winches. Smaller, illegal-sized lobsters are returned to the water along with any unwanted species. The harvested lobsters are kept alive in boxes or tanks containing circulating water.

Crab Traps

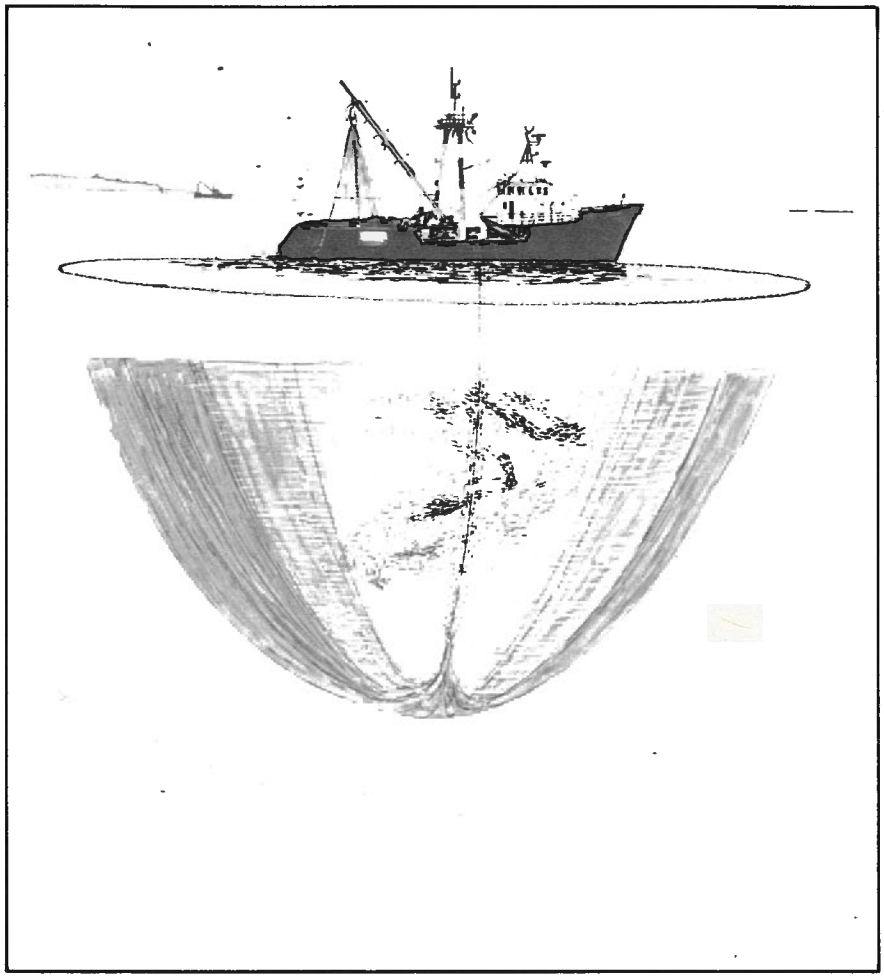
Crab traps differ considerably from those used in the lobster fishery. Crab traps are framed with iron rods and are covered with polyethylene rope webbing, and may be either cone-shaped or rectangular. They are much more expensive than lobster traps because of the material used, and are somewhat larger. Usually only one trap is placed on each line. While the main species caught in the Atlantic area is the Snow Crab, exploratory fishing is being conducted for Rock Crab, Jonah Crab and Red Crab.

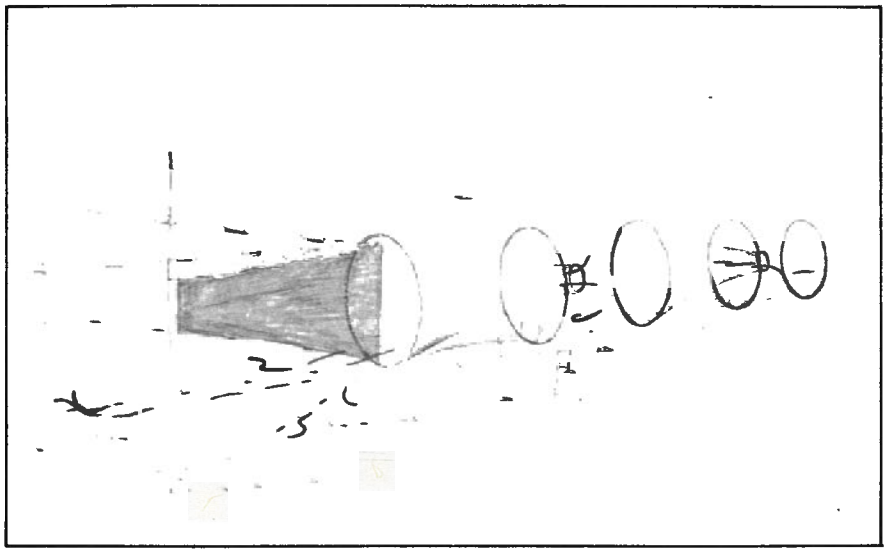


Purse Seining

A seine is a wall of webbing used to encircle fish. It is the encircling action, rather than towing, which is responsible for its catching power. As with a gillnet, the purse seine has floats on the top and weights on the bottom to keep it vertical in the water. A purse seine, however, has a wire rope passing through rings on the bottom of the net which enables the net to be drawn together to entrap fish. While purse seines are used to catch many species of fish, they are most effective when used to capture fish schooling near the ocean bottom.

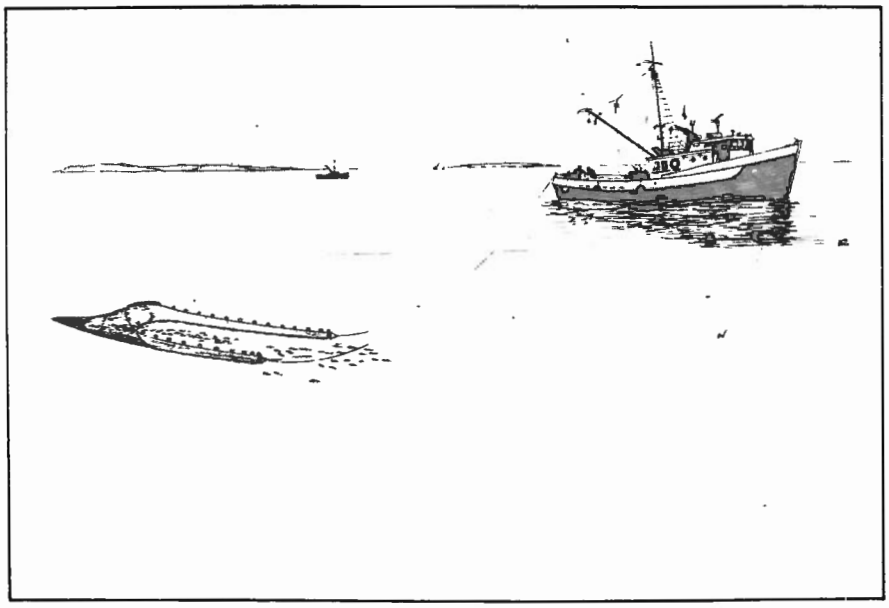
When a school of fish is detected, one end of the seine is taken by a small boat or "skiff". The vessel and skiff then encircle the fish with the net. After receiving the end of the line from the skiff, the vessel begins to winch in the wire cable, closing the bottom of the seine and forming a bag-like net around the fish. The other lines are now also winched in, reducing the space inside the net which is then brought alongside the vessel. The fish are dipped out and put in penned-off sections, boxes, or in the hold of the vessel.





Eel Traps

The principal commercial device used to harvest eels is the flume or "hoop net". The name comes from the hoop used to frame the net. The hoops are set in rivers, trapping the eels as they move in. A leader set in front of the net directs the eels into the funnel-shaped sections of the trap, from which they cannot easily escape. Eels are also taken in some areas in weirs or by spearing, but the latter method is used primarily through the ice in winter.

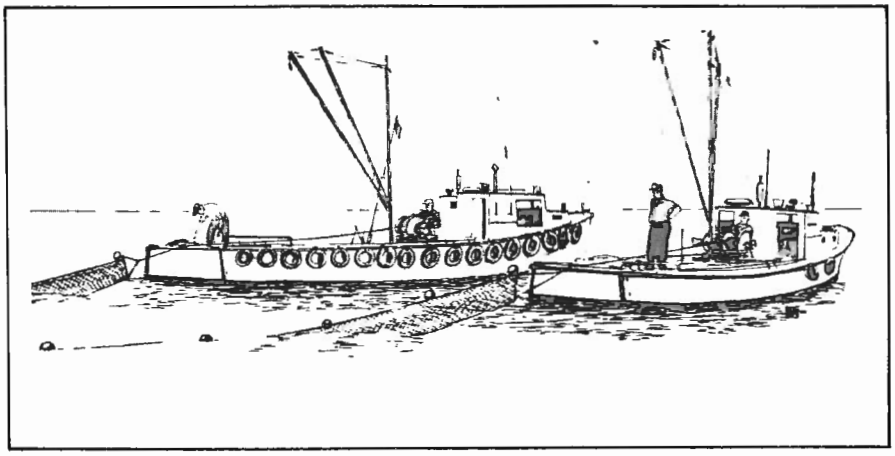


Danish/Scottish Seining

Danish/Scottish seining methods are used to catch species of groundfish such as flounder and cod. Both methods use similar nets and series of ropes spread out in a pear-shaped form along the ocean floor. The action of the ropes stirs up a mud cloud and herds the fish into the path of the net. In Danish seining, the vessel remains in a fixed position while the gear is hauled along the bottom. In Scottish seining, the net and ropes are towed along the ocean floor while they are closing. This is sometimes referred to as "fly-dragging".

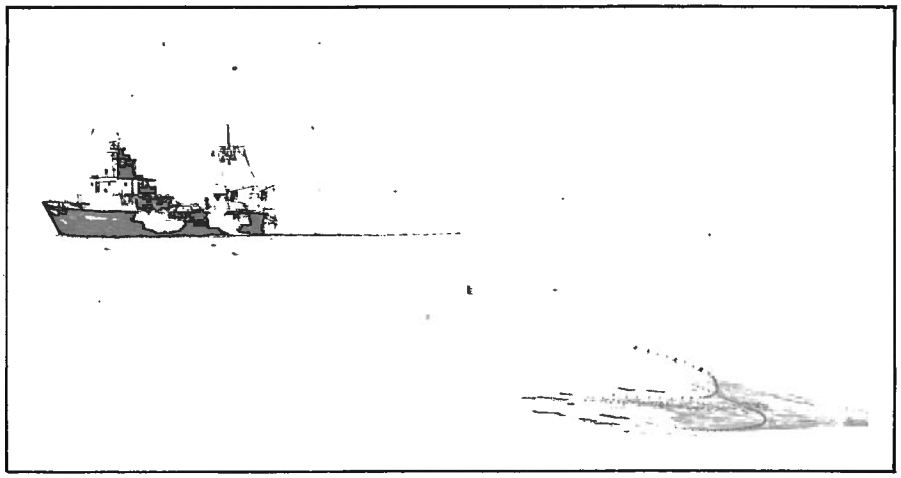
Canadian Pair Seining

Canadian pair seining is a recently-developed method of fishing used by relatively few fishermen. It is similar to Scottish seining but utilizes two vessels in the operation. The vessels sweep an area of smooth seabed with cables and ropes, corralling fish into a net, and winching the net in. The net resembles an otter trawl net except that the vertical opening is much wider. It is set and hauled by the two vessels, which maintain coordinated positions through regular radio contact. This method of catching groundfish species such as cod, flounder and silver hake is used by the smaller inshore vessels — 11-14 metres (35-45 feet) — because of the limited towing power required. The operation's success relies on the "heading" effect of the "warps" or cables. When the two vessels come together, the cables are brought together and the net is winched in from both boats.

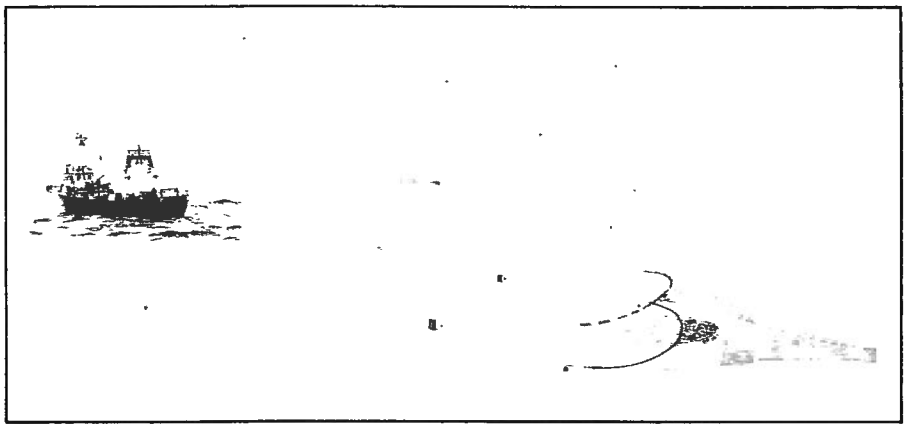


Otter Trawling

Otter trawls are cone-shaped nets which are towed along the ocean bottom to catch many species of groundfish. They take their name from the rectangular "doors" or "otterboards" that are attached to cables between the boat and the net. These doors serve to keep the mouth of the net horizontally open while the net is making its tow. A vertical opening is maintained by weights on the bottom and floats on the top and the water pressure generated from towing. The net traps fish in the end of the bag-like section or "cod-end", which has a mesh size that permits only the smaller fish to escape. The net rolls along close to the bottom with the aid of bobbins, which are similar in appearance to wheels.

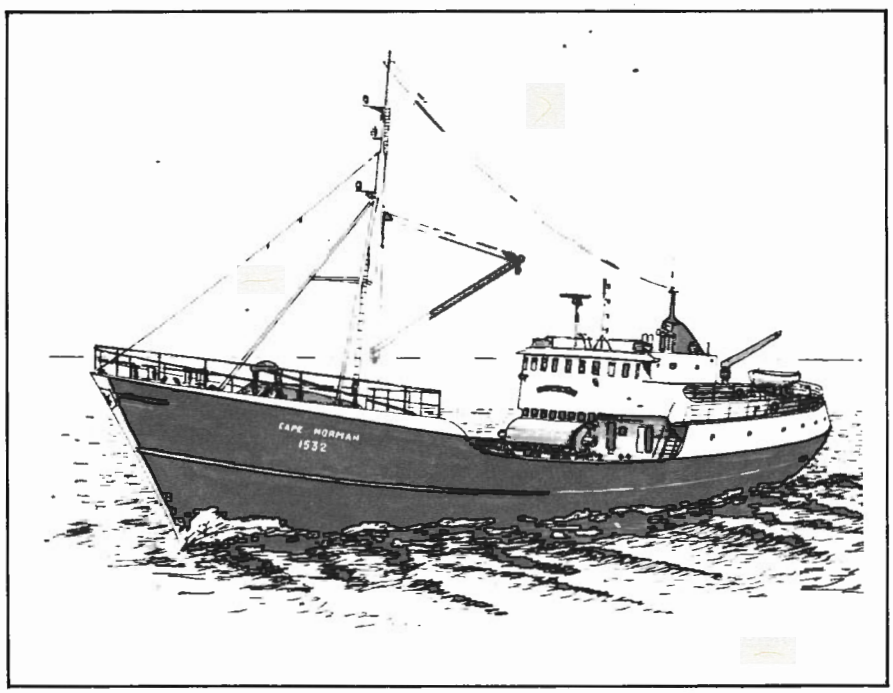


After a period of towing, the trawl is winched up beside the vessel. In a side trawling operation the cod-end is raised and suspended over the vessel. The cod-end is untied, and the catch released onto the vessel's decks, where the fish are bled, gutted and stored in the hold. In a stern trawling operation the gear is hauled up the "stern ramp" and the cod-end opened.



Mid-Water Trawling

Mid-water trawls can be used to catch many species of fish, most commonly herring, mackerel, redfish, pollock, capelin and shrimp. Mid-water trawls resemble otter trawls in that they are cone-shaped and constructed of webbing. Unlike otter trawls, however, they have fewer weights, and thus can be adjusted for towing at various depths. This adjustment is made by increasing the vessel's speed or by increasing or decreasing the length of the cable or "warp" between the vessel and the net. Conservation regulations have been established to limit the size of the mesh used for individual species.



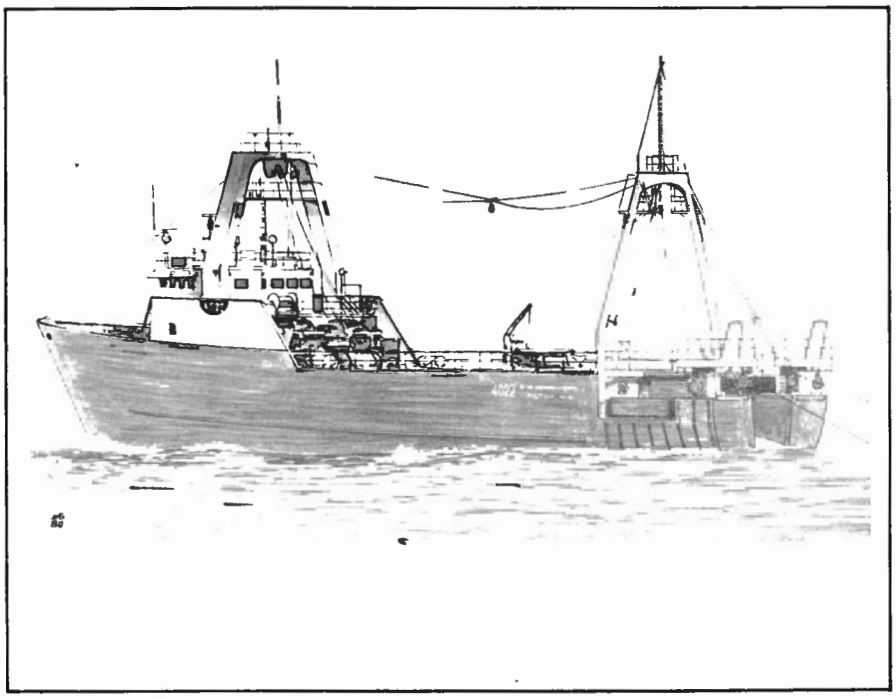
Atlantic Side Trawling

Atlantic side trawlers are members of the older series of groundfish trawlers which are declining in numbers due to the preference for more modern stern trawlers.

They are referred to as side trawlers since the gear (trawl) is towed from gallows fixed on one side of the vessel. Atlantic side trawlers are primarily between 19.8 and 30.48 metres (65-100 feet) in length and are of wooden construction.

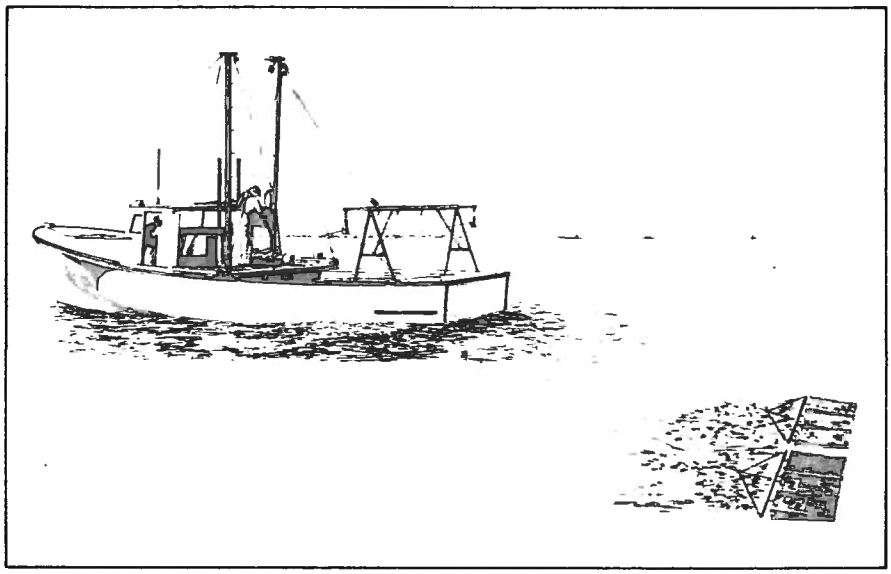
Stern Trawling

Stern trawlers are the main components of Canada's Atlantic offshore fishing fleet and are modern vessels of steel construction, averaging in size from 30.48-45.72 metres (100-150 feet). The gear (trawl) is hauled into the vessel over a large ramp through an opening at the back or 'stern' of the ship. Stern trawlers can operate in almost any waters or weather conditions and often range as far as 300 nautical miles off the Canadian east coast, fishing at depths of up to 250 fathoms. These vessels can carry up to 600,000 pounds of fish within their holds. They carry a crew of about 15 and can fish for ten days to two weeks each trip. Atlantic stern trawlers harvest traditional groundfish species such as cod, haddock, flounder and hake.



Scallop Dragging

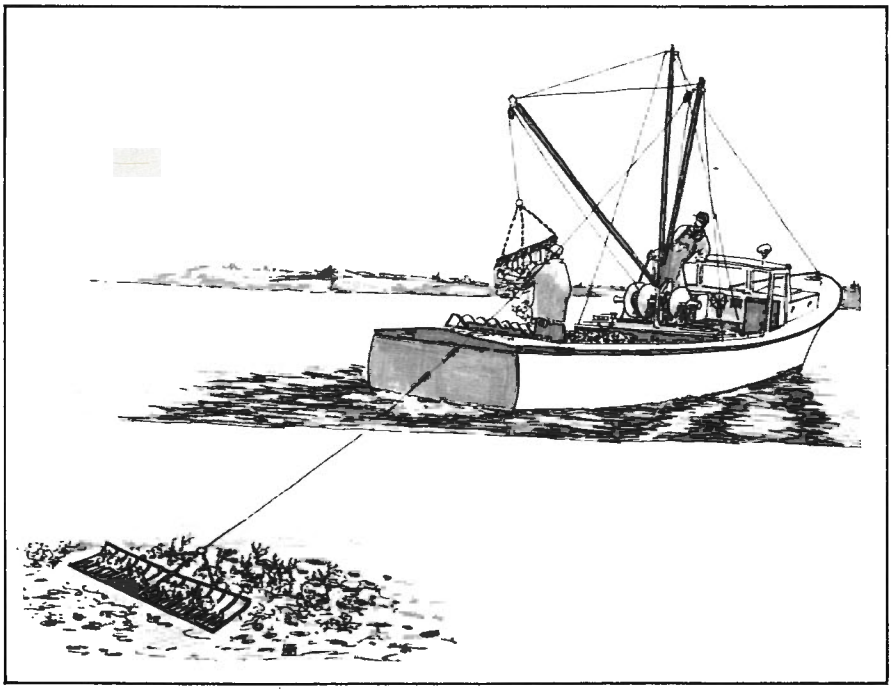
Scallops are harvested in both inshore and offshore areas. While methods of fishing are quite similar in both areas, the offshore fishery is significantly larger, both in terms of the volume of the landings and the size of the gear used. The drag consists of a metal frame with teeth on which a type of chain-mesh bag is attached. The drag is towed along the ocean bottom and the catch is raked into the mesh bag. The vessel tows the gear for a period of time and then winches it onboard. The crew removes the meat from the scallop shells during the next tow of the gear.



Irish Moss Harvesting

Irish moss, a sea plant which grows on the ocean floor, is harvested by three methods. One involves gathering the moss from the shoreline after winds and tides have broken it loose from the bottom. The equipment used in this operation varies from a fork or dip-net to a large scoop-like instrument pulled by horses through the water.

The other two methods involve raking the moss from the seabed where it grows. Larger inshore vessels tow one or more rakes with the help of ropes or cables. The vessel usually has a winch to haul the rakes on board. In smaller boats operating in shallow waters, the rakes, attached to long handles, are operated manually by fishermen. The sea plant usually grows on smooth rocky bottoms, thus facilitating the use of the rakes.



Clam Harvesting

Various kinds of mechanical devices have been developed to harvest clams. Harvesters differ in size and general construction to suit the type and location of the clam bed but all operate on the same principle. The harvesters are either self-propelled or hand-operated and are designed to shoot water from a number of jets onto the clam beds. In this way the clam bed is changed from a solid to a fluid state. The clams, being lighter, will then float to the surface of the seabed where they can be gathered.

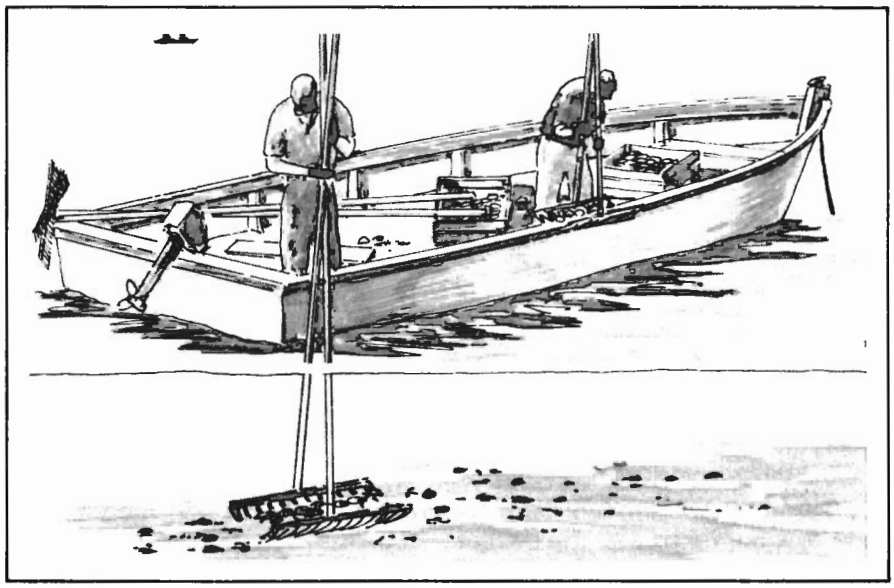
Clams are also harvested by individuals who dig them out of the beds with a spade or fork, mainly near the shoreline, and below the high water mark. In many areas, hand-operated forked instruments called "hacks" are also used to pull the clams from the mud at low tide.

Oyster Tonging

Tonging is the main method used to harvest oysters. It is used on natural oyster beds and small leased areas where regulations prevent the use of other equipment.

Tongs consist of a pair of rakes attached to long, wooden scissor-like handles. The handles are joined together approximately one-third of the way from the end of the rakes. The teeth of the rakes point inward and some tongs have baskets attached on both ends. The handles vary from three to eight metres in length.

With a series of short lifting movements, the oysters are scraped off the bottom and gathered up into the boat. The vessels used in the operation are usually small because they are more versatile. Harvesting oysters with tongs is a very time-consuming operation because tongs can be used only when the water is calm, and tongs are not efficient in water over five metres deep.



UNDERWATER WORLD

Underwater World factsheets are brief illustrated accounts of fisheries resources and marine phenomena prepared for public information and education. They describe the life history, geographic distribution, utilization and population status of fish, shellfish and other living marine resources, and/or the nature, origin and impact of marine processes and phenomena.

Others in this series:

Alewife
American Eel
American Oyster
American Plaice
American Shad
American Smelt
Arctic Char
Arctic Cod
Atlantic Cod
Atlantic Groundfish
Atlantic Halibut
Atlantic Herring
Atlantic Mackerel
Atlantic Pelagic and Diadromous Fish
Atlantic Salmon
Atlantic Shellfish
Atlantic Snow Crab
Beluga
Bluefin Tuna
Bowhead Whale
Capelin
Cetaceans of Canada
Crabs of the Atlantic Coast of Canada
Dungeness Crab
Grey Seal
Haddock
Irish Moss
Lake Trout
Lingcod
Lumpfish
Marine Fish Eggs and Larvae
Narwhal
Northern Shrimp
Pacific Herring
Pacific Salmon
Pollock
Red Hake
Red Sea Urchin
Red Tides
Redfish (Ocean Perch)
Rockfish
Roundnose Grenadier
Sand Lance
Sea Cucumber
Sealing – A Canadian Perspective
Sea Scallop
Selected Freshwater Fish
Selected Shrimps of British Columbia
Soft-Shell Clam
Spiny Dogfish
Squid
Thorny and Smooth Skates
Trout in Canada's Atlantic Provinces
Turbot (Greenland Halibut)
Walleye
White Hake
Winter Flounder
Witch Flounder
Yellowtail flounder

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