



A basketful of northern shrimp taken within 50-mile radius of Boothbay Harbor, Maine. (Photo: R. L. Dow)

THE U. S. EDIBLE FISH SITUATION

In the early months of 1968, supplies of edible fishery products ran 10 to 12 percent below a year earlier. Tighter supplies resulted in rising prices for most fishery products.

April 1 stocks of edible frozen fish were 12 percent below April 1, 1967. Stocks of frozen fillets and fish sticks and portions were a fifth lower than a year earlier. Holdings of cured fish were down about a third. Total stocks of shellfish were 6 percent above a year earlier because of plentiful supplies of processed shrimp products. Stocks of raw, headless, shrimp were adequate. Stocks of other shellfish were scarce.

During January-February, imports of fishery products were slightly higher than during the same months in 1967. Domestic landings were about the same to slightly below.

Late Spring-Early Summer

Supplies of fish and shellfish will increase seasonally during late spring and early summer as domestic landings pick up. However, total supplies are expected to continue below year-ago levels. The quantity of fish in Canada, a major U. S. supplier, is also 10 to 15 percent below last year.

Normally, a small seasonal decline in fish prices occurs in the second quarter. It is likely that prices will not show the usual seasonal decline in the second quarter because of tight supplies. Retail prices rose gradually from November 1967 to February 1968. The sharp increase in wholesale prices in

November and December 1967 is likely to be reflected in gradual increases in retail prices in the second quarter of 1968.

1968 Forecast

Despite lower supplies and higher prices, total consumption of fish and shellfish is expected to increase in 1968. However, indications point to a slight decline from 1967 in per-capita consumption of fresh and frozen fish. A substantial gain in imports and/or domestic landings would be necessary to keep per-capita consumption of fresh and frozen fish at year-ago levels. Per-capita consumption of canned fish and shellfish likely will hold at the 1967 level.

Among the popular fresh and frozen fillet items, only supplies of cod are likely to increase over a year ago. Supplies of haddock--and probably flounder too--are expected to decline again in 1968.

In sticks and portions, current supplies are a fifth below 1967. Any increase in sales likely will be for fish portions rather than fish sticks.

West Coast Fisheries

In the West Coast fisheries, supplies of halibut will be adequate for consumer needs. Halibut prices are currently below year-ago levels but are expected to rise during the annual marketing year that began in April.

Canned salmon stocks have been short in recent months. Landings of salmon are expected to improve over the very low level of

last year; prices likely will ease somewhat from current levels, depending on abundance.

Supplies of king crab, imported lobster tails, live lobsters, and scallops are scarce; prices are record high.

King crab landings in Alaska in early 1968 were much below a year earlier. Prices rose steadily. Even when landings pick up seasonally in the summer, prices are not expected to decline very much.

Lobster Tail Imports

Imports of lobster tails are seasonally heavy. As a result, a slight increase in holdings was evident in recent months; however, holdings continue well below a year earlier. The current volume of imports brought about a slight but temporary decline in lobster tail prices. Even if imports become abnormally heavy in the next month or so, prices would not be expected to drop to year-earlier levels.

Scallops Gain Gradually

Stocks of scallops showed a gradual gain in early 1968 but still were well below a year

earlier. The tremendous increase in prices during second-half 1967 apparently leveled off. Prices of scallops probably will weaken a little when fishing increases seasonally in the spring, but they will remain far above year-earlier levels.

Shrimp Plentiful

Stocks of processed shrimp products--breaded, peeled and deveined, and specialty products--are plentiful. Stocks of raw, headless, shrimp are heavier than a year ago, but supplies of larger shrimp are scarce and adequate only in medium sizes. Prices of raw, headless, shrimp are expected to continue gradually upward until about June 1. After that, prices for medium and small shrimp can be expected to decline seasonally as landings from the new crop are received. The seasonal decline is not expected to be as great as a year ago. Prices for large shrimp are expected to continue gradually upward until volume production begins in late summer. (BCF Branch of Current Economic Analysis.)



UNITED STATES

Shellfish Prices Expected to Remain High in 1968

In 1967, the harvest of shellfish other than shrimp declined. Imports were lower. Together, these factors helped boost prices in several categories to record highs. Record shrimp landings gave the U. S. its first \$100 million fishery.

This, and much other information, is contained in BCF's annual review, "Shellfish Situation and Outlook." It lists sea scallops, soft clams, king crab, blue crab, live northern lobsters, and lobster tails as record-breakers in wholesale pricing. Small declines from 1966 record prices are estimated for frozen shrimp and hard clams; but both were still well above average price levels in 1967. The only significant weakening occurred in the market for shucked oysters; it dropped nearly 9 percent below the 1966 average.

Shrimp

U. S. shrimp landings in 1967 were 191 million pounds (headless weight). Shrimp imports were a record 202 million pounds. At the beginning of 1967, inventories were above average. These elements combined made a total of 436 million pounds of shrimp available to U. S. consumers during the year. U. S. consumption of fresh and frozen shrimp for 1967 is estimated at 290 million pounds, based on South Atlantic and Gulf landings, a 6-percent gain over 1966.

Sea Scallops

Supplies of sea scallops dropped about 30 percent in 1967. The domestic catch of 10 million pounds was 40 percent below 1966's relatively low catch; imports of 13.5 million pounds were the lowest since 1963. Because supplies were short, the 1.2-million pound carryover for Jan. 1, 1968, was the lowest since 1946. The estimated total U. S. scallop consumption of 25.6 million pounds in 1967 was the lowest since 1958. Sales for the first 4 months of 1968 are expected to reach only 6 million pounds; they were 8 million for the 1967 period.

Lobsters

Domestic catch and imports of northern lobsters continued to decline. The 1967 imports of 15.6 million pounds were the lowest since 1945. Total U. S. landings in 1967 are estimated at 24.8 million pounds; these include 16.1 million pounds from Maine waters. Dockside lobster prices in 1967 were 8 percent above 1966. Wholesale prices for early 1968 are averaging about 50 cents a pound higher than prices of early 1967.

In the scallop fishery, decreasing abundance has been reflected in a smaller number of boats making fewer trips. The lobster, however, is pursued by means more accessible to the amateur. The smaller number of full-time lobstermen has been offset by more casual fishermen--all setting more traps than before. The net result is increased effort in this fishery.

Lobster supplies for first-half 1968 are expected to be no greater than those in 1967, possibly a little lower. Prices will probably continue above year-ago levels.

Spiny Lobster Tails

Consumption of spiny lobster tails in 1967 is estimated at 30.3 million pounds--8 percent over the previous two years. Supplies were down slightly from 1966. They totaled 34.1 million pounds, including 27.3 million in imports. The Jan. 1, 1968, carryover of 3.8 million pounds represented a drop of 44 percent below Jan. 1, 1967.

At the mid-April record price level (about \$2.65 per pound wholesale), spiny lobster sales are expected to be about 10 million pounds for Jan.-April 1968. The demand will probably be strong enough to prevent any sizable increase in holdings.

Aquaculture

The U. S. Government wants to help solve the problem of high prices and scarce supplies of shellfish. The U. S. is broadening its investigation of the technical and economic feasibility of aquaculture. Other areas of

study include improved techniques for forecasting available supplies, and more effective ways to locate and harvest various species.



U. S. Studies Effects of Imports on Some Fish

BCF is studying the effects of groundfish imports on the health of the U. S. industry. BCF acted at the request of Congressmen and representatives of the New England and Pacific Northwest sections of the industry.

The 2-month study will involve cod, haddock, hake, pollock, cusk, ocean perch, and flounder. It will deal only with imported fillets and blocks. Frozen fish blocks become fish sticks and portions, among the most popular ready-to-cook or ready-to-heat products.

Imports Almost Doubled

BCF statistics show that in the past 10 years imports of groundfish fillets and blocks soared from 161,369,000 to 316,860,000 pounds. While this was going on, major parts of the U. S. groundfish industry complained of falling sales.

In 1967, imports contributed a major part of U. S. consumption of these items.



Fur Seal Auction Held

The Fouke Fur Co. held its spring sale in Greenville, S. C., April 4-5, and 23,167 Alaska sealskins were sold for the account of the U. S. Government. Prices for dressed, dyed, machined, and finished skins (DDM&F) averaged \$111.47, 31.2 percent above the September 1967 sale. Blacks increased 40.8 percent, Mataras 29.3 percent, and Kitovis 8.8 percent. One lot of Matara skins sold for \$202, considered a record for this product. A year ago, one lot of Mataras sold for \$190, a record at that time. Natural Lakodas averaged \$90.71--27.2 percent higher than the previous sale. Sandrift Lakodas averaged \$58.61 and Dark Blue Lakodas averaged \$39.52, down 18.7 and 43.7 percent, respectively.

Income for U. S. & Alaska

Total sale income to the U. S. Government was \$1,690,000. Payment to Alaska in fiscal year 1969 under provisions of the Alaska Statehood Act should amount to about \$325,000.



Walleye Tagging Study Slated for Eastern Lake Erie

BCF biologists will conduct a walleye-tagging project in the New York waters of Lake Erie this spring. The study will be directed by Harry Van Meter, chief of BCF's Lake Erie investigations. Tentative plans call for capturing and tagging 6,000 walleyes offshore from Barcelona and Dunkirk, New York, during May. To do this, BCF has engaged a commercial fisherman for the netting operations. Research biologists will be aboard the vessel to tag the walleyes and record measurements. The fish will then be released in the immediate vicinity of capture.

Study's Objectives

The study's primary objectives will be to determine whether these walleyes move to other parts of the lake, how fast they grow, and how abundant they are. The numbers of walleyes frequenting the eastern basin of Lake Erie have increased during the past decade; those in the western basin have declined tremendously. Other than this, very little is known of the natural history of the walleye in the eastern basin. A similar walleye-tagging study was conducted in the western basin in 1959. The findings were published in 1963.

The tag is a small, yellow, neoprene tube commonly called a "dart tag." It is partially inserted into the flesh just below the dorsal fin. It is about 4 inches long and bears a printed number and mailing address.

The success of the eastern basin study will depend on the voluntary return of tags. Sport and commercial fishermen are requested to send in the tag with information about place of capture, date, and length of fish. Fishermen who return the tags will be notified of the area of release and other pertinent data on the fish they caught.



Udall Approves Clean-Up Program for Lake Michigan

Secretary of the Interior Stewart L. Udall has approved a Federal-State program to help restore the water quality of Lake Michigan. He recommended a course of action for cities, industries, and State and Federal Governments to reduce the pollution of Lake Michigan. The program is based on suggestions coming out of an enforcement conference in Chicago, Ill., in Jan., Feb., and March 1968, of the 4 states bordering Lake Michigan and the Federal Government.

Officials from Michigan, Indiana, Illinois, and Wisconsin said after the conference that "Lake Michigan is a priceless natural heritage which the present generation holds in trust for posterity, with an obligation to pass it on in the best possible condition."

Highlights of Udall's Recommendations

Highlights of Secretary Udall's recommendations to curb the serious pollution of Lake Michigan include:

- By the end of 1972, all cities in the Lake Michigan Basin must provide at least 80 percent removal of phosphorous from their wastes. They must comply with the water-quality standards approved by Secretary Udall for Lake Michigan. Phosphorous is a key fertilizer of algae, rapidly growing tiny plants that are a serious pollution problem.
- Industries must curb their pollution to comply with Lake Michigan water-quality standards approved by Udall. This must be substantially accomplished by December 1972.
- Representatives of those who participated in the conference will agree within 60 days on uniform rules and regulations to control wastes from boats.
- Disinfection must be continuous for all municipal wastes. This must be done as soon as possible and no later than May 1969.
- Eliminate the discharge of oil into Lake Michigan. The State conferees recommended strengthening of Federal legislation controlling oil pollution.
- Stop dumping of polluted dredging materials into Lake Michigan as soon as possible. The Army Corps of Engineers and the

States are requested to report within 6 months on what they are doing about it.

- The States and the U. S. should support a program to control or prevent pollution resulting from die-off of alewives, small inedible fish. Last summer, millions of these died in Lake Michigan.

- Ask U. S. Department of Agriculture to report to conferees within 6 months on agricultural programs to prevent pollution from siltation.

- Within 6 months, each State water-pollution control agency shall list cities and industries discharging wastes into Lake Michigan Basin. Interior Department will provide a list of Federal installations discharging wastes into the Lake. Develop a plan to treat all wastes harming Lake Michigan.

- Encourage discharge of treatable industrial wastes, following needed preliminary treatment, to municipal sewer systems.

- Effective immediately, combined sewers are to be separated in coordination with all urban reconstruction projects and prohibited in all new developments. Exceptions are where other techniques can be applied to control such pollution. Pollution from combined sewers is to be controlled by July 1977.

- The States and Interior will appoint members to a special committee to consider the problem of waste from nuclear power plants, including possible thermal pollution.

- Each State water-pollution control agency should speed programs to provide maximum use of area-wide sewage facilities.

- A technical committee on pesticides will be established to recommend a program to monitor and control this type of pollution.

- Appoint a committee to develop recommendations for a coordinated State-Federal monitoring program in the Lake Michigan Basin.

- State agencies and Interior should inventory all sites of potential major spills of oil and other pollutants.

- State agencies should arrange for water-quality analyses to be performed at least twice weekly at these water-filtration plants:

Green Bay, Milwaukee, Evanston, Chicago (both plants), Gary, Michigan City, Benton Harbor, and Grand Rapids.

- The Coast Guard will be asked to report on plans to monitor pollution in Lake Michigan by aircraft and other means.



Cut Weight Loss When Smoking Halibut and Salmon

An experiment that reduced the considerable loss or shrinkage normally occurring in the smoking process during commercial production of smoked halibut and salmon was conducted by BCF's Technological Laboratory in Seattle, Wash.

The commercial process consists of soaking pieces of slacked (defrosted) fish for 45 minutes in a saturated sodium chloride (NaCl, common salt) brine solution. Smoking continues overnight at 60° to 70° F. Then the pieces are heated for an hour at 180° to 190° F.



Smokehouse.

The Lab's Experiment

In the Seattle lab's experiment, pieces of halibut were preheated with solutions containing sodium tripolyphosphate (TPP) before smoking. The researchers found that TPP reduced the loss in weight during the smoking operation. Adding 2% TPP to the saturated brine solution used to soak the fish for the 45-minute period reduced weight loss from 30% to 25%.

Using a short, 1-minute dip in 7.5% TPP solution containing 2% NaCl reduced weight loss to 26%. The TPP did not affect flavor or texture of the smoked product.



Sport Fishing Licenses Rose Slightly in FY 1967

State hunting and fishing permit sales in the U. S. increased slightly in fiscal year 1967. Total income from them to the wildlife agencies reached \$154 million. So announced Interior Department's Bureau of Sport Fisheries and Wildlife on April 22, 1968.

The Bureau compiles the fiscal year figures from reports of the 50 States. The reports showed 20 million hunting licenses, tags, permits, and stamps issued in fiscal year 1967--about 500,000 over FY 1966. Total fishing licenses, tags, permits, and stamps issued increased from 26 to 27 million.

Sportsmen's Outlays

Expenditures by hunters for permits increased from \$77 million to \$81 million. For fishermen, the increase was from \$67 million to \$73 million. Bureau Director John S. Gottschalk said: "These increases are small, but healthy," demonstrating that fishing and hunting continue to be a major form of recreation in our society."

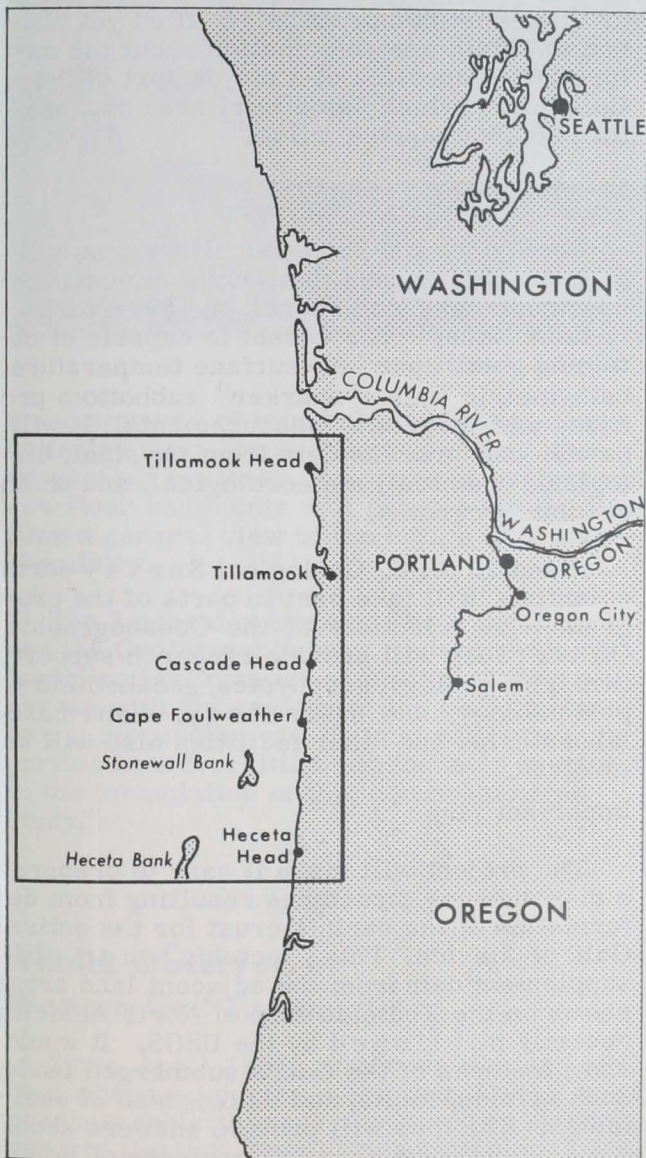
Pennsylvania led all states in hunting permits issued; California was way ahead in fishing permits.



OCEANOGRAPHY

Sea Bottom Off Oregon Mapped

The Coast and Geodetic Survey has published a bathymetric map covering 14,000 square statute miles of sea bottom off the Oregon coast. The map includes 2 banks rising to within 78 and 150 feet of the surface. It provides the most detailed bottom topography ever published for this section of the Pacific Ocean.



Area covered by bathymetric map (1308N-22) of sea bottom off Oregon issued by ESSA Coast and Geodetic Survey.

The map covers 100 miles offshore for a 140-mile coastal stretch between Heceta Head and Tillamook Head. The depths range from a few feet off the coast to more than 9,800 feet about 80 miles west of Heceta Head.

Depth contours reveal in detail a relatively smooth bottom for about 60 miles offshore. This is followed by a series of valleys and ridges. Prominent underwater features include: Heceta Bank, about 35 miles offshore, rising to within 150 feet of the ocean's surface; and Stonewall Bank, about 17 miles from Oregon shore, about 78 feet below surface.

West Coast Maps Planned

The Coast and Geodetic Survey plans a series of maps for the entire Pacific coast and for the seabeds off the Atlantic and Gulf of Mexico coasts. The maps are designed to aid U. S., State, and industrial interests explore and develop the potential resources of the Continental Shelf. This is an area of about 862,000 square statute miles off the U. S. coasts. Economic development of these resources depends heavily on bottom topographic maps; few exist.

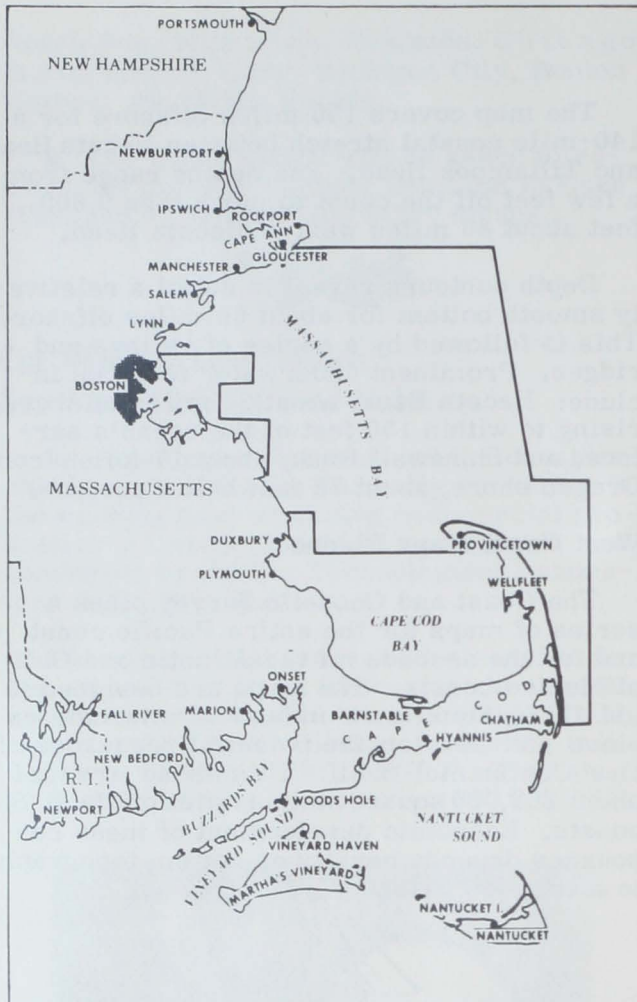


Six-Month Hydrographic Survey of Massachusetts Coast Underway

The U. S. Coast and Geodetic Survey is conducting a 6-month hydrographic survey of the Massachusetts coast. Part of a 5-year program begun last year, it includes detailed measurements of the Beverly and Salem harbors.

The 162-foot, 760-ton, 36-man USC&GS ship "Peirce" began the survey in mid-April and will continue until October. It will cover the coastal area from Beverly and Salem, north to Gloucester, where last year's survey ended, and then out to sea and south in a clockwise move to a point off Marblehead.

The survey will not cover recently surveyed Cape Cod Bay, or the area in and around Boston Harbor, also previously surveyed, except for Winthrop Harbor. But the survey will



Box indicates area of Massachusetts coast being surveyed by ESSA Coast & Geodetic Survey as part of a five-year program which began last year. Survey will resume at Beverly and Salem and continue this year north toward Gloucester.

embrace all other coastal harbors as far as Cape Cod by the time it is completed.

The Operation

Operating from the ship and from launches, the Peirce's hydrographers measure and record depths as determined by the time required for a sound wave produced in the vessel's hull to reach bottom and its echo to return. The return echo is recorded on a permanent graph at rapid intervals; the echoes form a continuous profile of the sea floor as the vessel covers a predetermined course. The hydrographers obtain the shape and slope of submerged elevations and depths, including any existing significant features, such as peaks, deeps, canyons, and cliffs.

Geologic Study of Gulf of Mexico Begins

Scientists of Interior Department's Geological Survey and the U. S. Naval Oceanographic Office have teamed up on a 1-year geologic study of the Gulf of Mexico. Part of the study is underway. The project seeks to "obtain new and significant knowledge of the major earth structures that underlie the Gulf, and the mineral resource potential of sea floor sediments and sub-seafloor rocks."

The joint Navy-USGS project is described as "the most comprehensive effort yet planned to obtain new information about the nature and properties of a major part of the Gulf floor--which has a total area of more than 600,000 square miles."

New Research Vessel

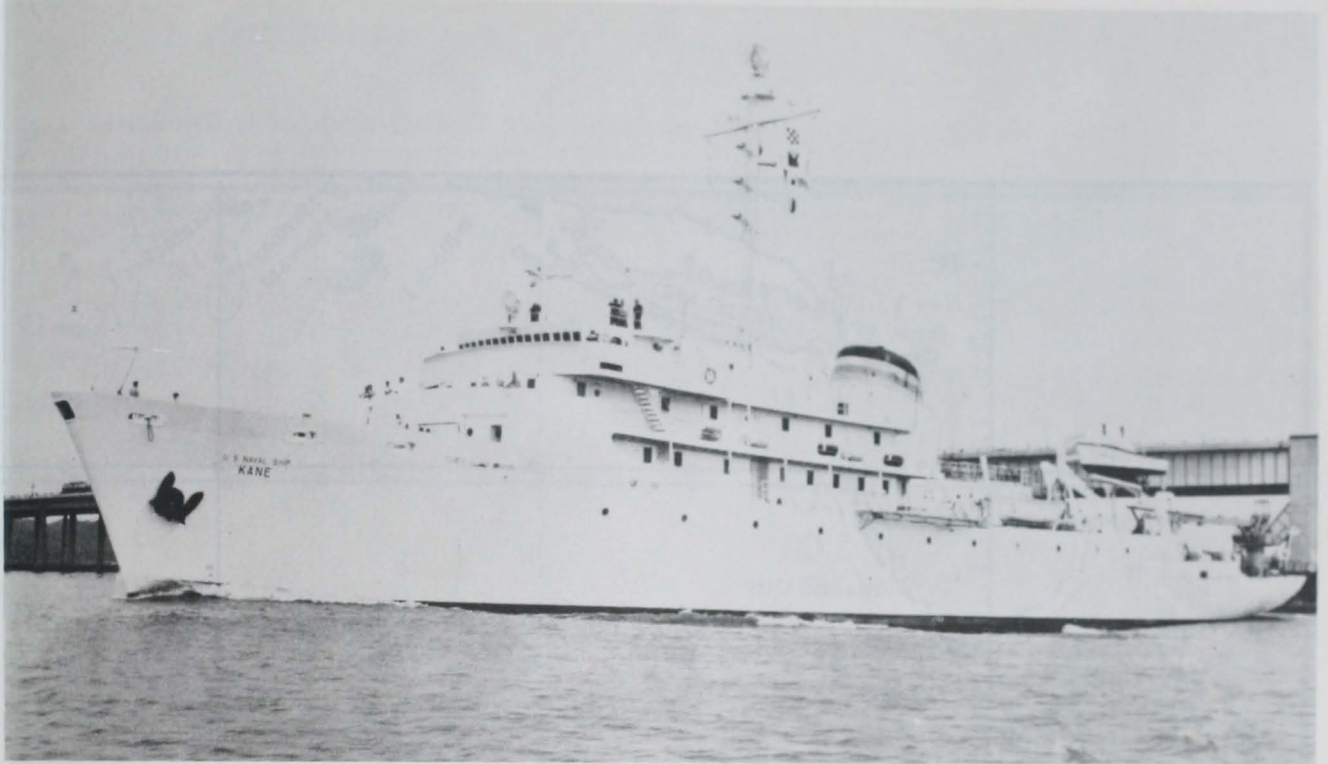
Geological and geophysical surveys will be conducted aboard the Navy's newest oceanographic research vessel, the 300-foot "Elisha Kane." The vessel is capable of obtaining continuous sea-surface temperature, bathymetric data, "sparker" subbottom profiles, and magnetic measurements. It will handle and process data from physical, biological, chemical, meteorological, and photographic programs.

About 20 U. S. Geological Survey earth scientists will take part in parts of the program with scientists of the Oceanographic Office. They will provide research support in marine geology, geophysics, geochemistry, paleontology, and hydrology. Land-based laboratories and other facilities also will be involved.

Important Map

The project will make it easy to prepare a map showing structures resulting from deformation of the earth's crust for the entire Gulf of Mexico. This "tectonic" map will supplement data from the adjacent land areas shown on the Tectonic Map of North America recently published by the USGS. It would show features of the Gulf's submerged lands, such as folds, faults, and thicknesses of sediments. The map will provide answers about a major unknown area in knowledge of North America's geologic structure.

There will be a geochemical laboratory aboard the Kane that can determine even



USGS oceanographic research vessel Elisha Kane.

trace amounts of minerals present in cores collected from the sea floor during the cross-Gulf cruises. Hundreds of analyses of sea-floor sediments will provide for the first time a general view of the entire Gulf's geochemistry.

The 2 agencies stated: "Both the Navy and the Geological Survey wish to encourage participation from all scientific groups concerned with the geology of the Gulf of Mexico. . . discussion will be held with interested parties in universities and industry to assist in the formulation of this comprehensive study."



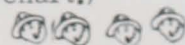
Whales Observed in Western Gulf Stream

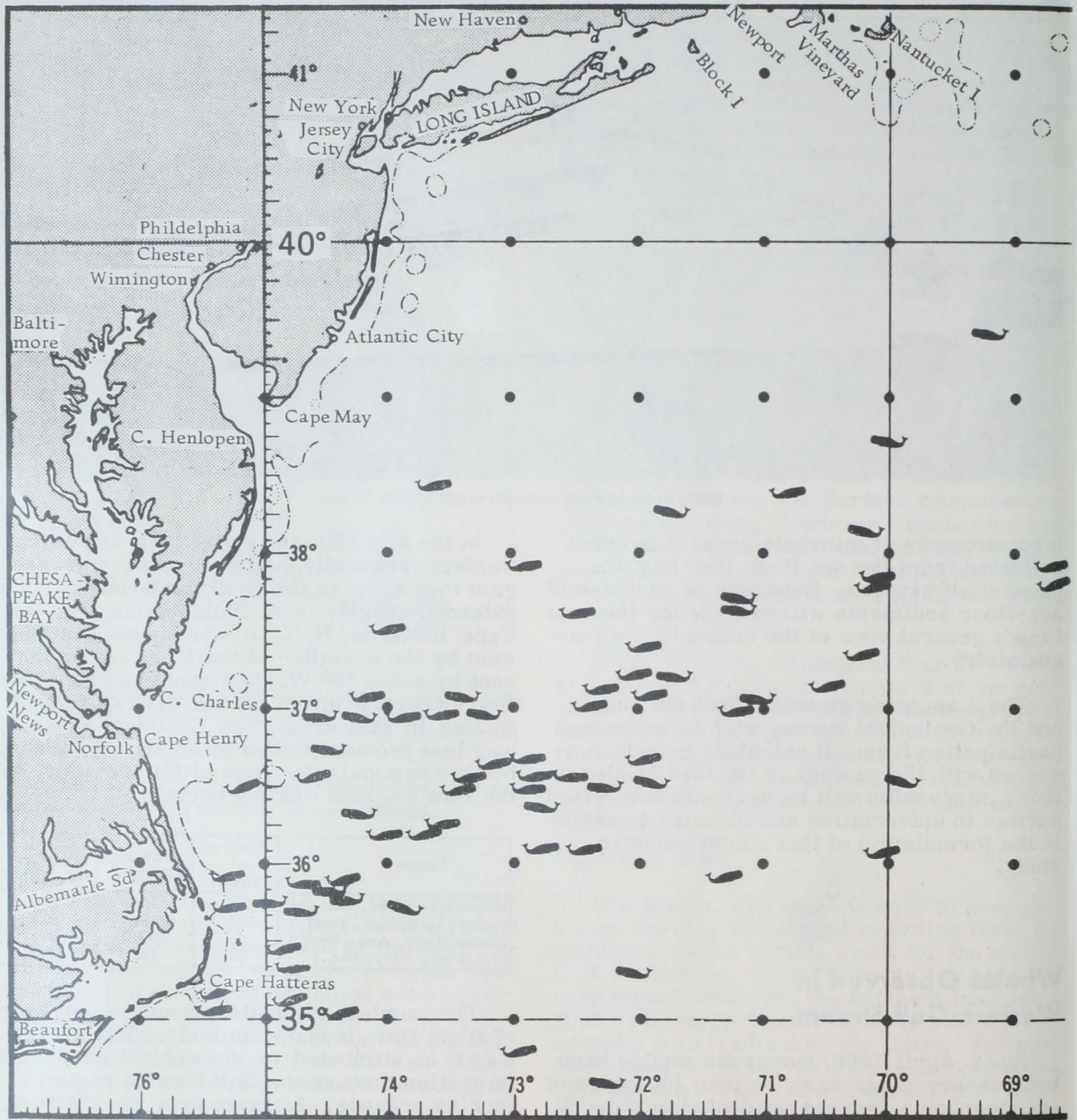
Since April 1966, numerous whales have been observed during more than 200 hours of oceanographic surveys conducted by aircraft, reports the U. S. Naval Oceanographic Office. About 90 percent of these observations were made in or near the western part of the Gulf Stream.

In the late 18th and early 19th centuries, whalers frequently hunted in an oceanic region they knew as the Southern Ground. This extended roughly from Philadelphia, Pa., to Cape Hatteras, N. C. It was bounded on the west by the coastline of the U. S. and on the east by about 60° W. Sea captains noted the Gulf Stream's effect on the distribution of whales in this area. The Southern Ground was less productive than other Atlantic areas, but it was popular because of its proximity to the New England whaling ports.

Season	Number of Whales	Hours Observed	Whales Observed Per Hour
Winter (Jan., Feb., March)	14	30.0	0.5
Spring (April, May, June)	52	43.6	1.2
Summer (July, Aug., Sept.)	42	100.0	0.4
Fall (Oct., Nov., Dec.)	24	52.7	0.5

The number of whales observed per hour of flight time is shown in table. The spring peak is attributed to the whales' northward migration through the Gulf Stream region to feeding grounds. As more data are obtained, the U. S. Naval Oceanographic Office will attempt to correlate the whale observation rate with environmental factors. (See the following pages for chart.)





Whale Observations

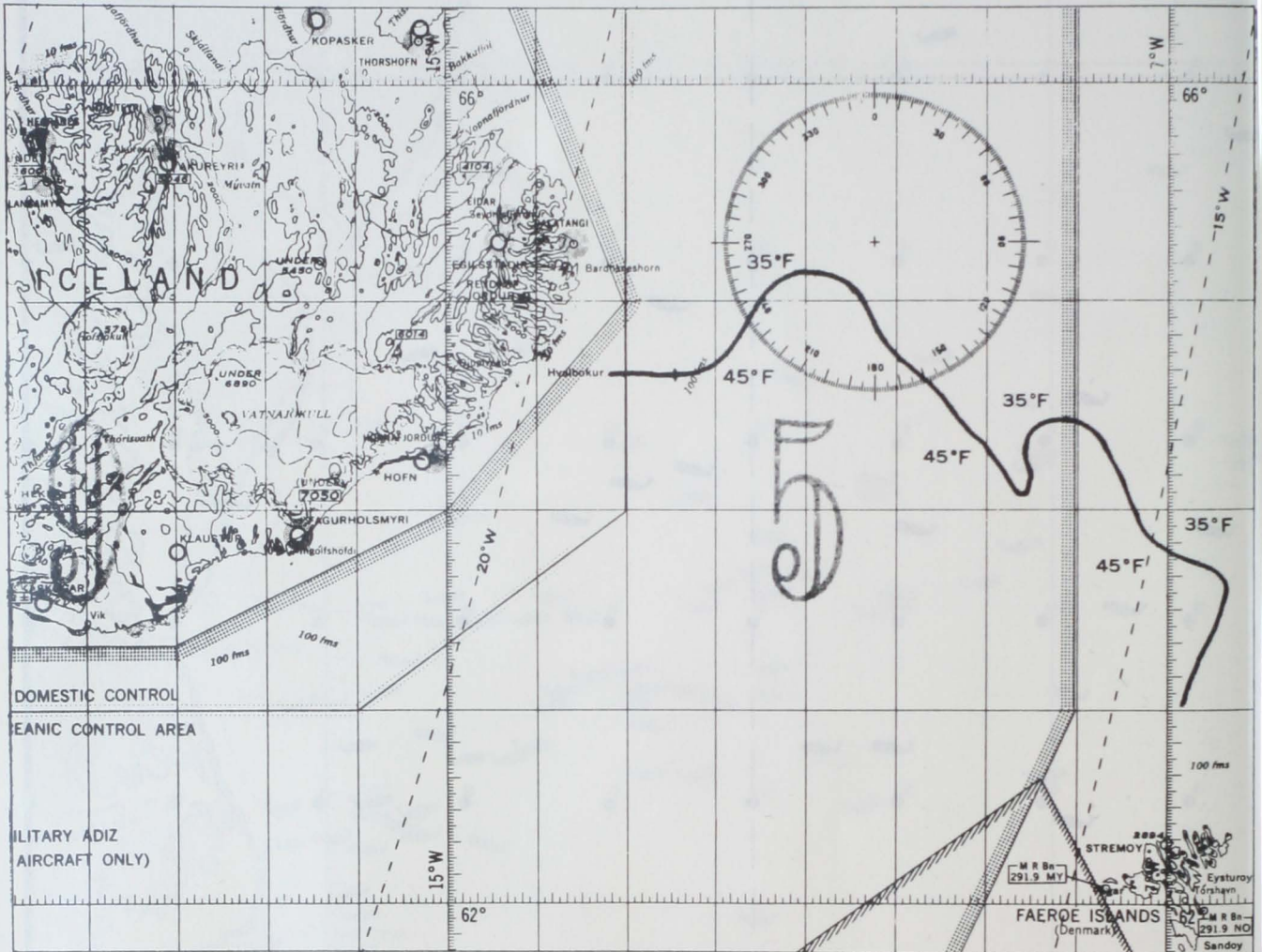
Navy Tracks Herring Zone for Iceland

For the first time in oceanography, a plane was used to locate and track the zone where Atlantic and Polar waters meet in the Norwegian Sea. An instrumented research plane of the U. S. Naval Oceanographic Office located the zone southeast of Iceland (see chart) and tracked it to the northern tip of the Faroe Islands. The mission was flown to assist Iceland.

Infrared Thermometers Used

To offset the approaching repetition of such losses, Dr. Steingrimur Hermansson, Head of Iceland's National Research Council, asked the Naval Oceanographic Office to use one of its airborne infrared thermometers to locate the zone between cool and warm waters.

Within 12 days, the oceanographic plane, flying out of Keflavik, Iceland, measured sea-surface temperatures around the entire island to a distance of about 100 miles. The



Robert Pickett, a participating scientist, said: "Herring, a fish upon which depends a sizeable portion of the Icelandic economy, feed in such zones. Last year this zone of demarkation between cool and warmer waters moved away from Iceland. Although herring were caught last year, the fishing fleet was so far from home that the catch spoiled on the trip back."

plane left the Washington, D.C., area on April 1 and returned on the twelfth.



Scripps 'STYX' Survey Underway

The 180-foot, 825-ton "Alexander Agassiz" sailed from San Diego, Calif., April 2 on the STYX Expedition to the Central Pacific. Investigations are scheduled in the Hawaiian, Samoa, and Society Islands. The vessel belongs to the Scripps Institution of Oceanography, University of California, San Diego.

Dr. William A. Nierenberg, director of Scripps, said the research will cover several phases of deep-sea oceanography--mainly studies of water characteristics, topography, and sediments in the Central Pacific; the past and present animal life on Mid-Pacific seamounts and guyots (flat-topped seamounts); and the circulation around oceanic islands.



U. S. Scientists Investigate North Pacific Polar Front

U. S. scientists are investigating a little-known oceanic boundary that stretches across the North Pacific from Japan to North America. Oceanographers call this boundary between cold Arctic waters and warmer subtropical water the Polar Front.

Scientists have known of this natural phenomenon for about 30 years, but the equipment necessary to study it only became available in recent years.

The study is a joint venture of scientists of the U. S. Department of Commerce's Environmental Science Services Administration (ESSA) and Oregon State University. It is being carried out from the "Surveyor," an ocean-survey vessel of ESSA's Coast and Geodetic Survey.

60 Miles Wide

Theodore V. Ryan, Director of ESSA's Pacific Oceanographic Research Laboratory in Seattle, Wash., and the expedition's chief scientist, estimated the Polar Front as 60 miles wide. Seasonal study of the Front was conducted in April 1968. It will be done again in September 1968 and in February of a fu-

ture year. He said the study will cover a 3,000-mile stretch of the North Pacific, midway between the Hawaiian and Aleutian Islands, starting from a point about 1,500 miles west of California. In addition to 3 ESSA scientists and technicians, there are 5 scientists from Oregon State University, headed by Dr. Kilho Park, professor of chemical oceanography. Dr. Park is interested in the chemical properties and processes found at the Front.

Expedition Purpose

Ryan explained: "One of the purposes of our expedition is to determine what happens to the water at the interface between these two dissimilar water masses. Oceanographers have long recognized that plant and animal life and even weather differ significantly on either side of the boundary. Some very significant changes occur in the waters when they meet. The chemical constituents of the water, such as phosphates, nitrates, silicates, carbon-dioxide concentrations, and many others, show a marked and abrupt change across the boundary. In addition, it isn't clear yet what happens to the resultant water type which is formed by the mixture of the two primary species." Some oceanographers theorize it ultimately sinks to intermediate depths and flows east and south.

Ryan said current meters and photography would be used to study the circulatory patterns at the bottom of the sea. The scientists will attempt to determine the main path of northward flow through the central North Pacific.

The Pacific differs from the Atlantic because the Bering Strait offers a very shallow, narrow passage between the two oceans--and there is no circulation of deep waters between the Arctic and the Pacific.

Ryan noted that one feature of the Polar Front is the distinct difference in weather on either side of the boundary. "The north side of the Polar Front is characterized by overcast skies and strong storm conditions, while the weather below the boundary is generally better."



Foreign Fishing Off U. S. In March

OFF ALASKA

Soviet: The number of fishing vessels decreased from about 130 in early March 1968 to about 100 at month's end. (In 1967, Soviet fishing and support vessels increased from about 130 in early March to over 150 by the end of the month.)

The Soviets discontinued their Pacific ocean perch fishery in the Gulf of Alaska, reduced a similar fishery off the Aleutians, but continued perch fishing south of the Pribilofs. Flounder fishing in the Bering Sea continued--but on a greatly reduced scale. Herring fishing south of the Pribilofs was discontinued by mid-month. King crab fishing in the eastern Bering Sea was one-third below last year's, but shrimp fishing in the central Gulf of Alaska expanded greatly during the month.

The Soviets fished Pacific ocean perch in 3 general areas: Gulf of Alaska, along Aleutians, and off Pribilofs. In Gulf of Alaska, the few remaining trawlers discontinued perch fishing in late March. (In 1967, they stopped ocean perch fishing there in mid-May.) In the eastern Aleutians, south of Fox Islands, a fleet of 10 medium trawlers and support vessels appeared early in March. Initial catches apparently were good, for by mid-month the number had tripled to nearly 30 vessels. Good catches, however, were short-lived; at month's end, fewer than 10 vessels remained. Most of this fleet moved south to the Pacific Northwest coast for hake fishing. In late March, about 5 stern factory trawlers and medium freezer trawlers moved to the edge of the Continental Shelf south and west of the Pribilofs seeking Pacific ocean perch. This area bisects the Bering Sea from Unimak Pass to Cape Navarin on the Asian mainland. The Soviets have fished perch intermittently for several years with few vessels for a short time.

Flounder fishing vessels in the Bering Sea decreased in number during the month. This fishery was almost at an end in late March, when only about 20 fishery and support vessels remained from about 70 in early March. (The pattern is similar to 1967's, when in late March the Soviets fished for flounder with about 30 vessels, and the fish-

ery ended by mid-April.) Good catches of flounder were observed by BCF agents during one flight, but apparently this was not true for all vessels. Some medium freezer trawlers caught barely 5 metric tons per day and were transferred to ocean perch fishing off Aleutians. Catches of large stern trawlers sometimes were excellent: one vessel landed 1,800 metric tons in 45 days, or about 40 tons per day.

The herring fishery in the Bering Sea, which began on commercial scale in late January, was short-lived. By end of February, ice drifted into area and forced fleet (at its peak 30 vessels) to disband. Some large stern factory trawlers left for ocean perch fishing; others (mostly medium trawlers) went into cod fishing, and some remained on grounds a few days longer despite bad weather and ice because fishing was good. By mid-March, most fishing vessels left; only 3 exploratory research vessels of the Pacific Institute of Fisheries and Oceanography still crisscrossed the herring grounds off Pribilofs studying species to forecast its abundance in next year's season. Most vessels were large stern trawlers and medium freezer trawlers; both classes can freeze catches. Also, the Soviets temporarily used the newly constructed cannery "Aleksandr Kosarev," equipped for herring canning. Good catches necessitated the help of several refrigerated transports to take frozen or salted catches to Siberian home ports.

Pacific cod was taken by the Soviets north of Fox Islands (in eastern Aleutians near Unimak Island) in deeper waters of Bering Sea; this was confirmed by aerial surveillance flights of U. S. Coast Guard and BCF. The initial 12 vessels at end of February increased by third week of March to about 20 medium freezer trawlers; the number again decreased to about a dozen trawlers at end of March.

The king crab fishery in eastern Bering Sea is conducted by only 2 canneries: "Pavel Chebotniagin" and "Konstantin Sukhanov." Each is accompanied by 3 tangle-net setting medium trawlers and an exploratory research vessel. During last few years, the Soviets deployed 3 canneries and 10-11 trawlers for king crab fishing on U. S. Continental Shelf.

Shrimp fishing on Portlock Bank off Afognak Island (in Central Gulf of Alaska) began on limited scale in February 1968. It expanded greatly in March. The 2 medium freezer

trawlers, which were conducting more exploratory than commercial fishing in February, apparently found large concentrations of small Alaskan shrimp. In late March, they were joined by 13 more trawlers and 2 canning and freezing floating factories: "Aleksandr Kosarev" and "Korablestroitel Khlopov," both recently constructed in Leningrad's Admiralty Shipyards. The two differ from the "Zakharov" class canneries engaged in king crab fishing. They are the largest of their type: 531 feet long. Although built in same shipyard as Zakharovs, this new version has 50 percent greater processing capability and employs 20 fewer persons aboard. Most processing lines are automated. New vessels have 12 processing lines (400 machines), plus special plants to salt fish and boil shrimp. Canning lines are completely automated and can produce 300,000 cans of herring (or 180,000 cans of tuna) each working day. Shrimp apparently are frozen and packed in small packages. A daily production of 40 metric tons of fish meal and fish oil also is possible. In 1967, the Soviets operated only 1 large Zakharov-class mothership with about 20 shrimp fishing medium freezer trawlers. This ratio was not particularly good because the processing facilities of one mothership could not keep up with excellent catches of medium trawlers. As a result, part of catch had to be frozen aboard freezer trawlers, cutting fishing time.

Japanese: Typically during early spring, more Japanese fleets arrive on fishing grounds off Alaska. This year, arrivals raised the number of vessels from 45 at beginning of March to about 110 at end.

Gulf of Alaska Pacific ocean perch fishing increased slightly with at least 6 factory trawlers so engaged by mid-March. Five were fishing principally in central Gulf of Alaska from off Yakutat Bay to south of Kodiak Island. The sixth factory trawler worked off southeast Alaska throughout month. About 12 factory trawlers (500 to 3,500 gross tons) fishing principally for ocean perch apparently were operating as independent units. They appeared in increasing numbers along edge of Continental Shelf in eastern and Central Bering Sea. A factoryship was fishing ocean perch along edge of Continental Shelf south of Pribilofs.

By late March, 2 more fleets, believed involving 55 accompanying trawlers--engaged principally in production of minced

fish meat and fish meal and oil--joined a third fleet with 10 trawlers on proved pollock grounds north of Fox Islands.

By mid-month, the usual two Japanese king crab fleets arrived on accustomed fishing grounds north of Alaska Peninsula. One is accompanied by the usual 6 tangle-net handling trawlers; the other has 10 accompanying trawlers. The Japanese say the latter will place greater emphasis on fishing pots for both king and tanner crab this year. Apparently, this accounts for the extra trawler-type vessels with this fleet.

The increased efforts by long-liners in Gulf of Alaska continued through March. Sightings indicated there were at least 3 long-liners active off southeast Alaska, fishing principally for sablefish.

OFF PACIFIC NORTHWEST

Soviet: During March 1968, 20 different fishing and support vessels were sighted. During first 3 weeks, most were large stern trawlers but, in fourth week, when hake fishing began, 9 medium trawlers moved into waters off Washington accompanied by 3 large processing and transporting support vessels.

Soviets fished off Oregon during most of March (see table) and concentrated their vessels off Grays Harbor (Washington) when hake began to run.

Week Ending	Area	Type of Vessel				Total
		Medium Side Trawlers	Stern Factory Trawlers	Support Vessels	Research Vessels	
Mar. 7	Wash.	-	1	-	-	1
	Oregon	-	2	-	1	3
	Total	-	3	-	1	4
Mar. 14	Wash.	-	1	-	-	1
	Oregon	-	1	-	-	1
	Total	-	2	-	-	2
Mar. 21	Wash.	-	1	-	-	1
	Oregon	-	5	2	-	7
	Total	-	6	2	-	8
Mar. 28	Wash.	9	1	3	-	13
	Oregon	2	-	-	-	2
	Total	11	1	3	-	15

Almost no information is available on Soviet catches in this area, but it is believed that most stern trawlers fished for ocean perch and other rockfishes.

Only one fishery research vessel was identified, "SRTM-8450," about 30 miles off Heceta Head in Central Oregon during early March; then she moved south and was sighted off California.

Japanese: Three vessels (2 stern trawlers and 1 long-liner) were fishing off Pacific Northwest, all off Washington. But only on the long-liner were fish observed: rockfish and sablefish.

OFF CALIFORNIA

Soviet: After an absence of about 2½ months, the Soviets began fishing off California in mid-March with 6-9 stern factory trawlers. Most vessels were sighted in the northern part of California, above San Francisco. During last week, a supply tanker arrived off Point Reyes to refuel fleet.



Fig. 1 - Soviet factory stern trawler "Peter Liziukov" was one of several recently constructed "Atlantik" class trawlers operating off U. S. Atlantic coast in March 1968.

(Photo: Charles L. Philbrook)

Two of the large trawlers were "Atlantiks," a new class of freezer trawler being constructed in East Germany. The first Atlantik deployed in the Pacific was the "Akustik." She began fishing off Pacific Northwest in November 1967, moved off California in December, and by January 1968 was sighted near Baranof Island in Gulf of Alaska. By mid-March, she was again fishing off California, but only for about a week. Then she was replaced by the "Aviator," another Atlantik just off East German construction slips. The new trawlers are being sent fishing directly from shipyards via the Panama Canal; their crews are flown from Far East

to European Russia. They return to their Far Eastern home ports only after maiden trip.

The research vessel "Akademik Berg" (intermittently off California and Pacific Northwest during past 3 months) was sighted on March 21, about 20 miles west of Fort Ross, losing much oil. She was not reported off California later and it is presumed she headed north and possibly home for repairs. She was replaced in fourth week by a smaller exploratory medium trawler, the "SRTM-8450" of Pacific Institute for Fisheries and Oceanography in Vladivostok, whose mission was to find concentrations of rockfish.

OFF HAWAII

Soviet: The number of vessels fishing 200-300 miles north of the Hawaiian Islands increased to about 12 in first half of March. Catches were good. By end of March, however, the fleet had moved out. The species caught were the families Pacific dories "Zeidae" and alfonosinos "Berycidae." Excellent catches were taken at times: Several trawlers caught up to 70,000 pounds per fishing day several days in a row. The fleet used midwater trawls since ocean depth exceeds 2,000 fathoms.

OFF U. S. TRUST TERRITORIES

Soviet: It is believed the 4 medium trawlers tuna purse-seining off Caroline Islands are continuing.

IN GULF OF MEXICO AND OFF SOUTH ATLANTIC

No foreign vessels were sighted fishing off the U. S. Atlantic coast south of Cape Hatteras (including Florida coast) or off U. S. Gulf of Mexico coast.

IN NORTH ATLANTIC

An estimated 170 foreign fishing vessels from the USSR, Poland, and Spain fished. Soviet vessels were most numerous; weekly sightings showed sharp increases from about 50 early in month to over 100 by month's end. In all, 125 individual vessels were sighted.

Twelve Polish vessels (2 stern trawlers, 9 large side trawlers and 1 factory base ship) and an estimated 30 Spanish pair trawlers also were sighted.

Widespread and frequent shifting of fleets between Georges Bank and Middle Atlantic occurred. As a result, surveillance flights were coordinated with both the First and Third Coast Guard Districts.

N NORTHWEST ATLANTIC

Soviet: Early in month, only 5-6 Soviet vessels were scattered from south of Block Island, R.I., to eastern slopes of Georges Bank. By mid-month, a group of 12 stern trawlers was 60 miles south of Block Island. Moderate catches on board appeared to be haddock. Near month's end, a fleet of 47 Soviet vessels (mostly medium trawlers) was about 55 miles south of Martha's Vineyard. Moderate catches of herring were observed on board.

OFF MID-ATLANTIC

Soviet: Through March, large fleets fished primarily off New York and New Jersey. Early in month, 50-60 vessels were located southeast of Cape May, N. J.; mid-month, nearly 100 vessels. These were west of "no fishing" zone south of Long Island. Heavy-to-moderate catches observed on board were primarily herring.

The Soviets made good use of loading zones off Moriches Inlet, L. I., and Atlantic City, N. J. Once, 21 vessels (including several giant 15,000-gross-ton processing ships)

were crowded into small loading zone off Long Island. The loading zone apparently was too small and several vessels were sighted in adjacent 9-mile contiguous zone. The Coast Guard notified Soviets they were within U. S. 12-mile zone--and their vessels departed immediately for high seas.

Polish: 5-6 vessels were seen fishing off southern New England and New York, frequently within "no fishing" zone. Catches were primarily herring. One Polish trawler, illegally anchored inside U. S. 12-mile limit, was so advised by Coast Guard of the violation and returned to high seas.

Spanish: An estimated 30 Spanish pair trawlers (see fig. 2) fished on eastern slopes of Georges Bank. These received attention in response to New England fishing industries' concern over the discarding of haddock witnessed by U. S. fishermen. It appears the Spaniards want large fish (cod) only and wash smaller fish overboard (see fig. 3.)

SOVIET VIOLATIONS OF U.S.-USSR MID-ATLANTIC BIGHT FISHERIES AGREEMENT

In March, 13 violations of the Agreement involving 13 individual Soviet vessels were observed. Eleven cases involved both trawlers and support ships anchored illegally outside the authorized loading zones. Two Soviet side trawlers were observed fishing within "no fishing" zone.



Fig. 2 - Spanish "Pareja" trawlers fishing on eastern Georges Bank in Feb. 1968.

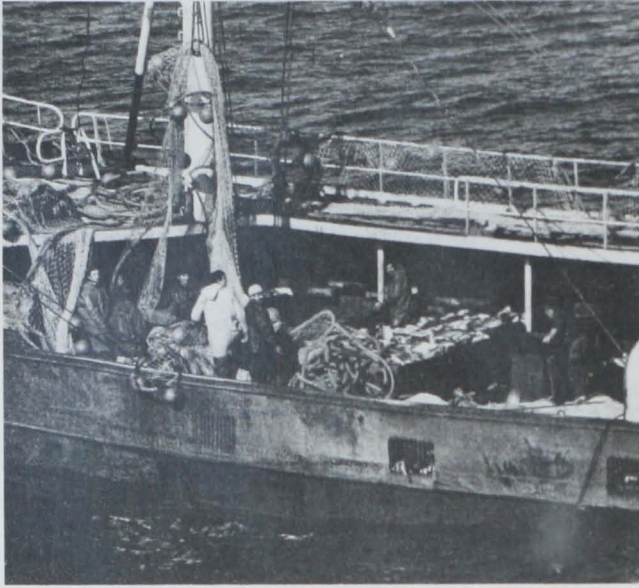


Fig. 3 - Harvesting cod by Spanish "Pareja" trawler on Georges Bank in Feb. 1968. (Photos 2 & 3: Ralph C. Levie)

BOARDINGS OF FOREIGN VESSELS IN NORTH ATLANTIC

The Soviet repair tug "Uragan" towed factory stern trawler "Pallada" into Boston Harbor on March 2, 1968. The Pallada had nets caught in her propeller while fishing east of Cape May, N.J. Because of an approaching storm, permission was granted to enter protected waters of Boston Harbor. Both vessels were inspected by BCF Resource Management Agents.

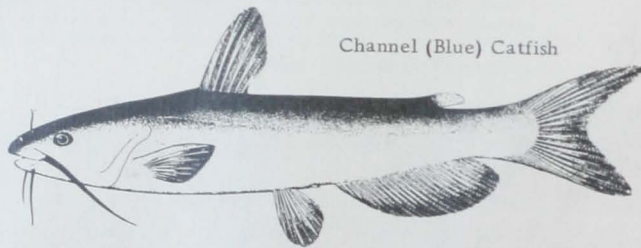
The Polish trawler "Brda" entered a Philadelphia shipyard for boiler repairs on March 11, 1968. The vessel remained several days and was boarded by a Resource Management Agent.

The Soviet water tanker "Buguruslan" received permission to enter Philadelphia port on March 26, 1968, to load 700 tons of water for fishing fleets off U.S. Atlantic coast.



THE CATFISH

Fifty million pounds of farm-raised catfish are expected to be harvested in 1970, and this will double again by 1972. The current average yield is 1,000 pounds per surface acre. More efficient operators obtain yields of 1,500 to 2,000 pounds per acre. In experimental trials, yields of 7,000 pounds per acre have been achieved. In any case, there is a good possibility that in the next 10 years the harvest of commercially cultured catfish alone will exceed commercial catches of all wild species in the Great Lakes.



Channel (Blue) Catfish

Recent development of a mechanical dressing and skinning machine has greatly facilitated processing operations. Farm fish producers have formed processing and marketing organizations. Outside capital has been invested in catfish farming with an eye toward integrated production-processing-marketing procedures. An unfilled demand exists for the highly esteemed catfish in its traditional market area in the south-central United States. The succulent, white, meaty fillets and steaks from catfish are ideal for producing more products for new market areas.

The stage is set for commercial fresh-water fish farming to make a major contribution to the food resources of the United States. We in the Bureau of Commercial Fisheries are pleased to have contributed to the development of the blossoming industry. We expect to contribute even more significantly in coming years through research and technical assistance.

STATES

California

1967 ANNUAL REPORT ON FISH AND GAME ISSUED

In 1967, California's commercial fishery landed about 589 million pounds worth \$77,000,000. The landings were below those of recent years. Tuna made up about half the 1967 landings. This was disclosed by Walter T. Shannon, Director, California Department of Fish and Game in his 1967 annual report.

The crab harvest was 10.6 million pounds, a slight rise from 10.4 million in 1966. Most were taken in northern California; only 390,000 pounds were landed in the San Francisco area. However, Shannon stated, 1967-68 is expected to be much better, "with some 2 million pounds being taken in the San Francisco area."

Shrimp landings were 1.5 million pounds; 1968's landings should be about the same.

Anchovy

Last season's reduction fishery landed 37,615 tons of anchovy; the live-bait fishery landed 6,691 tons. The Fish and Game Commission set a quota of 75,000 tons for the third experimental anchovy reduction season (1967-68). It was the same as the past 2 years.

Albacore Research

Research on albacore revealed that "the backbone of the fishery" are the 2- and 3-year-old fish. Shannon stated: "This means that the fishery could survive one weak year class but would be in trouble with two weak year classes in a row." His department has the knowledge "to predict this sort of thing before it happens."

Shrimp Surveys

Shrimp surveys show that the 1967 year class is one of the weakest in a dozen years. "We shall have to be careful not to over-harvest shrimp in 1969," Shannon emphasized.

Salmon and Steelhead

In 1967, commercial salmon landings were 7 million pounds; they were 9.7 million in

1966; the 10-year average was 7.4 million. Salmon and steelhead spawning runs are below average, especially in Sacramento and American Rivers.

The State planted more than a million silver salmon in north coast streams in 1966-67. It released the first yearling king salmon in the San Joaquin system. It will stock 200,000 kings a year in this system in an attempt to restore the once-great runs.



Alaska

COAST GUARD AND BCF WRITE SAFETY BOOKLET FOR FISHERMEN

The U. S. Coast Guard and BCF have co-authored "Safety Notes for the Alaskan Fisherman." The authors note the urgent need for the publication: "Alaska has the undeniable distinction of having the worst water safety record of any state in recent years. Furthermore, a large percentage of Alaska's grim statistics are from the commercial fishing industries."

During 1966 and 1967, 99 commercial fishing boats over 20 feet long were lost. Nearly 1,800 accidents involving fishermen occurred. In 1966, 60 fishermen perished.

The booklet will be made available to Alaskan fishermen. A. K. Larssen of BCF's Alaska Region Exploratory Fishing and Gear Research Base worked closely with the Coast Guard in preparing it.

What Booklet Covers

Through case history, hypothetical case, photo and cartoon, the easy-to-read booklet throws a lifeline to the fisherman.

In "Saga of the F/V Highliner," a story fashioned to instruct, the authors tell how a skipper in crisis should have handled the situation. Its theme: "When the water gets over your knees!--that's the time you should have already called for help! Many boats and lives have been lost from waiting too long before signalling for assistance."

A chapter entitled "Brass Tacks" reports that "the most frequent difficulty experienced by Alaskan fishing vessels is trying to occupy

a space already filled--by a rock! Although some rocks may not be charted properly, the vast majority of those which have been struck are properly charted!" It provides advice to keep the fisherman "in good shape."

The booklet contains safety information concerning fire, overloading, icing, weather, collision. An indispensable chapter to fishermen is "When All Else Fails"--the problem of survival.

The booklet also covers the daily routines--and injuries--of handling fishing gear and marine equipment.

* * *

UDALL CONDEMNS WATER POLLUTION CAUSED BY OIL OPERATIONS

To contend with the increasing water-pollution incidents caused by oil exploration in Alaska's Cook Inlet, Interior Secretary Stewart L. Udall has asked industry to cooperate in an emergency control program and in setting strict industry guidelines.

Secretary Udall said: "During recent months, I have received well-substantiated evidence that exploration and development activities in Cook Inlet have resulted in a recurring series of pollution incidents. Between June 1966 and December 1967, there were some 75 incidents of oil pollution in Cook Inlet reported by Federal and State Agencies responsible for the conservation of the natural resources of the area."

He added that pollutants included crude oil, mud sacks, garbage, refuse, engine oil, stove oil, and jet fuel. Some progress has been made in talks with industry officials, he noted, but the basic problem remains.

Secretary Udall cited as examples the damage sustained in commercial fishing with oil fouling nets and fish taken in nets. Also, 1,800 to 2,000 ducks were killed by one oil spill. In December 1967, a tanker colliding with a dock caused an oil spill of more than 1,000 barrels of oil over 20 miles.

Concerned About Future

Secretary Udall said: "I am concerned not only about the pollution problem in Cook Inlet but have even greater concern about the possibilities of similar consequences from the

forthcoming exploratory and development programs in the Gulf of Alaska and Bristol Bay.

"Those areas are of even greater importance to commercial fisheries and wildlife. In fact, nowhere else on the North American Continent does the prospect of pollution from oil development pose such overwhelming threats to birds and other wildlife and to fishery resources."

Secretary Udall said he could not over-emphasize his concern for the safety of fish and wildlife resources in the years ahead. "One gusher, one wrecked tanker, one broken pipeline, or one large spill--accidental or not--could cause lasting damage. In fact, no oil exploratory or development work should start in Bristol Bay until the industry can assure that its operations will be carried out without polluting the environment and without damaging fish and other aquatic resources."

* * *

SET QUOTAS FOR HERRING-SPAWN-ON-KELP FISHERY

During the past few years, the Alaska fishery for herring-spawn-on-kelp has grown to a \$750,000 dollar business, reports BCF Juneau. This fishery occurs for a few minutes to a few hours at 3 places in southeastern Alaska. The kelp, with its burden of spawn, is picked by hand from small boats. It is dry salted in barrels for export to Japan. Competition is very intense because the price paid to fishermen may be \$1 or more per pound and processing is very simple.

This year, new regulations require fishermen to register for a single area. A quota is set for each fisherman depending on the total number of registrants. These actions have reduced the "gold rush" atmosphere. However, it did not reduce significantly the number of fishermen or processors.



Oregon

COHO SALMON RELEASES COMPLETED

The Oregon Fish Commission completed its annual coho salmon releases in April. Its hatcherymen released from 9 coastal and Columbia River hatcheries 8.7 million coho smolts, young fish ready to begin their seaward migration.

In addition to the smolts, which are fed in the hatcheries for about 14 months, more than 7 million small, unfed, coho were released. Most of these smaller fish went into Willamette River tributaries where the commission is attempting to develop a large coho run.

Spectacular Coho Season

The coho releases completed one of Oregon's most spectacular coho seasons. Sport fishing the length of the coast was the best ever; a record 300,000-plus coho were caught at the mouth of the Columbia. The ocean troll fishery landed a record 8.3 million pounds. The Columbia River gill net catch of 3.8 million pounds was the second highest since 1929.

Despite these record and near-record harvests, about 26,000 adult coho were hauled from commission hatcheries in tank trucks of the Fish Commission, U. S. Fish and Wildlife Service and Oregon Game Commission, and released into streams with natural spawning potential.

Another 92,000 returning coho were sold to commercial processors on bid. About 25,000 were provided to state and county institutions for food programs.

36 Million Eggs Taken

Commission hatcherymen took 36 million coho eggs. Eleven million were given to other fisheries agencies, including the Oregon Game Commission, U. S. Bureau of Sport Fisheries and Wildlife, and the Idaho, Montana, Alaska, California, Michigan, New York, and Minnesota conservation departments.

Eighteen million coho eggs were retained at Fish Commission hatcheries. The recent fry releases came from this stock. The remainder are being reared at the hatcheries. After culling and natural mortalities, about 10 million smolts will be released in early spring 1969.

* * *

NEW DAM THREATENS CHINOOK RUN

Oregon Fish Commission director Robert W. Schoning said in April that no commercial fishing season for spring chinook in the Columbia River would be considered in the immediate future unless the prevailing fish passage situation at John Day Dam were drastically reversed.

The season was to remain closed until further notice. Without such action, the commercial season would have begun on April 27, the same as in 1967.

The Washington Department of Fisheries in the second half of April, closed sport fishing for spring chinook in the Columbia for Washington fishermen; the Oregon Game Commission closed it for sport fishing on the Columbia in Oregon. The Washington agency also delayed opening the commercial fishery on the Columbia until further notice.

Fish Passage Problems

Schoning said that he was expecting a relatively small run of spring chinook this year, and that those in the river already were experiencing extreme passage difficulties. The problem was caused by the newly completed John Day Dam between The Dalles and McNary Dams. The fish were not moving over the fishway at the new dam in satisfactory numbers.

Bonneville, the lowermost dam on the river, is 145 miles above the mouth. The Dalles Dam is 46 miles above Bonneville; the John Day Dam is 24 miles further upstream; McNary is 67 miles above Day.

The count at Bonneville of chinook moving up the ladders was over 59,000 fish through April 25. At The Dalles Dam, the count also was encouraging: 2,800 chinook over on the 25th for a season total of 33,000. But, Schoning stated, John Day Dam counts were extremely alarming--a total of only 1,620 chinook through April 25.

Although some time lag between passage at the dams was expected, something was drastically wrong at John Day Dam: thousands of fish that successfully negotiated The Dalles fishways were held up.

Corrective Measures

Oregon Fish Commission and Washington Department of Fisheries biologists and engineers worked closely with the Corps of Engineers to adjust fish-passage facilities. The number of chinook passing John Day increased somewhat later in April--but was still far below normal.

* * *

NEW FISH-MARKING METHOD APPROVED

A new method of marking hatchery-reared salmon by causing fluorescent rings to form in their bones has been approved by the U. S. Food and Drug Administration, reports Dr. Thomas E. Kruse, Oregon Fish Commission research director.

The technique mixes the antibiotic oxytetracycline into the food of young salmon being reared in the hatchery. A small amount is enough to lay down an identifying mark in the bones. When examined under ultraviolet light, the mark appears as a fluorescent yellow band that stands out clearly against the bluish background of "normal" bone.

Method's Advantages

Among the method's advantages is that it does not handicap the fish, as may happen when fins are clipped or when metal or plastic tags are used. The oxytetracycline technique is also cheaper than other methods and does not require handling of the fish with the possibility of injuring them. Experiments have shown that more than one ring can be produced in the fish by feeding of the marking agent at intervals.

Flourescent Mark

To examine fish for the flourescent mark, a bone sample must be taken. A segment of backbone from the tail end is ideal. This is a relatively simple matter when adult salmon return to the hatcheries on the spawning run. The fish are dispatched prior to spawning, and there is little problem in removing a bone sample with a special bit mounted in a drill press. At fish-processing plants, bone samples should also be readily available since the tails are cut off and discarded in preparation of the salmon for canning.

Sampling the sport catch for the mark is different. Biologists have designed a special tool to remove a bone from the inside of the mouth. This does not mutilate the fish as removal of a section of backbone would. It should overcome any objection many fishermen would have to their catch being somewhat mangled--even for science.

Initial work in marking fish by feeding oxytetracycline was done by Douglas Weber and George Ridgway of BCF Seattle. The refinements in method and technical work

necessary to win Food and Drug Administration acceptance were made by an Oregon Fish Commission crew under biologist Irv Jones of the Clackamas research laboratory staff.

Fisheries workers believe the new technique will measure more accurately the contribution of hatcheries to sport and commercial fisheries.



Washington

AQUARIUM FACILITY TO BE BUILT ON PUGET SOUND

The Oceanographic Commission of Washington State has appointed a committee to select a site and carry out the design, construction, and operation of a major aquarium facility on Puget Sound in King County. The new committee began work on May 7.

The sum of \$3,000,000 in county general obligation bonding authority is available for the proposed aquarium. The County of King will contract with the Oceanographic Commission of Washington (OCW) and its State nonprofit corporation, the Oceanographic Institute of Washington to build and operate the facility.

Both Research and Entertainment

OCW members say that the proposed aquarium will be a modern mixture of public viewing and entertainment areas, working fisheries and oceanographic research facilities, many open to public--and a working tool of all State educational levels from secondary to university.

The committee has representatives of the Oceanographic Commission of Washington, University of Washington, State of Washington Departments of Fisheries, Fish and Game and Parks and Recreation, the City of Seattle, King County, U. S. Bureau of Commercial Fisheries, the Pacific Science Center, and Virginia Mason Research Center.



Massachusetts

BOSTON HARBOR POLLUTION CONFERENCE CALLED

Pollution in the Boston Harbor area has required closing more than 1,000 acres of shellfish beds, Secretary of the Interior Stewart L. Udall has announced. The halt in clam harvesting is causing an estimated annual loss of \$256,000 to \$1,400,000 a year. The shellfish beds were closed by Massachusetts because of bacterial contamination in the harbor waters.

The greatest source of water pollution in Boston Harbor is the discharge of municipal waste. About 460 million gallons a day of raw or partially treated sewage from the metropolitan area are discharged through 2 major sewerage systems.

More pollutants are discharged into the harbor and its tributaries from boats, other water-pollution control plants providing inadequate treatment, and overflows from combined sewers carrying sewage and storm water.

The waste produce bad odors, stimulate excessive growth of aquatic plants, and make it dangerous to use the waters for swimming and boating.

Udall Calls Enforcement Conference

Sec. Udall has called a Federal-State enforcement conference in Boston on May 20 to cope with the pollution problem. He acted under a provision of the Water Quality Act of 1965. The provision gives him authority to start an enforcement action when he finds that substantial economic injury has been caused by inability to sell pollution-damaged shellfish in interstate commerce.

Representatives of Interior Department's Federal Water Pollution Control Administration and Massachusetts will attend.

* * *

COMMERCIAL FACTORY TO PRODUCE FPC IS DEDICATED

A commercial plant to produce fish protein concentrate (FPC) was dedicated at the end of April in New Bedford, Mass. Governor John Volpe stated that the product "can give new employment and strong new hope to our lagging industry." Some observers saw its major significance as a potential lifeline for the world's hungry millions.

The Alpine Geophysical Associates plant will grind whole fish and extract their oil and water. It is reported that the remainder will have a pure animal protein content of more than 80 percent.

* * *

BOSTON POND HAS TROUT FISHING

The fisherman on 63-acre Jamaica Pond in Jamaica Plain, Boston, can hear the sounds of the vibrant city and see a large apartment building to the north. But his attention is concentrated on the rainbow, brown, and brook trout--and the largemouth and smallmouth bass. The pond is within the Boston parks system.

Jamaica Pond is one of several city-surrounded trout-waters in the Northeast District of the Massachusetts Division of Fisheries and Game. Some others are: Plug Sound and Round Pond in Haverhill, Dug Pond in Natick, Forest Lake in Methuen, and Woburn's Horn Pond.



CORRECTION

In "Mass Culture of Pink Shrimp and Pompano Studied by Miami U," April CFR, p. 13, a sentence in paragraph "Use of Warmed Water?" should have read: "When the cooling water is pumped out, it has increased in temperature by about 10° F."