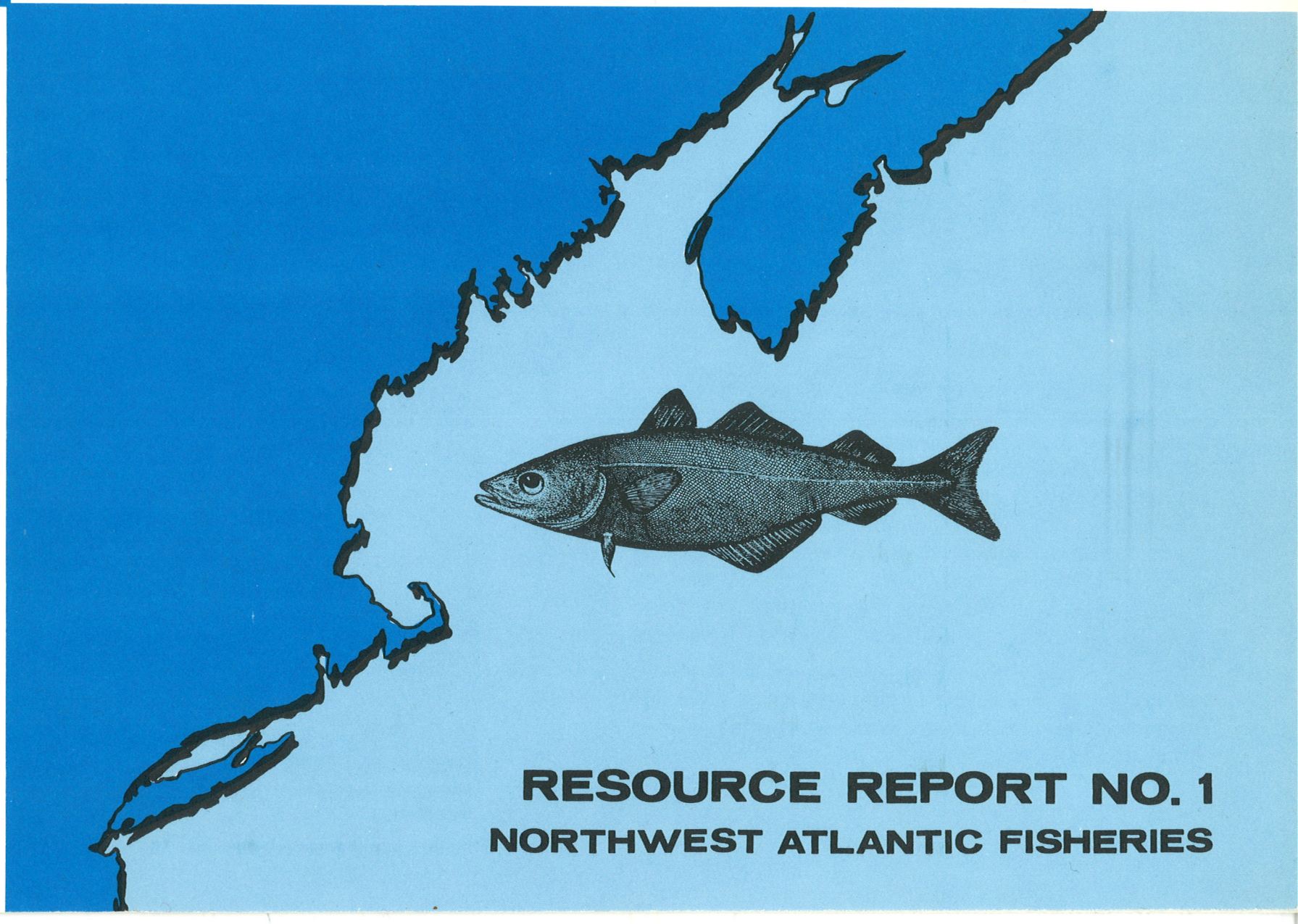
A UNITED STATES DEPARTMENT OF COMMERCE PUBLICATION

POLLOCK



RESOURCE REPORT NO. 1

NORTHWEST ATLANTIC FISHERIES

U.S.
DEPARTMENT
OF
COMMERCE
National
Oceanic and
Atmospheric
Administration

U. S. DEPARTMENT OF COMMERCE

Maurice H. Stans, Secretary

Rocco C. Siciliano, Under Secretary

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Dr. Robert M. White, Acting Administrator

NATIONAL MARINE FISHERIES SERVICE

Philip M. Roedel, Director

INTRODUCTION

The harvest of marine fishery resources becomes more complex as new, and often unfamiliar, kinds of gear become available to fishermen and as competition for the world's fishery resources grows. United States fishermen need key information on the fish species sought—water temperature, grounds, seasons, gear, market potential, etc.—to plan future operations intelligently. This is of special interest when a fisherman considers entering a new or different fishery. The aim of this Resource Report series is to get this key information, where known, into the hands of those in the fishing industry in some concise form. Emphasis is on underutilized and potential fishery resources.

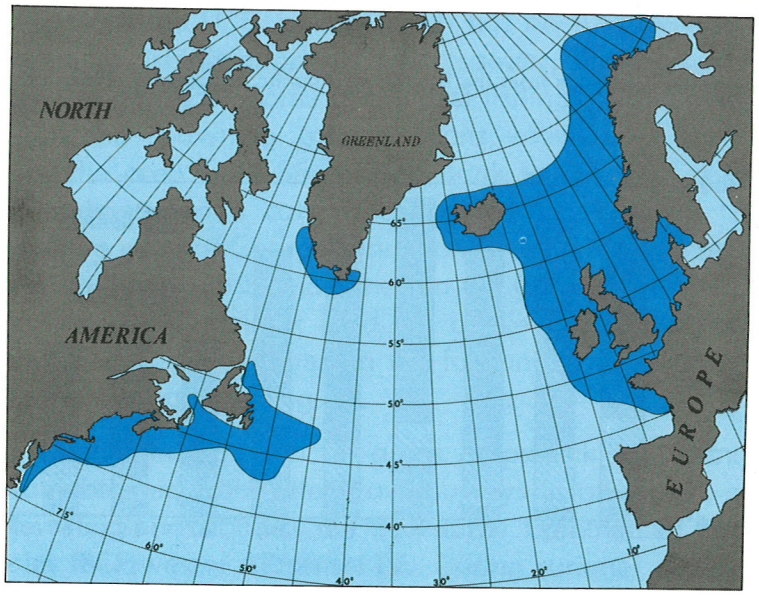
This report on pollock is the first in this series. The contents were assembled by National Marine Fisheries Service[1] personnel. Their work covers the areas of information discussed. Their objective was to make this pamphlet useful to the industry for planning fishing strategy. We invite the suggestions of readers for improving future pamphlets.

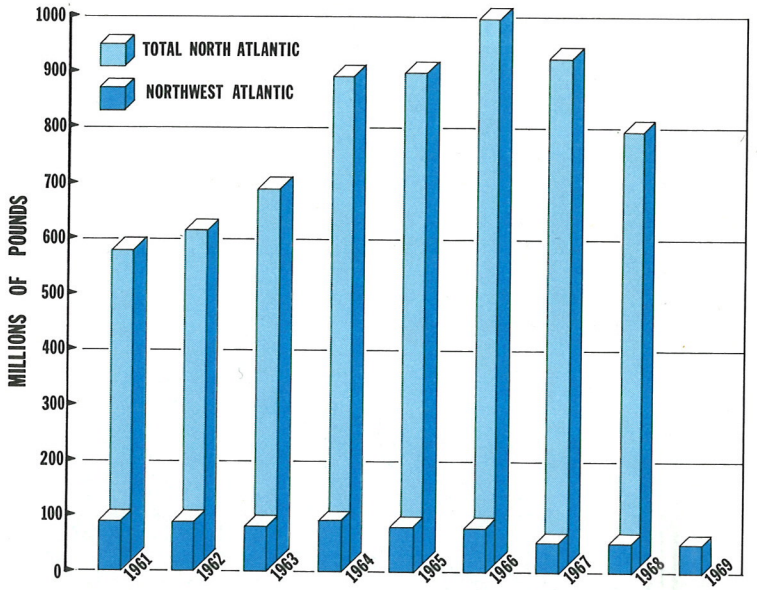
[1] Formerly Bureau of Commercial Fisheries

Pollock Widely Distributed

The pollock, a close relative of the cod and haddock, is found in the cool, coastal waters from Cape Hatteras northward to Newfoundland, Greenland, Iceland, and, in European waters, from the coast of France to the northern coast of Norway (Fig. 1). This species, called saithe or coalfish in Europe, has been fished heavily in northern European waters for more than 50 years. Landings from the entire North Atlantic, for all countries, reached a high level of one billion pounds in 1966 and have since declined to about 800 million (Fig. 2). Judging from the comparative landings, pollock is not nearly as abundant off the North American coast as on the eastern side of the North Atlantic.

1. Range of pollock (*Pollachius virens*) in the North Atlantic Ocean.

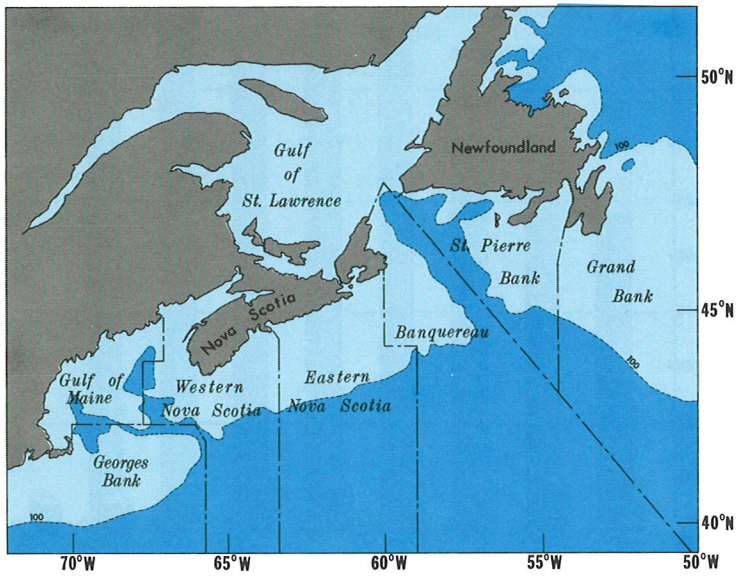




2. Pollock landings from the entire North Atlantic and the portion from the Northwest Atlantic.

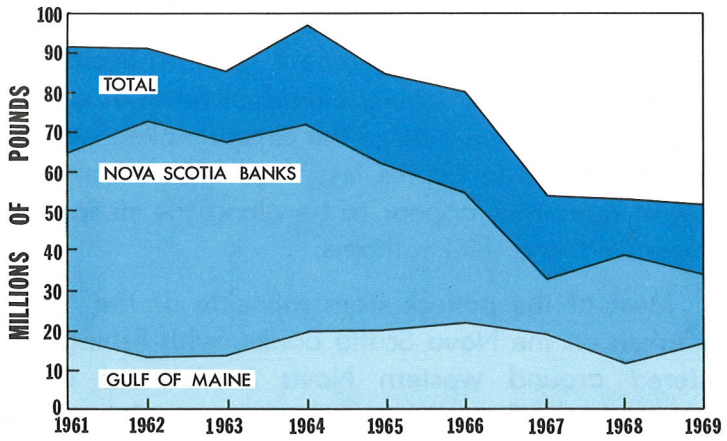
On the North American side of the Atlantic, the pollock is abundant only over a short part of its range. Being a cool-water fish, rather than a cold-water species like the cod, it is most abundant off western Nova Scotia and in the Gulf of Maine (Fig. 3). It is comparatively scarce south of Georges Bank or north of southern Newfoundland. The bulk of the catch is taken with bottom otter trawls in depths less than 100 fathoms. The greatest quantities appear to be along the steep slopes between 40 and 100 fathoms.

Most of the pollock from this side of the Atlantic are taken on the Nova Scotia banks, with fishing effort centered around western Nova Scotia and eastern Georges Bank (Fig. 4). In recent years, Canada has landed the greatest portion of this catch. The United



3. Fishing areas of the Northwest Atlantic.

4. Pollock landings from the Northwest Atlantic, by fishing area, 1961 - 1969.



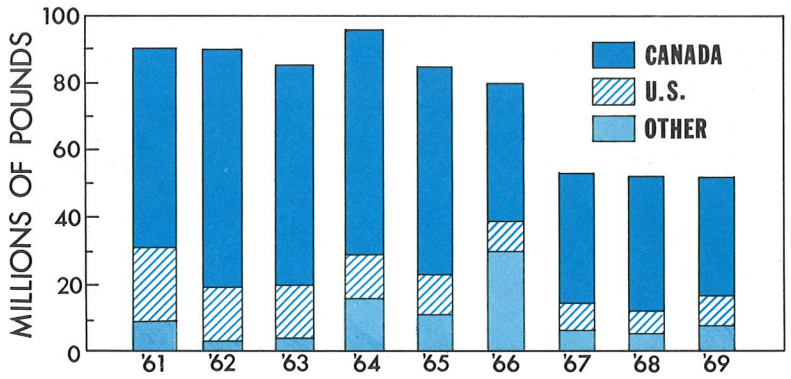
States usually has been second with much smaller landings (Fig. 5).

There has been a drop in pollock landings from the Northwest Atlantic since 1964. Canadian landings in particular have declined because of the drop in catch from the Nova Scotia banks. Aside from 1966, there has been no steady influx of new fishing effort for pollock on the Nova Scotia banks by countries, such as Germany, that have fished this species heavily in eastern Atlantic waters. It seems likely that fishermen from these countries would fish harder for pollock on the Nova Scotia banks if large quantities were available.

Estimation of Stock Size Difficult

The U. S. catch of pollock generally has been taken by boats fishing for other species such as haddock.

5. Pollock landings from the Northwest Atlantic, by country, 1961 - 1969.

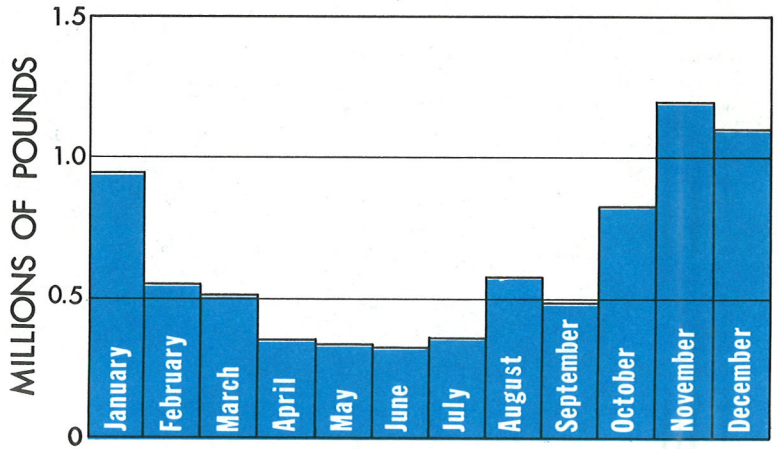


Therefore, there has been little opportunity to measure the fishing effort directed specifically toward pollock. Without a measure of this fishing effort, and its effect on pollock abundance, it is very difficult to estimate the size of the pollock population. The comparatively small landings of pollock from the Gulf of Maine, however, suggest that increasing the fishing there would raise the catch. Pollock congregate in the southern Gulf of Maine to spawn during the late fall and winter. It is likely that greater quantities of these spawners could be taken than have been harvested in the past if more boats fished there.

Catch Is Seasonal

Since the U. S. pollock catch has been largely incidental to fishing effort for other species, there are few favorite grounds. Some of the best fishing, as indicated, is on the spawning concentrations which are located over the area from Stellwagen Bank to Jeffreys Ledge. In addition, good catches are made at times on the northern edge of Georges Bank, on Grand Manan Banks, and on the Nova Scotian shelf in the general vicinity of Browns Bank. Pollock landings at New England ports are, as expected, highest in the fall and early winter—the spawning time (Fig. 6).

More information on areas of pollock abundance was obtained from otter trawl surveys in all waters off New England aboard the Bureau of Commercial Fisheries (BCF) vessel **Albatross IV.** During summer surveys, which were conducted in July and August, they were least abundant. The few substantial catches made then were from the general area off Matinicus Island and Mt. Desert Rock in about 30 to 100 fathoms. The bottom temperature there was about 43° to 46°F. Better catches were made during the fall surveys (October to November), with the highest catches coming from the Stellwagen Bank-Highland Light area and from along the northern edge of Georges Bank. These catches were



6. Average monthly landings of pollock at principal New England ports, 1965 - 1969.

mostly in depths of 30 to 60 fathoms and at bottom temperatures of 42° to 46°F. During the winter surveys (January and February), the catches were similar to those in the fall, although they were from different areas. The best catches were made to the north of South Channel in the area of Tobins and off western Nova Scotia, particularly around the southwest edge of Browns Bank. The water depth in both of these areas was 50 to 100 fathoms, and the bottom temperature was 39° to 41°F.

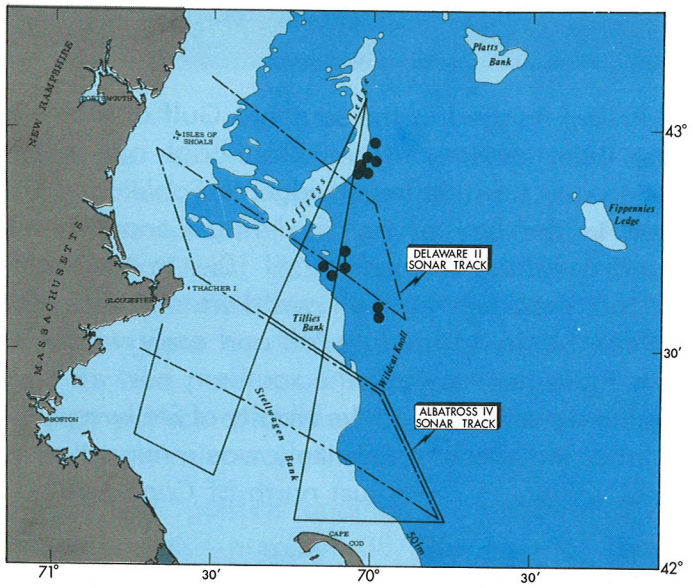
7. Large pollock on the deck of the *Delaware II*.

Pollock Often Above Bottom

Further information on areas of abundance in the summer (late May to mid-June) was obtained from pollock scouting trips by fishing vessels under charter to the BCF in 1969. Results from these show that pollock in good numbers were available to trawls, particularly to the high-opening types, on Grand Manan Banks in 40 to 80 fathoms and on Western Hole grounds in 78 to 90 fathoms.

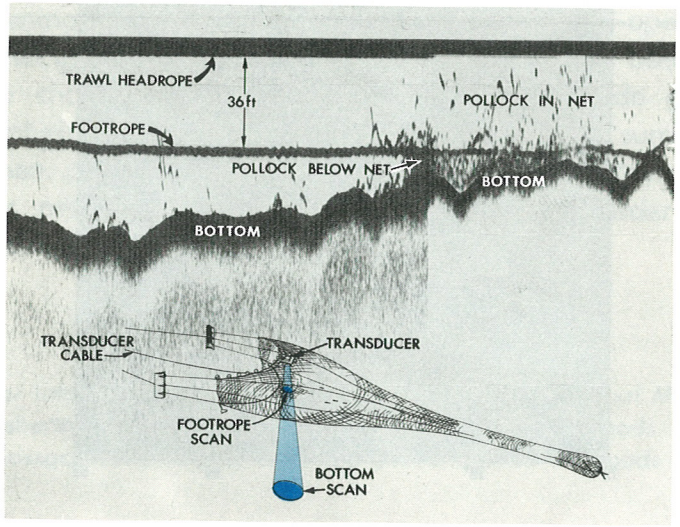
Two special pollock surveys by BCF vessels in November and December 1969 provided further catch information. In the first of these, pollock fishing areas along the western side of the Gulf of Maine were surveyed by the **Delaware II** in late November 1969 (Fig. 7). Good pollock concentrations were found northwest of Wildcat Knoll in 45 to 52 fathoms. Moderate concentrations were found off Sharrer Ridge in 68 to 100 fathoms, off Thacher's Buoy in 25 fathoms, and off the eastern edge of Jeffreys Ledge in 32 to 34 fathoms.

The second pollock survey was a joint one by the **Delaware II** and **Albatross IV** in December 1969. Good catches of pollock, shown as black dots in figure 8, were made with bottom trawls in the area from northeast of Tillies Bank in 50 to 70 fathoms to off the eastern edge of Jeffreys Ledge in 50 to 85 fathoms. The bottom temperature over this area ran about 46° to 48°F. The fish in some of these catches were located with sounding gear before the trawls were set. The largest catch, in this case with a midwater trawl, was made this way (Fig. 9).



8. Locations of large pollock catches off Jeffreys Ledge by *Delaware II* and *Albatross IV* in December 1969.

9. Echogram of pollock made during a midwater trawl tow.



A Winter Spawner

One of the most important pollock spawning areas appears to be in the southern Gulf of Maine, particularly over the rather broken bottom between Stellwagen Bank and the Isles of Shoals. Some spawning also takes place along the southeast coast of Nova Scotia. There apparently is little spawning in the northern Gulf of Maine, in the Bay of Fundy, in the deeper parts of the Gulf, or on Georges Bank.

Small Pollock Are Inshore

The eggs drift in the upper water layers for the six or eight days required for hatching. The newly hatched young also are in these upper waters until development to fingerling size is complete in the late spring. The small fish then go to the bottom in coastal areas from Cape Cod to southern Newfoundland. These fish spend their first two or three years in coastal waters, which serve as nursery areas, and are commonly known as "harbor" pollock. They frequently are seen in bays and harbors rising to the surface in schools in pursuit of small bait fish and shrimp. During the coldest months they apparently move to deeper, warmer water farther offshore.

Pollock gradually move offshore as they grow larger, and the fish in the deeper areas of the Gulf of Maine, down to perhaps 80 or 100 fathoms, consist of large individuals.

The growth of pollock in the Bay of Fundy is approximately as shown in the table. The fish spawn for the first time at ages four to seven. As is seen, growth slows after age six. Pollock in waters off New England grow at about this rate also.

Age in years	Average length in inches	Average weight in pounds
1	6	0.2
2	12	0.5
3	16	1.8
4	19	3.2
5	22	4.6
6	26	6.8
7	28	8.4
8	29	10.5
9	30	12.0
10	31	13.2

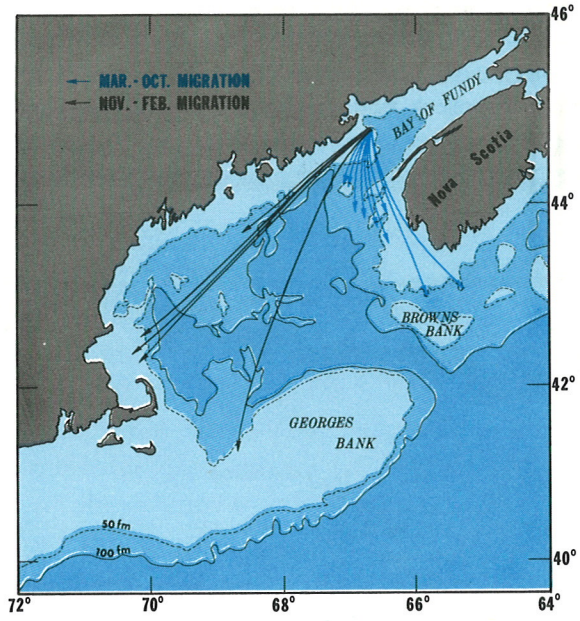
(Data from Steele, 1963.)

Pollock feed largely on small fishes, such as herring, whiting, and sand eels, and on the kinds of shrimp that are found in the upper layers of water. These feeding habits bring them far above the bottom at times, and bottom trawls are sometimes ineffective for catching them. They are cool-water fish, however, and are unlikely to be found in upper waters when the water temperature is above 52°F. And even the harbor pollock are not abundant in water over about 60°F.

Migrate to Spawn

Pollock tagged in the southern Gulf of Maine have shown little tendency to move, although one made the long journey from Jeffreys Ledge to Sable Island. Fish tagged in the Bay of Fundy during Canadian studies showed greater movement (Fig. 10). In the spring to early fall, these fish tended toward waters around Western Nova Scotia; in the late fall and early winter, there was a movement toward the southern part of the Gulf of Maine—particularly to the vicinity of Stellwagen Bank. This latter movement quite likely was a migration to the coastal spawning areas just north of Cape Cod.

10. Movement of tagged pollock from the Bay of Fundy.



Mostly Otter Trawl Fishery

The otter trawl is the most important gear used for catching pollock, although lines, gill nets, purse seines, and midwater trawls also have been used with some success at times. Most New England fishing vessels are rigged for otter trawling, and conversions to some of these other gears would be expensive and of doubtful success for the pursuit of pollock alone. Methods for increasing pollock catches with otter trawls will, therefore, be given principal consideration below.

Most U. S. pollock landings are made with "Yankee"-style trawls—numbers 35, 36, 41, etc. They are moderately effective, but, as mentioned, pollock are not a primary species sought by New England fishermen, and development of more efficient trawls for pollock has had little attention. Since these fish often are some distance above the bottom, the BCF recently has tried high-opening nets for them. One four-seam, high-opening trawl, developed by the BCF at Gloucester and used on the chartered boats referred to earlier, made good catches of pollock in the late spring and early summer, when pollock landings normally are low. Plans for this net, which presently must be built to order are available.[1]

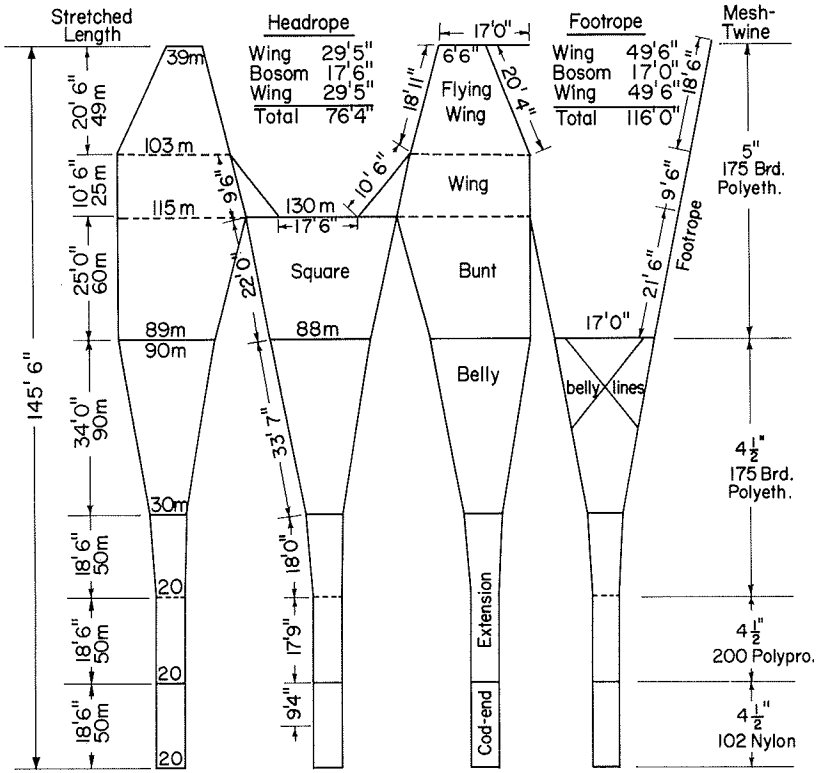
[1] For information on gear and net plans, write National Marine Fisheries Service, Gear Research Base, Box 6, Woods Hole, Massachusetts 02543, or phone 617 548-5123 in Woods Hole.

High-Opening Trawls Available

A similar high-opening, four-seam trawl which currently is coming into use is the Atlantic Western Trawl. This net is available in Canada, and in a few places in the U. S., in a range of sizes for different size vessels. Measurements for four models and the Yankee trawls of approximately equal size (and drag) are summarized in the table. Many U. S. groundfishing vessels could convert easily to the Model III without other changes.

Comparative Sizes of Otter Trawls

Atlantic Western Trawl			Otter Trawl Models		
Net	Length in Feet		Net	Length in Feet	
Model	Headrope	Footrope	Model	Headrope	Footrope
I	98′	137′	Yankee #45-A	85′	116′
			Icelandic-Yankee	76′	116′
II-A	61′	98′	Yankee #36	60′	80′
			60 - 80	60′	80′
III	79′	116′6″	Yankee #41	79′	100′
			#41-A	73′	94′
IV	54′3″	78′1″	Yankee #35	50′	70′



11. Plan of Atlantic Western Trawl - Model III.

A plan for a modified Model III Atlantic Western Trawl is given in figure 11, with the construction details in the table. The in-use headrope height of this net during tests with transducers attached was 16 to 20 feet, depending on tide, weather, and vessel speed. The wingspread was fairly constant at about 44 feet. In comparison, a number 41 net had a headrope height of about 10 to 12 feet and a wingspread of about 42 feet.

Construction details for the Atlantic Western Trawl—Model III

Part	Specifications
Headrope	Three lengths 7/8″ dia. comb. wire rope 76′-4″ long: 18′-11″ + 38′-6″ + 18′-11″. 38′-6″ length marked 10′-6″ from ends.
Footrope	Seven lengths 3/4″ or 7/8″ dia. 6 x 19 wire rope 116′ long: 18′-6″ + 9′-6″ + 21′-6″ + 17′ + 21′-6″ + 9′-6″ + 18′-6″.
Wing end rope	Two lengths 3″ cir. nylon rope, 17′ long.
Fishing line	One length 7/8″ dia. comb. wire rope 18′ long.
Hanging line	Five lengths 2-3/4″ cir. polypropylene rope: 9′-9″ + 22′-4″ + 19′ + 22′-4″ + 9′-9″. Two lengths 2-3/4″ cir. polypropylene rope for flying wing taper—each 20′-4″. Eye at each end.
Rib lines:	
Wings and squares	Two 34′-6″ lengths of 2-1/4″ cir. polypropylene rope, eye one end. Marked at successive intervals, 22′ and 9′-6″ from eye.
Belly to codend	Four 81′-8″ lengths of 2-1/4″ cir. polypropylene rope, no eyes. Marked at successive intervals, 3′, 33′-7″; 18′, 17′-9″, 9′-4″ from one end.
Floats	Thirty-six 8″ dia. aluminum floats.
Rollers	Roller gear and rubber disks to suit on footrope wires up to flying wing. Large diameter rollers (20″) recommended.
Belly lines	Two lengths 1-1/2″ cir. polypropylene rope 45′ long.

High-opening nets strain more water than low-opening ones of the same spread, and they, therefore, have greater drag. Since few fish try to escape in the leading parts of the net, using large mesh in the wings and square would reduce drag without materially affecting escapement.

Midwater Trawling and Other Methods

Commercial midwater trawls are not available in smaller sizes suitable for use by most New England trawlers. Midwater trawling offers a distinct advantage over other methods for fishing above rocky bottom, but it is unlikely that conversion to midwater trawling for full-time pollock fishing would be profitable. If suitable midwater trawls become available, this fishing method may prove to be useful on spawning concentrations of pollock during the late fall and winter, with seasonal dependence on other species.

Purse seining requires large, sustainable volumes of fish. It is not recommended for pollock fishing alone, although it could be useful at some seasons when pollock are concentrated in waters above the bottom. This gear is used to take about 80 percent of the pollock catch along the coast of Norway where great numbers of immature fish concentrate in the fjords.

Gill nets have been used for pollock in the past in areas of very rocky bottom, such as off the Maine coast where bottom trawling is impractical. Conversion of large otter trawlers to gill net fishing would be expensive and impractical as it does not utilize most of the major fishing equipment used aboard trawlers. Very small trawlers, however, could convert easily to this gear on a seasonal basis.

Market Prospects Good

The successful campaign in 1969 to introduce pollock to the consumer showed that there are large potential markets for this fish. This nationwide effort, with its major concentration on New England, New York, Pennsylvania, and the Baltimore-Washington area, reached all levels of the food industry, including major retail grocery chains from Maine to West Virginia. More than 200

12. Julia Child's T. V. demonstration of pollock cookery was shown throughout the country.

food vendors tested pollock, and most rated its taste and texture "highly acceptable." Some 3,000 food experts (food editors, nutritionists, restauranteurs, etc.) sampled pollock at fish cookery demonstrations. Leaflets and recipes were distributed at 10 conventions of people employed in group feeding enterprises. Posters and tear-off recipe pads were used by hundreds of Massachusetts stores and seafood markets for a major pollock promotion in August 1969.

In addition, consumers were exposed to pollock through over 3,000 radio and TV programs (Fig. 12). Housewives clipped pollock recipes from 1,500 newspaper and magazine articles. Every major newspaper in the northeast carried at least one article on pollock.

As a result of the campaign, pollock sales are up, and the market could use more of this fish. Unfortunately, domestic pollock production is not keeping pace with the expanded demand. To fill its needs, the industry has had to depend heavily on imported fish.

Steady Supply Needed

Retail market outlets need a stable pollock supply at controlled costs for efficient operations. They would prefer to sell pollock at moderate prices until it becomes solidly established with the public. Therefore, while the near-term ex-vessel prices will not be as high as for fish of established popularity like haddock, the long-term prospects seem good.

Domestic processors should be able to expand markets immediately for fresh and frozen pollock fillets and steaks in New England and to the south. It will be more difficult to penetrate mid-west and upstate New York markets, however, because of strong foreign competition. Frozen fillets will move best in the latter areas.

For the restaurant trade, fresh pollock must be available year-round from local suppliers and in the proper product form. The large fillets now produced by most domestic processors generally are unacceptable. The restaurant market could very likely be increased substantially if processors convert these larger fillets to smaller cuts.

13. Double portions show pollock is finest kind at school lunch.

Institutional feeders need strict portion control to manage costs. Schools and in-plant cafeterias are extremely cost conscious—more so than hospitals, nursing homes, and the military. All institutions, however, will expect to get pollock for reasonable costs until high acceptance is established.

A number of institutions already use pollock occasionally with good results, and this market probably could expand rapidly (Fig. 13). The fresh and frozen fillets are highly acceptable here in taste and texture, but they often are rejected because of size.

High Quality Demanded

Shipboard handling of fresh pollock greatly affects landed quality. Since the shoreside processor cannot improve the quality of what is delivered to him by the fisherman, the latter bears the greatest responsibility for a high quality product.

To land high quality pollock, the fisherman must handle the fish with care to avoid bruising. The fish must be gutted thoroughly. Only the belly area should be cut and not the side or fillet area as often happens. All tag pieces of guts should be cut off. Ideally, the blood-colored material along the backbone and gills should also be removed. The gutted fish should be washed immediately in clean seawater and put gently into the fish hold. There they should be stowed with sufficient ice to cool them rapidly to 32°F. and to keep them at that temperature for the rest of the trip. The gut cavity of large fish should be filled with ice to speed cooling. Quality tests of pollock handled as described above show that marketable storage life is about 14 days.

Small Cuts Preferred

Fresh U. S.-caught pollock usually is marketed whole or as skinned or unskinned fillets. The fillet size from small pollock is similar to that from haddock, and the consumer acceptance is good. The long, thick slab fillets from large pollock, however, meet with sales resistance. Studies have shown that these thick fillets can be split into two or more thinner fillets which then can be cut further into fillet-shaped pieces of acceptable size. The table gives percentage yield from the various market classifications of pollock fillets. The information is based on the experience of several New England processors.

Market Classification of Fillet	Percent Recovery	
	Skin-on	Skinless
Full nape	46	44
Partial nape	43	41
Regular cut	40	38
Boneless	36	34

Steaks and chunks are market forms not usually used for the large pollock landed by the U. S. fleet. They can be prepared from fresh, iced fish with special power-driven circular knives. It is more common, however, to freeze the fish and then to cut the steaks and chunks with a band saw. Flavor is superior in the unfrozen fish.

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[1] For additional information on literature, write to National Marine Fisheries Service, Biological Laboratory, Box 6, Woods Hole, Massachusetts 02543, or phone 617 548-5123 in Woods Hole.