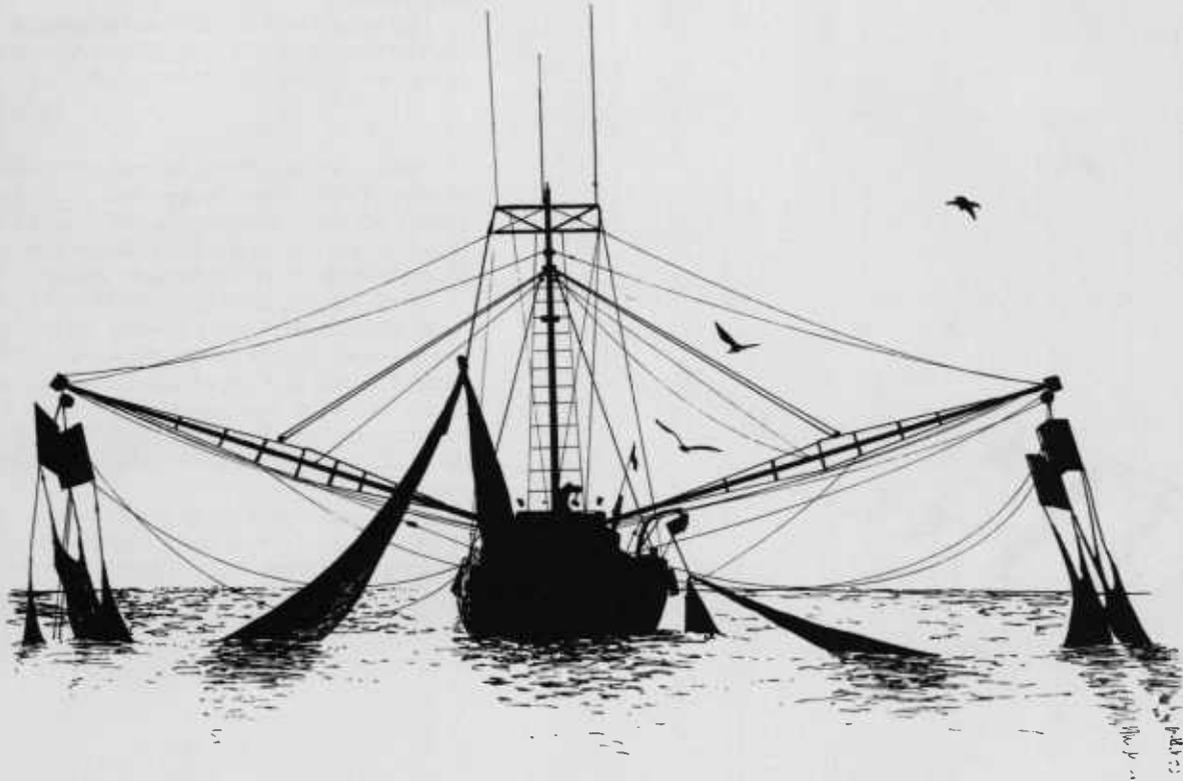


A Guide to Oregon's Commercial Fishing Vessels



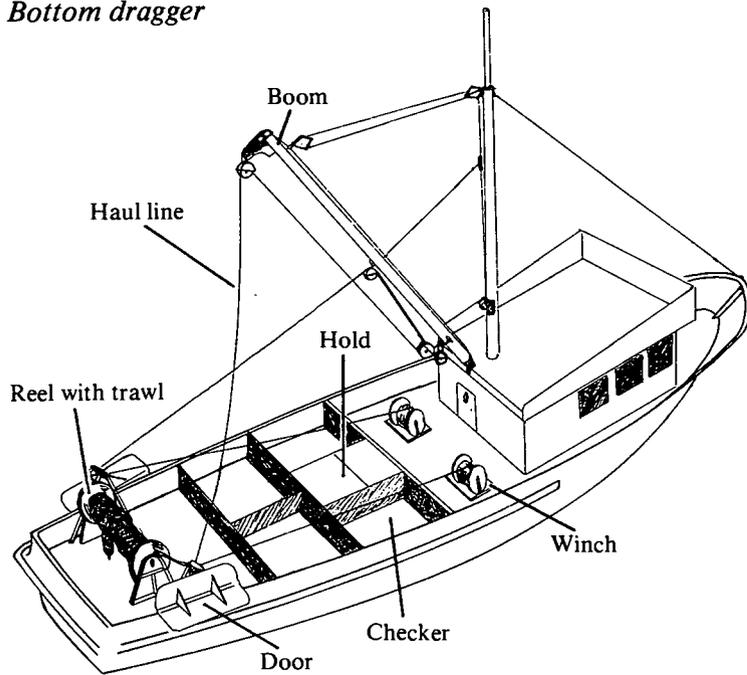
**We're down on the waterfront, watching the fishing vessels come in
What kind of boat was that? Troller? Trawler? How can you tell the
difference? Have you asked questions like these on a visit to the coast?
Many visitors put such questions to Marine Advisory Program**

**Oregon State University
Extension Marine Advisory Program**



**A Land Grant / Sea Grant Cooperative
SG 68 September 1981**

Bottom dragger



staff members.

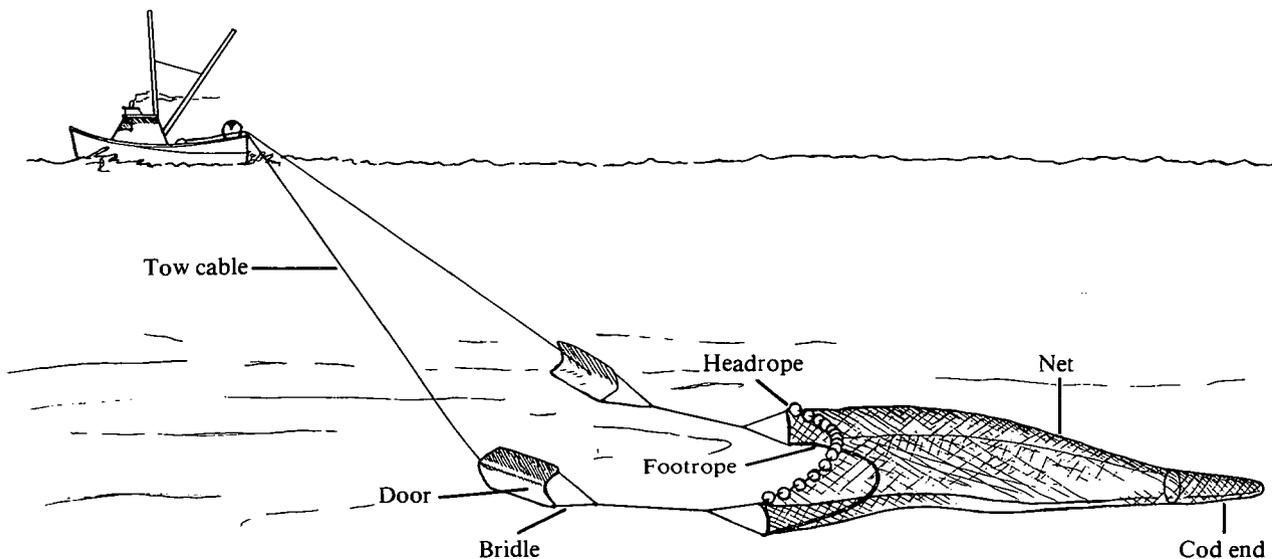
This bulletin both describes and pictures the various types of Oregon commercial fishing vessels and explains how fishermen use them to catch fish.

Fishing vessels that you see may participate in one or more of eight major Oregon fisheries and at least a dozen California, Washington, and Alaska fisheries. Vessel design, size, and gear—onboard and in the water—will tell you in which fishery a vessel participates.

Vessels range in length from the 18-foot boats that some salmon trollers and gillnetters use to trawlers 90 feet or longer. One or two people work the smaller boats. Three or four are required to operate larger vessels, which fish from several days to weeks at a time. Fuel capacity, weather, space available for storing the catch, and the crew's fortitude limit the length of the trip.

Vessels are made of wood, steel, fiberglass, aluminum, or ferrocement. In most cases, pilot houses and engines are forward, freeing the stern area for a working platform, gear rigging, and fish storage.

Bottom trawl in operation



Navigation and fish-finding electronic equipment play an important role in all fishing operations. This gear might range from a small boat's CB radio and depth finder to a large trawler's several hundred thousand dollars' worth of sophisticated electronic equipment.

Investment in a vessel is substantial— from \$2,000 for a small "fixer-upper" to over \$1,000,000 for the larger trawlers. Gear repair and replacement is continuous. Crabbers might lose 20% of their pots a season—at \$100 each. One lost bottom net costs a minimum of \$2,500 to replace, and it *must* be replaced, to keep the boat fishing and to pay the bills. In addition insurance, licenses, fuel, and crew shares all add significantly to operating costs.

A variety of gear can appear on the same vessel because many owners must use their vessels for more than one fishery to earn a living. However, they will usually rig them for only one fishery at a time. Nets, hooks and lines, and pots are the basic types of gear used in Oregon to harvest ocean finfish and shellfish. Dredges are also now being used in the developing scallop fishery.

(See the appendix, page 12, for a quick overview of Oregon fishing vessels, crew size, gear, and seasons.)

Fishing with nets

Trawlers

A trawler is a fishing vessel that drags a funnel-shaped net ("trawl") through the water to harvest fish or shrimp. The net is wide at the mouth and tapers back to the narrow "cod" end that collects the catch. Trawls can be over 100 feet across the opening and 150 feet long.

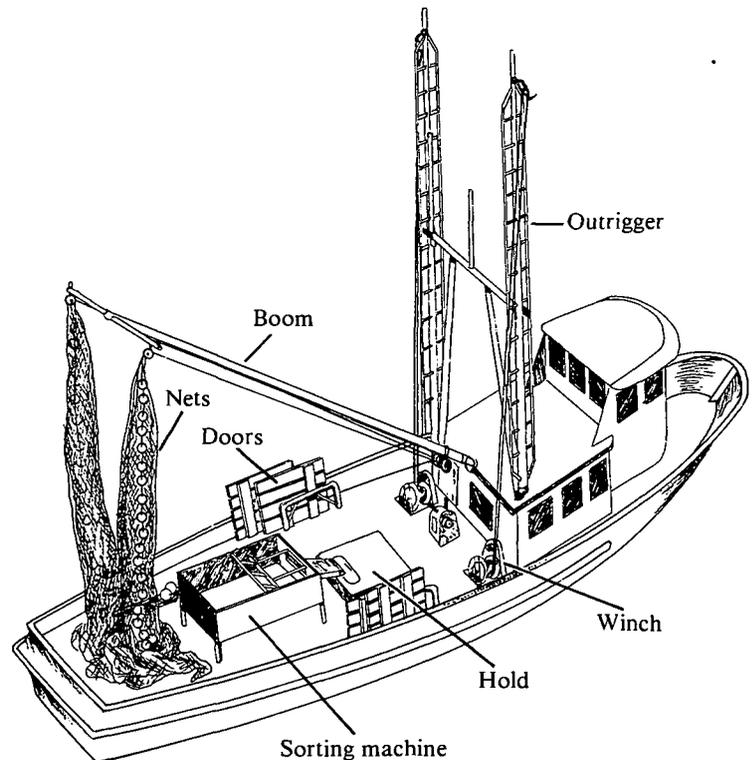
Trawl fishermen tow bottom and shrimp nets at 2 to 4 knots on or above the ocean floor. They might tow midwater nets faster to stay with the schooling fish they harvest.

A large, rectangular wooden or metal "trawl" door attached to each side ("wing") of the front of the net keeps the net spread open during the tow. Doors are flat, oval, or slightly V-shaped. A steel tow cable extends from each door to a winch just behind the pilot house.

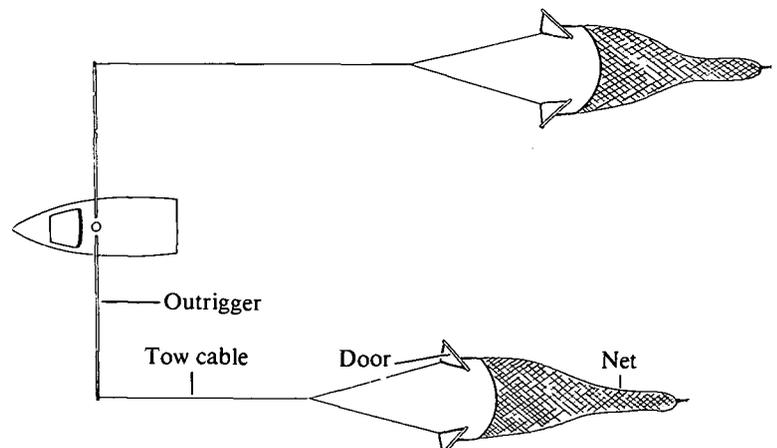
Many of the newer trawlers have square sterns with inclined ramps; they are referred to as "stern trawlers." On these, nets are hauled aboard by winching them up the ramp. Trawlers without inclined ramps haul the nets over the side.

Bottom draggers and midwater trawlers work year-round while shrimpers are restricted to a seasonal fishery from April to mid-October.

Double-rigged shrimper



Shrimp trawls in operation



Bottom draggers tow a trawl along the ocean floor to catch bottomfish such as perch, rockfish, cod, flounder, blackcod, and sole. Most trawls are designed to catch particular groups of bottomfish.

The large mesh net (4½ to 5 inches) is kept on a stern-mounted reel. Doors are stored along the port and starboard rail near the reel. The crew sets the net off the stern by unwinding it from the reel into the water, cod end first, allowing the drag of the cod end in the water to unwind the net from the reel.

Then they place the doors in the water and release enough cable from the winches to position the net at the desired tow depth. Water pressure causes the doors to separate as they move along the ocean floor and thus pull the mouth of the net open horizontally. A combination of floats on the headrope, laced to the upper lip of the net, and a weighted footrope, laced to the lower lip of the net, holds the net mouth open vertically.

If it is to be towed over rough bottoms (as for rockfish), steel bobbins or rubber discs attached to the footrope help it ride over obstacles. Tow time lasts from 30 minutes to several hours. Depths range from 10 to 500 fathoms, at distances of from 1 to 40 miles offshore.

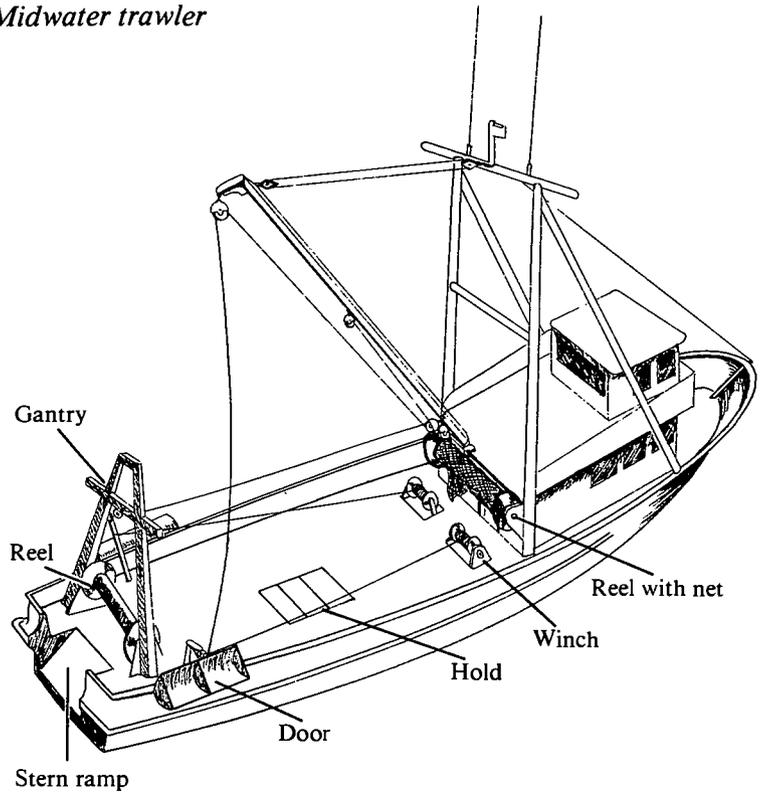
The crew hauls the net by winding in the cables with the winches until the doors are in place on the vessel and most of the net wound back onto the reel. On vessels without inclined ramps, they bring the cod end around to the downwind side of the stopped vessel and hoist it up and aboard by a haul line and block on an overhead boom. If the catch is so large that they cannot hoist the net without danger to vessel or gear, they must lift and empty it in sections ("splits").

Once the catch is aboard, they reset the net for another tow. Then they separate the fish by species into deck bins ("checkers") and ice or refrigerate them in the hold. One tow can bring up 30 tons of bottomfish. It is not unusual to have 60 tons of fish in the hold after a 4-day trip.

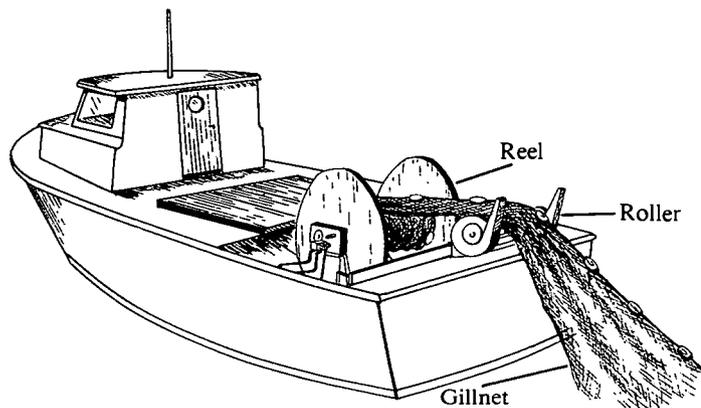
Shrimpers tow one or two small-meshed (1½-inch) nets just above the ocean floor for small, pink cocktail shrimp. Single-rigged shrimpers tow one net off the stern (as bottom draggers do), and this net is kept on a stern-mounted reel. Double-rigged shrimpers tow one net off each side of the vessel from large outriggers lowered to a 60° angle. In this case, nets are not kept on reels but folded on deck or hung from the boom while in port. Double-riggers, of course, have two sets of doors—one set for each net.

Chains ("tickler chains"), attached to the footrope, drag along the muddy bottom, stirring shrimp up and into the net.

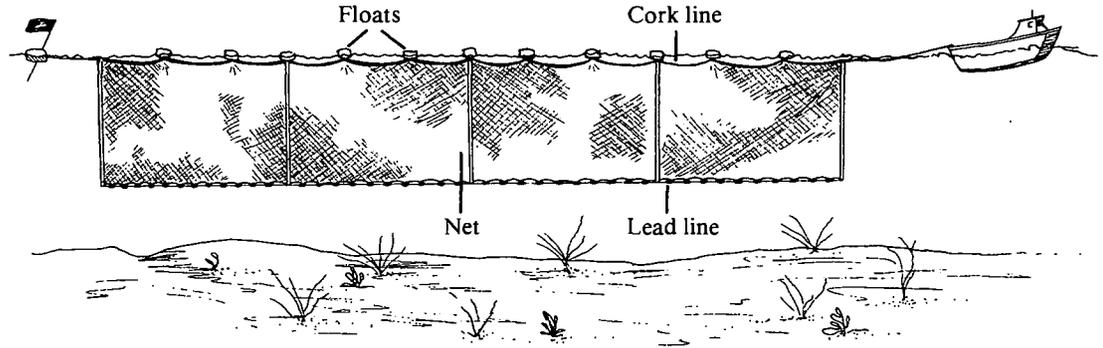
Midwater trawler



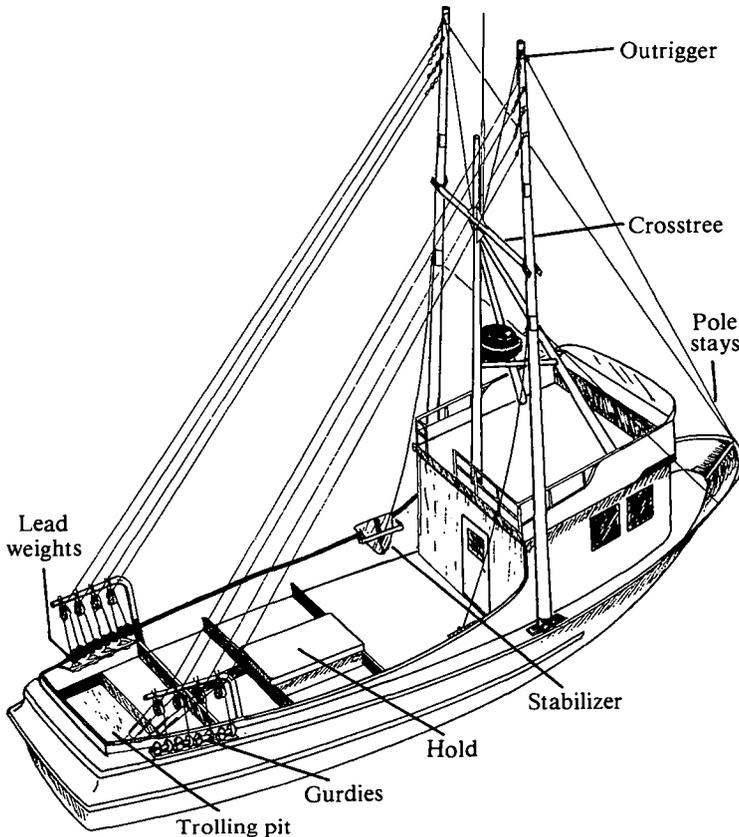
Gillnetter with stern-mounted reel and roller



Floating gillnet



Salmon troller



Once onboard, shrimp are sorted from fish on a shallow table or run through a mechanical sorting machine. The machine or table and small mesh net distinguish a shrimper from a bottom dragger. You can identify double-riggers by their large outriggers, lack of reel, and two sets of doors.

Shrimp are found in green or gray mud at depths of 80 to 150 fathoms.

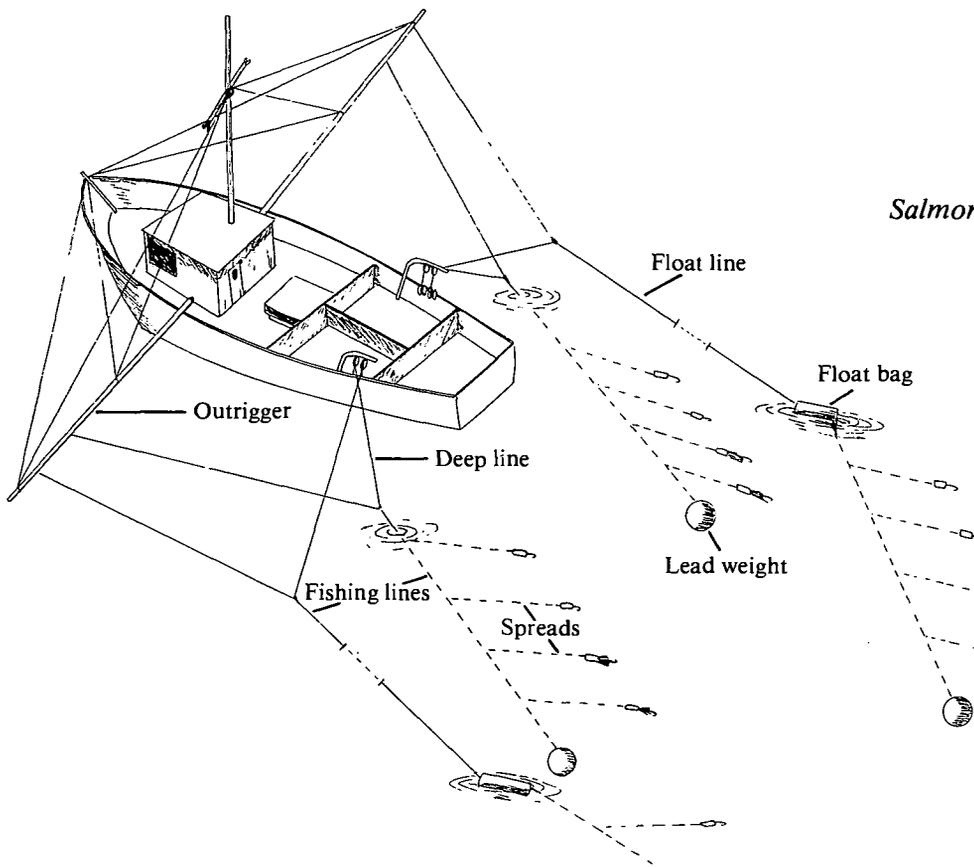
Midwater trawlers tow a net off the stern from just above the sea floor to just below the surface. They harvest fish that move in schools such as Pacific whiting and rockfish. Sophisticated electronic equipment enables the skipper to both find and stay with fish. The net is towed a much shorter time than is the bottom or shrimp trawl—10 to 30 minutes—and may yield 50 tons of fish in one tow. Virtually all of these vessels are stern trawlers.

The vessels are rigged much like bottom draggers but use tall, concave metal doors; they frequently have more than one net reel onboard. An overhead A-frame or gantry on the stern holds one or two reels, and there may even be a third, located near the pilot house. Often, the other reels store bottom trawls, allowing the crew to quickly convert the vessel from midwater- to bottom-trawling. In this case, bottom trawl doors would also be carried onboard.

Gillnetters

Gillnets are allowed on certain Oregon rivers for shad and on the Columbia River for salmon, sturgeon, shad, and smelt. They may not be used in the ocean.

Salmon is the primary gillnet fishery, but it is permitted for only a few weeks a year. Mesh size is strictly regulated, to allow escapement of steelhead trout.



Salmon troll gear set (stabilizers not shown)

Onboard gear is arranged in one of several ways: (1) stern-mounted reel and roller for setting and hauling the net over the stern; (2) bow roller with no reel, the nets being folded on deck or in boxes; or (3) bow-mounted reel and roller for setting and hauling over the bow.

A curtain of lightweight netting, up to 1500 feet long, is payed out from the reel or by hand and allowed to drift with the tide. Salmon swim into the net and are caught by the gills. When the net is lifted, the fisherman picks out salmon as they come aboard. They are delivered in the round to buyers every few hours.

Fishing with hooks and lines

Trollers

Oregon trollers fish for salmon and albacore tuna by towing a number of lures or baited hooks through the water. Fishing lines are rigged to a pair of 3-to 6-inch-diameter outriggers ("trolling poles"); when lowered to a 45° angle, they hold the fishing lines away from the boat. A wedge-shaped stabilizer ("flopper stopper") might also be attached to each outrigger; these help stabilize the boat. When not in use, outriggers are held vertically by brackets secured to a beam ("crosstree") on the masthead. The gear is designed to withstand the tremendous shock of striking fish.

Salmon trollers outnumber all other types of vessels in the fleet. They supply fresh coho and chinook salmon to our markets. Vessels vary greatly in size from 18-foot day boats to trip boats up to 60 feet long. Smaller vessels generally return to port daily with their catch; larger vessels may stay at sea up to 8 days.

Many of these vessels have a trolling pit in the stern so the fishermen can steer the vessel while operating the gear.

Up to four stainless steel fishing lines are fished from each outrigger. As many as 15 lures on monofilament leaders ("spreads") are attached to each line at 2- to 4-fathom intervals. A 10- to 50-pound lead weight ("cannonball") takes each line to the desired depth. Fishing lines are set and retrieved using gurdies (pulleys). To spread out the lures and to prevent tangles, the crew uses float bags to float up to two lines per side behind the boat.

Lures can be fished from just under the surface down to 80 fathoms, at speeds from 1 to 4 knots. These include spoons, flashers, plastic or rubber squid ("hoochies") and natural baits, such as herring and anchovy.

Fishing depth, troll speed, type of lure and area fished all help to determine the number and species of salmon caught.

Crews clean and wash salmon before storing them in an iced or refrigerated hold. A day's catch could range from nothing to several hundred fish.

Salmon trollers can range from central California to southeast Alaska and can fish up to 50 miles offshore. The season, subject to change and restrictions, occurs between May and October.

Albacore trollers tow artificial lures on the surface at from 4 to 8 knots, to catch the fast-moving, hard-hitting tuna. Action can become intense at times, with the fishermen pulling in fish as fast as they can. A good day's catch might be 300 tuna— each weighing up to 40 pounds.

Albacore trollers tow as many as 13 lines of varying lengths from the outriggers and stern. A lure ("jig") is attached to the end of each unweighted line. Jigs have metal heads, plastic skirts or feathers, and large, barbless double hooks. Fish are pulled aboard by hand or by line haulers (pulleys) located on the stern. Once fish are onboard, they are allowed to "cool down" before being placed on ice or refrigerated in the hold, where they are stored in the round.

Albacore prefer water from 58° to 64°F. Trollers range far offshore; some venture to the mid-Pacific. A typical trip lasts 10 to 12 days, if ice is used to cool the fish, and up to 75 days with onboard freezing. There is no season restriction for this fishery in Oregon, although albacore typically appear in late summer and early fall off our coast, when the ocean water is warmer.

Many trollers fish for salmon during the early part of the season, switch to albacore, then to crab during the winter.

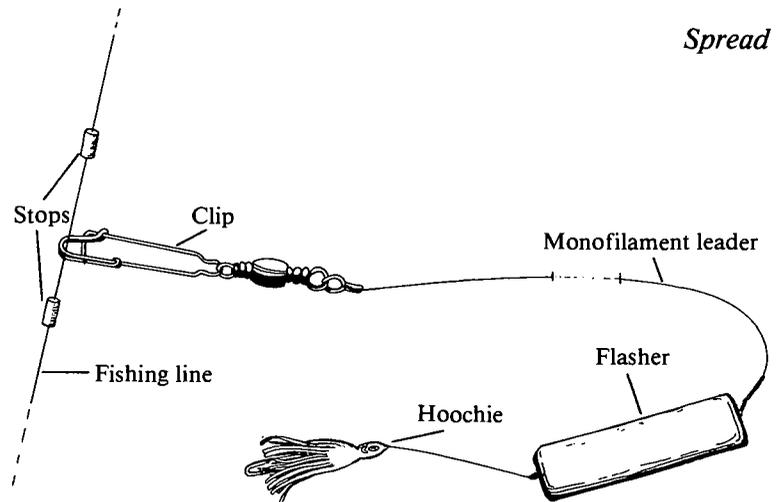
Longliners

Blackcod, halibut, and sturgeon are caught with a line ("groundline") stretched over the bottom with leader and baited hooks attached at intervals. The groundline is anchored at each end and marked by surface buoys, poles, and flags. Hook size and spacing, soak time (fishing time), and fishing depth vary; but the basic gear operation is the same.

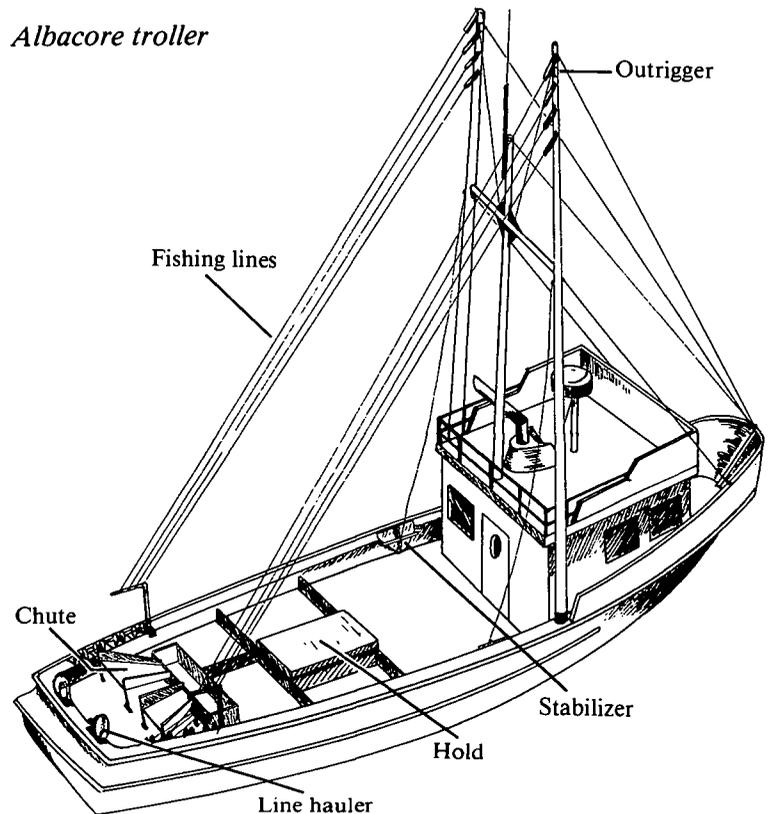
Onboard gear consists of bamboo poles about 17 feet long, with 12- to 14-inch red flags and 60-inch round buoys, usually stored near the pilot house. With this gear, a longliner has a distinctive appearance. A baiting tent, shed, or table on the stern, various types of line setting, and hauling and storage equipment (such as chutes, pulleys, and tubs) are also found onboard. When used, tubs on the work deck hold the groundline with hooks placed around the rims.

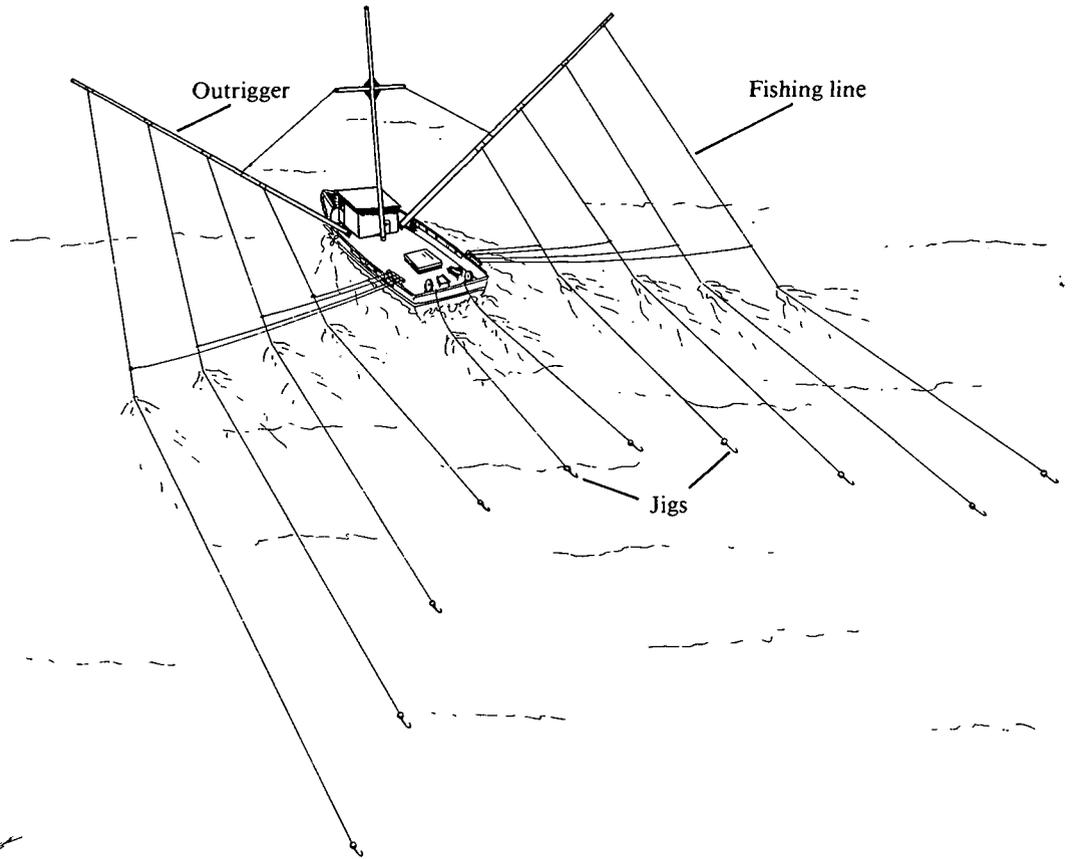
A halibut groundline might cover 3 miles, with up to 800 hooks, and take 3 hours to retrieve. Blackcod hook spacing is much closer. A groundline 1½ miles long could have 3,000 hooks.

Crews must bait hooks before they set the lines. They usually do this by hand although some automatic baiting machines are coming into use. Common baits include herring, octopus, and cod.

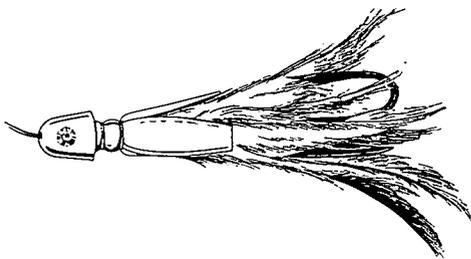


Albacore troller



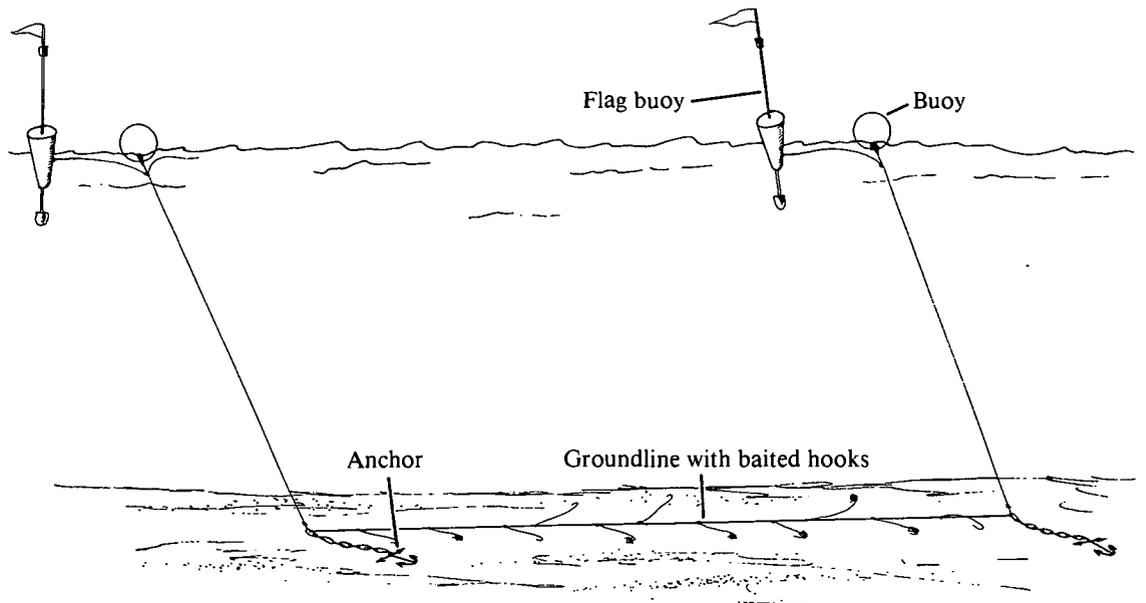


Tuna jig

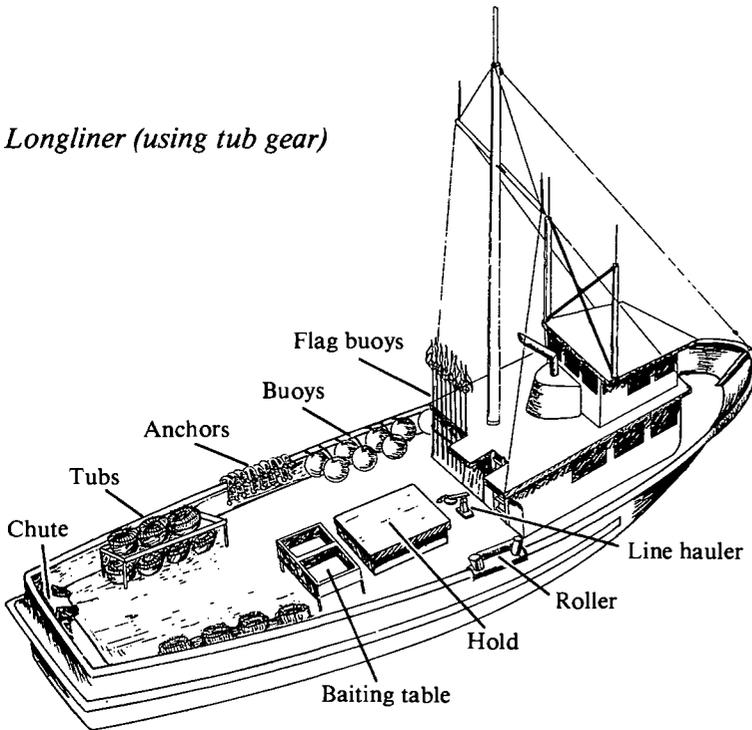


Albacore gear set (stabilizers not shown)

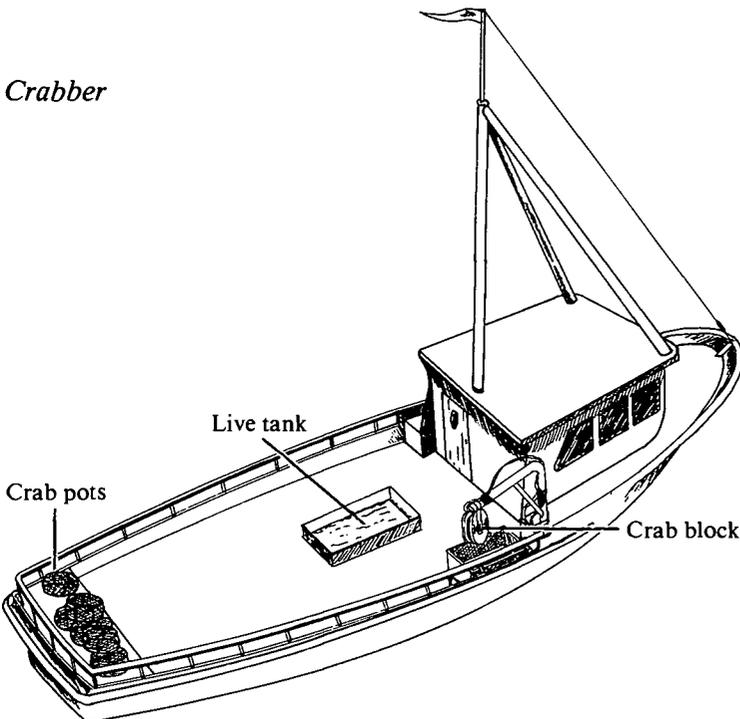
Set longline gear



Longliner (using tub gear)



Crabber



Halibut lines are set at 30 to 150 fathoms and soaked 6 to 12 hours before hauling. Blackcod longlines are fished at 100 to 400 fathoms and are hauled after only 4 to 6 hours because the soft-mouthed blackcod tend to wriggle free or be taken by predators. Blackcod may or may not be cleaned before icing, depending on the market. Halibut are always dressed at sea.

Blackcod are fished year-round, but the halibut season is limited by quotas and may only last a few days or weeks during the summer months.

The sturgeon longline fishery takes place on the lower Columbia River. Gillnet boats are used, and groundlines are wound on the net reel. The seasons are variable but may run for 2 months in the early spring and a month or more in the summer.

Fishing with pots

Pot fishermen use baited traps set on the ocean floor to catch live Dungeness crab or blackcod.

Dungeness crabbing, the primary pot fishery along the Oregon coast, uses vessels that participate in a combination of other fisheries during various times of the year.

Crabbers are rigged with a large, hydraulic power block ("crab block"). Mounted just behind the pilot house, it is used to haul in pots. The catch must be delivered live to the market, so vessels use a circulating seawater system in their holds to accomplish this.

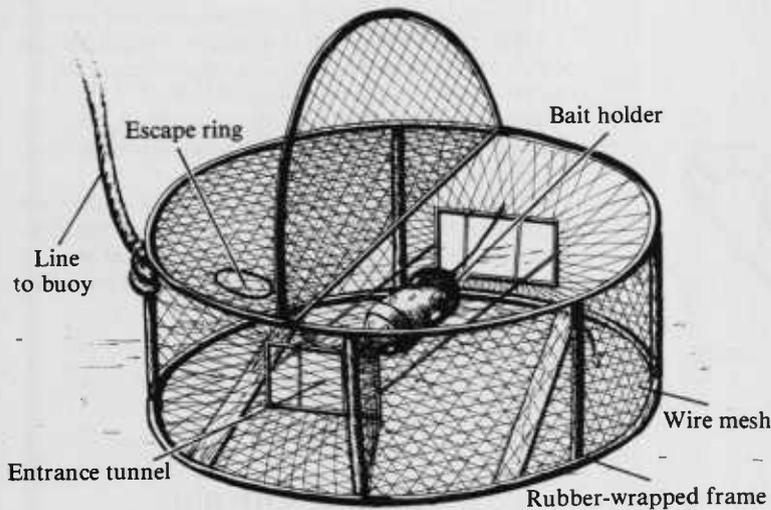
Most pots are circular, 36 to 48 inches across, and weigh from 75 to 160 pounds. The skipper and crew will often build their own during the off season. The 3/4-inch welded steel frames are wrapped with strips of used inner tube to protect the steel from corrosion.

Stainless steel wire is used to weave a 3- to 4-inch-diameter mesh over the wrapped frame. Tunnels on opposite sides of the pot allow crabs to crawl in after the bait. A ring on the top or side gives undersized crabs an escape route.

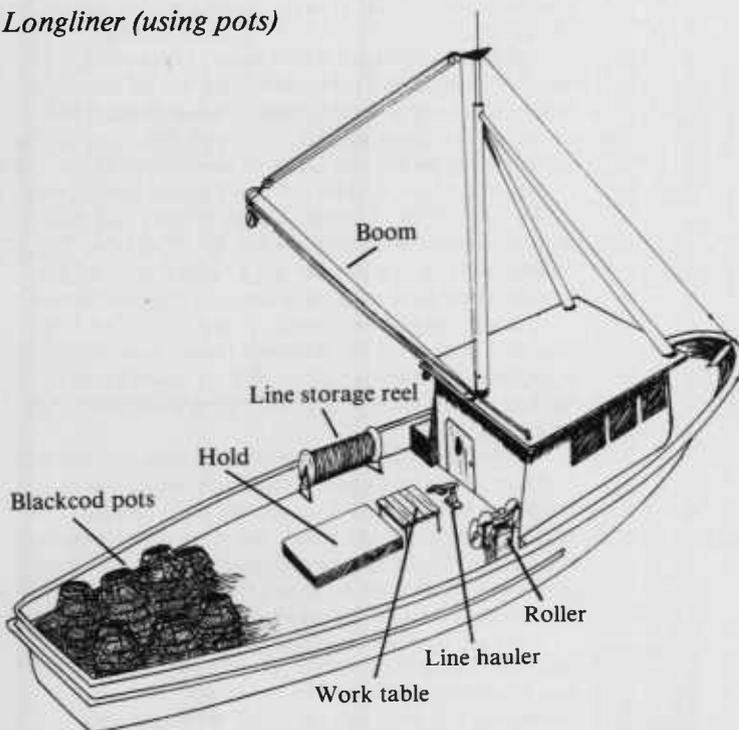
The crew pushes baited pots overboard, one at a time, as the vessel follows a particular depth line in waters from 3 to 80 fathoms. A single line and cylindrical plastic buoy attached to each pot marks its position on the bottom. Buoys are marked or colored to distinguish one vessel's pots from another's. Depending on vessel size, from 100 to 1500 pots are fished.

Pots are retrieved individually by snagging the buoy line with a hooked pole, placing the line in the crab block, and lifting the pot to the vessel. As each pot comes up, it is emptied, the catch sorted, the pot

Crab pot



Longliner (using pots)



rebaited and reset. A two-man crew can average 30 to 40 pots an hour, harvesting up to 60 crabs per pot.

Crab pots are checked every 1 to 7 days, depending on fishing conditions. Only male Dungeness crabs at least 6¼ inches across the shell may be harvested; the rest are returned live to the sea.

The season is normally from December through August.

Blackcod pot fishing is selective for blackcod and is used as an alternative to the other methods of catching this species.

Vessels are usually 60 or more feet in length because of the deck space required to carry the large pots. Rectangular, basket-shaped, and cylindrical pots are in use. Basket-shaped pots have collapsible bottoms so more pots can be stacked on deck. Onboard gear includes a line hauler or hydraulic block like the crab block, an overhead hoist for lifting the heavy pots, and large buoys and flag poles. Reels are sometimes used to hold the groundline, or it is coiled on deck or in the hold.

Pots baited with squid or herring are run on a longline system with up to 50 pots attached to each line. Groundlines are set at depths of 200 to 400 fathoms and are weighted at each end by an anchor. Surface buoys and flagpoles mark the location of the lines.

Fishing with dredges

Scallopers. The 1981 discovery of weathervane scallops in commercial quantities off the Oregon coast set off a flurry of activity in developing harvesting gear and processing techniques.

Quite a few of the vessels are converted double-rigged shrimpers. Instead of nets and doors, these tow two dredges simultaneously, one from each outrigger off the sides of the vessel.

Basically, a dredge consists of a metal frame box 7 to 15 feet wide, trailing a bag made of steel rings (see page 12).

Runners on the bottom of the box help it move over the sea bottom. It is towed from a cable attached to an outrigger. During the tow, scallops are scooped up and deposited into the bag.

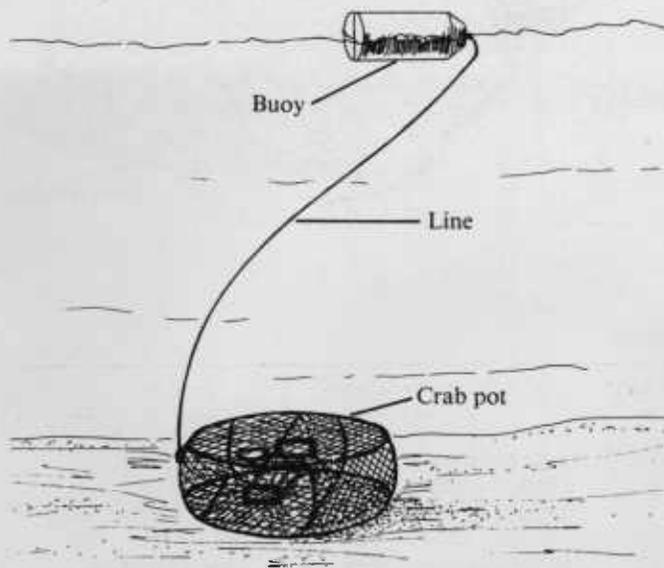
Scallops are shucked either on board or at the processing plant. Onboard shucking requires crews of 5 to 13, working in shifts around the clock. Shucking tables and wash boxes, or baskets, are set up on deck wherever there is space. Shucked scallops are placed in bags and chilled with ice or refrigeration in the hold.

Trips last from 5 to 10 days when scallops are shucked onboard. Otherwise, unshucked scallops are delivered daily to the processing plants.

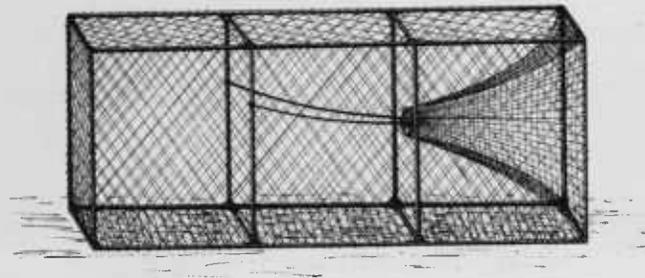
The fishery began with no season or gear regulations determined. When this bulletin was being published, management agencies and fishermen were working together to establish sound rules.

This bulletin was prepared by Susan V. Austin, licensed commercial fisherman, Newport, Oregon. The artwork is by Lise A. Klenke.

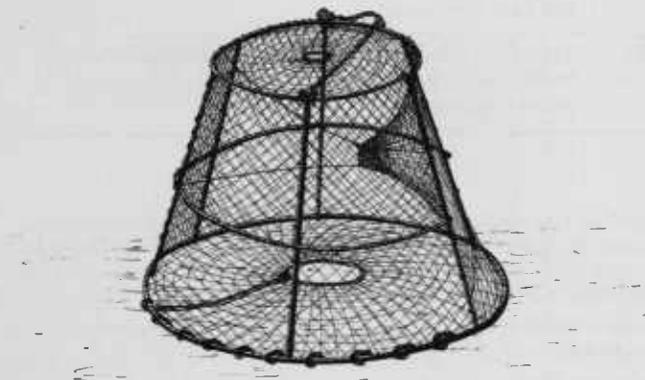
Set crab pot



Rectangular blackcod pot



Basket-shaped blackcod pot

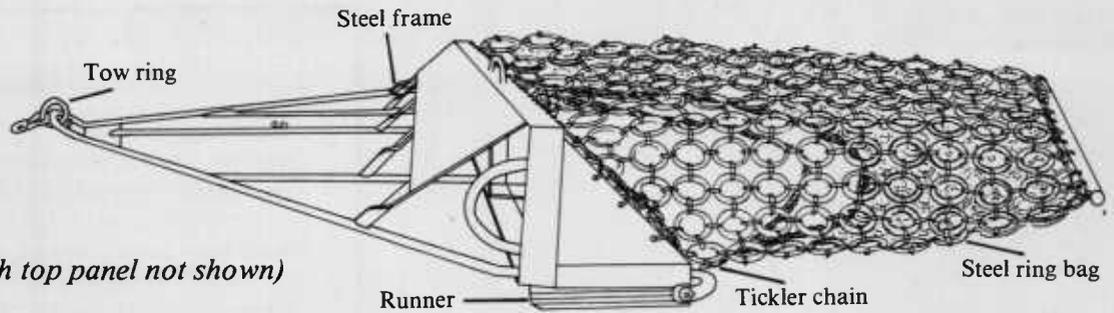


Glossary

- bow**—front of a vessel.
- cod end**—the narrow, closed end of a trawl net.
- crew shares**—percentage of catch value from fishing operations paid to crewmen as their wages.
- depth line**—a course along a uniform depth of water, such as “40-fathom line.”
- doors**—commonly rectangular wooden or metal structures towed ahead of a trawl to spread the mouth open (can be V-shaped or oval).
- dressed**—viscera have been removed.
- fathom**—6 feet.
- fishery**—the harvesting of specific finfish or shellfish, as in “salmon fishery.”
- flasher**—rectangular lure that uses a “flashing” action to attract salmon.
- float bag**—device used to float fishing line, weight, and gear from back of salmon troller.
- forward**—toward the front end of a vessel.
- gantry**—frame structure raised on side supports to span an area, usually on stern of vessel.
- hold**—storage compartment below decks used to store the catch.
- in-the-round**—viscera have not been removed.
- knot**—1 nautical mile per hour.
- lure**—a device with hooks used to attract fish.
- outrigger**—boom extending outward from a vessel’s side from which trawls or fishing lines are towed; kept in an upright position when not in use; used in pairs.
- pilot house**—enclosed area from which a vessel is normally operated (cabin).
- plug**—a wood or plastic cylindrical lure painted to generally resemble a bait fish.
- port**—left side of vessel (facing forward).
- pot**—baited trap used to catch finfish or shellfish.
- roller**—cylindrical device used to slide gillnets and groundlines over a vessel’s rail.
- season**—period during which a fishery is conducted.
- shellfish**—marine animals with hard external coverings such as crab and shrimp.
- starboard**—right side of vessel (facing forward).
- spoon**—type of lure used to catch salmon (spoon-shaped).
- stern**—back end of a vessel.
- trolling pit**—lowered area in the stern of a salmon troller from which vessel can be steered and gear worked.

For further reading

- Browning, Robert J., *Fisheries of the North Pacific* (Edmonds, Wash.: Alaska Northwest Publ. Co., 1980).
- Sainsbury, John C., *Commercial Fishing Methods: An Introduction to Vessels and Gear* (London: Fishing News [Books] Ltd., 1975).



Scallop dredge (nylon-mesh top panel not shown)

Appendix.—A comparison of Oregon fishing vessels, crews, gear, and seasons

Vessel	Fishery	Vessel Size	Crew Size	Distinctive Gear	Season
<i>Trawlers</i>					
Bottom dragger	bottomfish: perch, rockfish, cod, flounder, blackcod, sole	45-100 ft.	2 to 3	large mesh trawl, net reel, doors, winches, overhead boom	year-round
Shrimper	pink shrimp	45-85 ft.	2 to 3	<i>Single-rigged:</i> net reel, small mesh trawl, doors, winches, overhead boom <i>Double-rigged:</i> 2 small mesh trawls, 2 sets doors, winches, overhead boom, no net reel	April-October
Midwater	Pacific whiting, rockfish	70-100 ft.	3 to 4	1 to 3 net reels, winches, gantry, doors, stern ramp	year-round
<i>Gillnetters</i>					
	salmon, shad, smelt, sturgeon	20-40 ft.	1 to 2	roller; may or may not have net reel	intermittent (Columbia River)
<i>Trollers</i>					
Salmon	coho, chinook	18-60 ft.	1 to 2	outriggers, gurdies, lead cannonball weights; usually trolling pit	intermittent May-October
Albacore	albacore tuna	40-70 ft.	2 to 3	outriggers; usually line haulers	open but fished July-October
<i>Longliners</i>					
	blackcod, halibut, sturgeon	25-70 ft.	3 to 4	large round buoys with poles and flags, line hauler, roller; may or may not have tubs, chutes, baiting table, or shed	<i>blackcod</i> —year-round; <i>halibut, sturgeon</i> —on quotas (spring and summer)
<i>Crabbers</i>					
	Dungeness crabs	35-75 ft.	2 to 3	powerblock, crab pots, live tank	December-August
<i>Blackcodders</i>					
	blackcod	50-85 ft.	3-4	powerblock, overhead boom, blackcod pots; may or may not have reel, roller	year-round
<i>Scallopers</i>					
	scallops	45-85 ft.	up to 13	2 dredges, winches, overhead boom, outriggers, shucking tables, wash boxes	none established

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