



Indians carrying bags of salmon along Columbia River. (Photo: USIA in National Archives)

# U. S. AND USSR AGREE ON SOVIET FISHING OFF U. S. MID-ATLANTIC COAST

On Nov. 25, 1967, the Soviet Union and the United States reached a 1-year Agreement on Fishery Problems in the Western Areas of the Mid-Atlantic Bight. These are the waters extending from Cape Cod, Mass., to Cape Hatteras, North Carolina.

The Soviet Union agreed to reduce its fishing effort. The U. S. agreed to permit Soviet fishing in a limited area within the 9-mile contiguous zone of the U. S. off Long Island--and Soviet landing in a limited area off New Jersey when it would not conflict with U. S. sport and commercial fishermen.

The 12-member U. S. delegation was headed by Ambassador Donald L. McKernan, Department of State, and included representatives of industry, Coast Guard, and the Bureau of Commercial Fisheries. The Soviet delegation was led by Vladimir M. Kamentsev, First Deputy Minister of Fisheries, and included 10 officials of the Soviet Ministry of Fisheries. The U. S. experts consider the 1-year accord an experimental step in international fisheries agreements.

## McKernan's Statement of Problems

In explaining the problems of U. S. fishermen, McKernan pointed to the sharp declines in U. S. landings of red hake during the past 3 years. In southern New England fishing ports, landings of red hake decreased from 59.4 million pounds in 1965 to 10.8 million in 1966--down 81 percent. He said: "As far as U. S. fishermen are concerned, this important fishery has virtually disappeared, with severe economic consequences for the Americans.

Landings of whiting or silver hake remain far below what we consider normal. Our studies indicate that abundance has diminished to a remarkably low figure." Other fisheries causing concern are scup, fluke, and other flounders.

McKernan concluded: "The United States remains one of the strongest supporters of the concept of freedom of fishing on the high seas with reasonable regard for the interests of local coastal fishermen in areas where distant-water fleets operate . . . . We must show by concrete example to the nations of the world, whose coastal fishing is adversely affected by high-seas fisheries, that they can cooperate with nations conducting these high-seas fisheries in reaching mutually satisfactory solutions and that in fact such solutions are preferable to drastic actions of a unilateral nature. I think that our two countries have been the leaders in recent times in reaching cooperative solutions to common fishery problems."

## WHAT AGREEMENT PROVIDES

- The Soviet Union will refrain from fishing during Jan. 1 to April 1, 1968 in a large rectangular area about 46.5 miles wide and over 100 miles long south of the eastern half of Long Island. The area encompasses about 4,600 square miles. This will permit large concentrations of Atlantic red hake and whiting to reach their spawning grounds undisturbed.

[Some U. S. scientists believe the Soviets have been intercepting hake on the high seas where they concentrate early in the year before moving in shore. This limitation on Soviet fishing should provide U. S. fishermen a somewhat greater access to this resource and may alleviate their present economic difficulties.]

● The Soviet Union will not increase its 1968 catch above 1967 catches in the Mid-Atlantic Bight south of sub-area 5 of the International Convention for the Northwest Atlantic Fisheries (ICNAF) and north of Cape Hatteras. These are the waters west of meridian 71°40' as far as Cape Hatteras; meridian 71°40' runs across Block Island south of Rhode Island coast.

[This measure will bring some relief from increasing foreign fishing pressures on U. S. inshore fisheries. Intensive Soviet offshore fishing has resulted in increasing catches of species important to U. S. coastal fisheries.]

In addition, the Soviets will not conduct "specialized fisheries" for scup (porgy) and fluke in the Mid-Atlantic Bight. Also, they will not increase the incidental catches of those species.

[In the past, Soviet fleets took only small quantities of scup and fluke incidental to other catches. Because these 2 fisheries are important to U. S. commercial and sport fishermen throughout Middle Atlantic area, it was considered important to protect fisheries.]

#### U. S. Permits Soviet Loading

● The U. S. will allow the Soviets to "conduct loading operations" in limited areas off Long Island and New Jersey. The Soviets will be able to transfer fish catches to processing vessels or transfer supplies from base ships to fishing vessels. Access to the loading area off Long Island will be permitted from Nov. 15 to May 15. From Sept. 1 through May 1, Soviet vessels will be permitted to load or unload in a 3-mile stretch off New Jersey. The loading area off southeastern Long Island was determined during the negotiations. The one off central New Jersey was to be defined and communicated to the USSR before Jan. 1, 1968. (See map p. 3 for N. J. area selected. The

area was selected to interfere least with U. S. sport or commercial fishermen.)

[Loading and unloading in protected areas close to shore is important to the Soviets. They have encountered technical problems in high-seas transfers of catches and supplies. They also will be able to repair disabled vessels quickly.]

#### USSR Can Fish Off Long Island

● The U. S. gives the USSR the privilege of fishing in the 9-mile exclusive fishing zone off Long Island during Jan. 1 to April 1, 1968. This is the period when Soviet vessels will refrain from fishing in the area of silver hake concentration. The area is about 10 miles long and 6 miles wide. It extends landward towards Moriches Bay from the outer limits of the U. S. 9 mile fishery zone. It encompasses about 60 square miles. A similar privilege was extended to the USSR in a small area off the Alaska coast in the Feb. 13, 1967, Agreement.

#### Both Nations To Expand Research

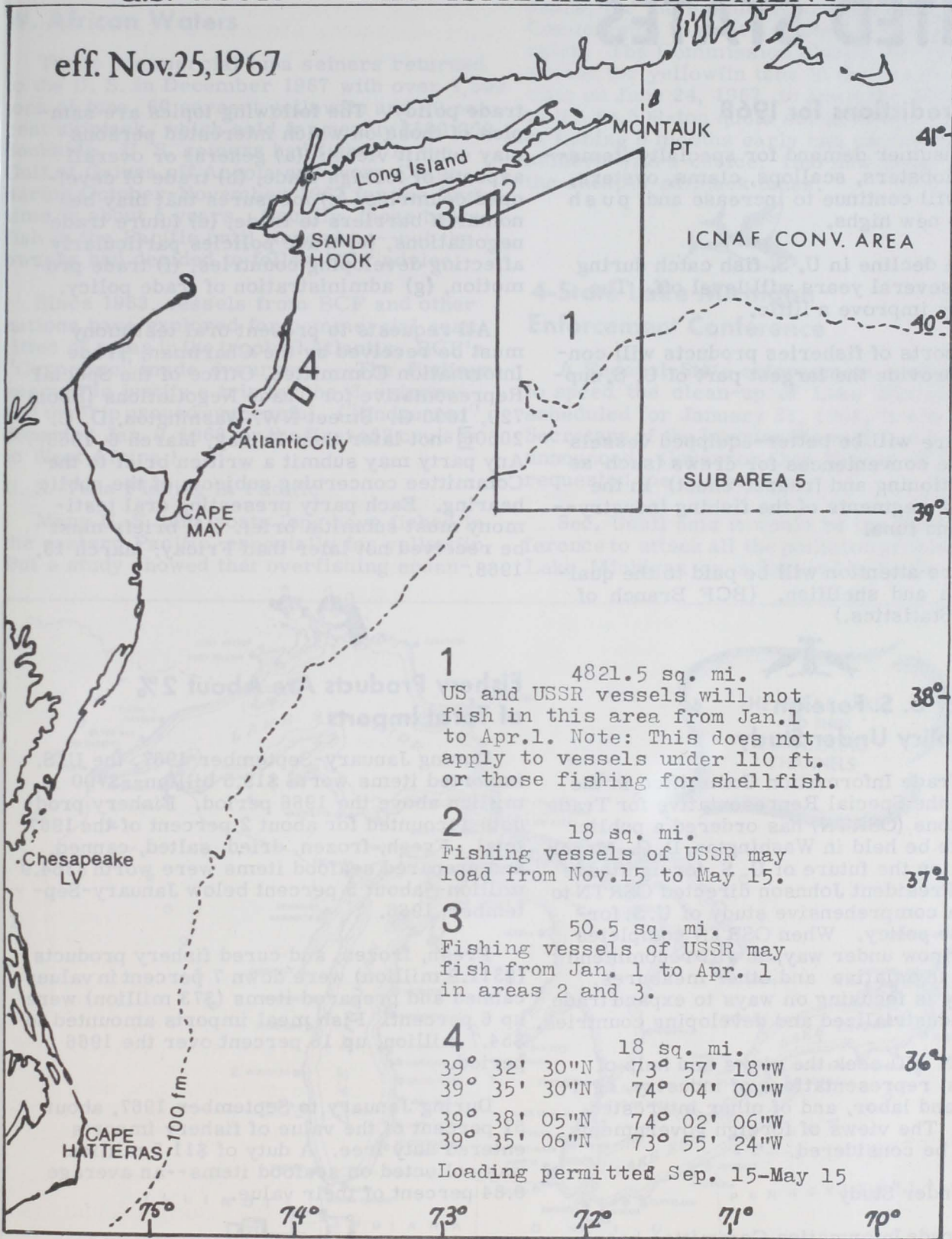
The Agreement seeks to ensure the maintenance of maximum sustainable yields from fisheries in the Mid-Atlantic Bight. The U. S. and the USSR will expand research "on species of fish of interest to both parties" and exchange scientific and research data, books, and articles. To coordinate fishery research, their scientists will meet periodically and exchange tours on research vessels.

[The investigations may provide data to evaluate Agreement's effectiveness and its potential for conservation.]

BCF and the Coast Guard jointly conduct extensive surveillance of foreign fishing vessels in U. S. waters. This service will make it possible for the U. S. Government to verify Soviet compliance with provisions of the "Atlantic Agreement."

# U.S.-USSR 1-YEAR FISHERIES AGREEMENT

eff. Nov.25,1967



**1** 4821.5 sq. mi.  
 US and USSR vessels will not fish in this area from Jan.1 to Apr.1. Note: This does not apply to vessels under 110 ft. or those fishing for shellfish.

**2** 18 sq. mi.  
 Fishing vessels of USSR may load from Nov.15 to May 15.

**3** 50.5 sq. mi.  
 Fishing vessels of USSR may fish from Jan. 1 to Apr. 1 in areas 2 and 3.

**4** 18 sq. mi.  
 39° 32' 30"N 73° 57' 18"W  
 39° 35' 30"N 74° 04' 00"W  
 39° 38' 05"N 74° 02' 06"W  
 39° 35' 06"N 73° 55' 24"W  
 Loading permitted Sep. 15-May 15

# UNITED STATES

## Some Predictions for 1968

- Consumer demand for specialty items--shrimp, lobsters, scallops, clams, oysters, crabs--will continue to increase and push prices to new highs.
- The decline in U. S. fish catch during the past several years will level off. The catch may improve a little.
- Imports of fisheries products will continue to provide the largest part of U. S. supplies.
- There will be better-equipped vessels with more conveniences for crews (such as air conditioning and freezer chest) in the better-off segments of the fishing industry--shrimp and tuna.
- More attention will be paid to the quality of fish and shellfish. (BCF Branch of Fishery Statistics.)



## Future of U. S. Foreign Trade Policy Under Study

The Trade Information Committee in the Office of the Special Representative for Trade Negotiations (OSRTN) has ordered a public hearing to be held in Washington, D. C., March 25, 1968, on the future of U. S. foreign trade policy. President Johnson directed OSRTN to conduct a comprehensive study of U. S. foreign trade policy. When OSRTN completes the study now under way, it will recommend required legislative and other measures. The study is focusing on ways to expand trade among industrialized and developing countries.

OSRTN will seek the views and help of Congress, representatives of industry, agriculture, and labor, and of other interested persons. The views of foreign governments also will be considered.

### Topics Under Study

The Trade Information Committee hearing is designed to provide a full exposition of public views on all aspects of U. S. foreign

trade policy. The following topics are samples of those on which interested persons may submit views: (a) general or overall aspects of foreign trade, (b) trade of developed countries, (c) measures that may be nontariff barriers to trade, (d) future trade negotiations, (e) trade policies particularly affecting developing countries, (f) trade promotion, (g) administration of trade policy.

All requests to present oral testimony must be received by the Chairman, Trade Information Committee, Office of the Special Representative for Trade Negotiations [Room 729, 1800 G. Street NW, Washington, D. C. 20506] not later than Friday, March 8, 1968. Any party may submit a written brief to the Committee concerning subjects of the public hearing. Each party presenting oral testimony must submit a brief. All briefs must be received not later than Friday, March 15, 1968.

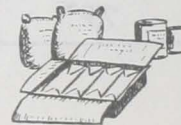


## Fishery Products Are About 2% of Total Imports

During January-September 1967, the U. S. imported items worth \$19.5 billion--\$700 million above the 1966 period. Fishery products accounted for about 2 percent of the 1967 total. Fresh, frozen, dried, salted, canned, and prepared seafood items were worth \$384.9 million--about 5 percent below January-September 1966.

Fresh, frozen, and cured fishery products (\$311.9 million) were down 7 percent in value; canned and prepared items (\$73 million) were up 6 percent. Fish meal imports amounted to \$54.7 million, up 18 percent over the 1966 period.

During January to September 1967, about 57 percent of the value of fishery imports entered duty free. A duty of \$11.5 million was collected on seafood items--an average 6.84 percent of their value.



### 3 Boats Return With Tuna From W. African Waters

Three commercial tuna seiners returned to the U. S. in December 1967 with over 1,500 tons of tuna, 60 percent yellowfin and 40 percent skipjack, which sold for nearly \$500,000 dockside. U. S. seiners had fished in the Gulf of Guinea off Angola and Ivory Coast during October-November 1967 for the first time in about 5 years. Usually, these boats fish in the Pacific until November--but the owners had decided to follow BCF advice.

Since 1963, vessels from BCF and other nations have explored for commercial quantities of tunas in the tropical Atlantic. BCF's "Geronimo" made 6 surveys. The findings seemed to justify a trip by the 3 seiners--and the trip proved successful. ("Undaunted" departed Jan. 9, 1968, on the first of 2 cruises to West Africa.)

#### U. S. Tuna Fishing in Pacific

Many U. S. tuna boats long have fished in the eastern Pacific, especially for yellowfin. But a study showed that overfishing endan-

gered yellowfin stocks. During the past few years, the Inter-American Tropical Tuna Commission has set a quota for the yellowfin catch. The Commission closed the fishing season for yellowfin tuna in the eastern Pacific on June 24, 1967, to limit the 1967 catch to the 84,500-ton quota set in 1966. The end of fishing 6 months early had confronted tuna seiners with a choice: find new areas or fish the cheaper skipjack tunas.



### 4-State Lake Michigan Enforcement Conference

A Federal-State enforcement conference to speed the clean-up of Lake Michigan is scheduled for January 31, 1968, in Chicago, Secretary of the Interior Stewart L. Udall has announced. Governor Otto Kerner of Illinois requested the conference.

Sec. Udall said it would be the first conference to attack all the pollution problems of Lake Michigan on a lake-wide basis. "No



resource problem in the country is more important than the saving of Lake Michigan," he emphasized.

In a telegram to Governor Kerner, Sec. Udall said: "Your request that I call an enforcement conference on the four Lake Michigan States to protect the water quality of Lake Michigan and its drainage basin reflects your long recognized leadership in the field of natural resources. I consider the saving of Lake Michigan so important that I am planning to attend and open the Federal four-State conference." Sec. Udall will serve as chairman.

He said formal notifications of the conference were mailed to the States involved; Illinois, Indiana, Michigan, and Wisconsin.

#### Problems Facing Conference

The participants will look at all pollution problems threatening Lake Michigan. These include "inadequately treated municipal and industrial wastes; dumping of dredged material into Lake; sewage and refuse discharged from commercial and pleasure boats; over-enrichment of the water by phosphates and other nutrients; oil pollution; thermal pollution; alewives and lampreys, and bacteriological pollution that forces closing of beaches along the lakefront."

An enforcement conference in 1965 dealt with only part of the Lake. A conference report indicated that discharge of untreated or inadequately treated sewage and industrial wastes into Lake Michigan, the Grand Calumet, Little Calumet, Calumet River, Wolf Lake, and their tributaries endangered the health and welfare of residents in Illinois and Indiana.

Since then, it became evident to those concerned that solution of the pollution problems of Lake Michigan and its tributaries requires a combined drive by the 4 bordering States, the cities, and the U. S. Government.



### U. S. and Romanian Experts Will Exchange Visits

The U. S. and Romania have agreed on a program of exchanges and visits for 1968.

One part of the program will be a 3-month visit to the U. S. by 3 Romanian fisheries experts to observe and train with personnel of the Bureau of Commercial Fisheries (BCF).

During the training period, BCF scientists will be able to board a Romanian factory stern trawler working on Georges Bank to study fishing and fish-processing techniques.

The agreement also includes visits to Romania by experts from the Bureau of Sport Fisheries and Wildlife and the National Park Service of the U. S. Department of the Interior.



### Alewife Mortality in Lake Michigan Will Continue

Scientists of BCF's laboratory in Ann Arbor, Mich., recently completed an annual survey of alewives in Lake Michigan. They found the adult population very numerous despite millions of deaths in 1967. The severe problems caused by alewives in some Great Lakes can recur in spring and summer 1968.

Dr. Stanley A. Cain, Asst. Secretary of Interior for Fish and Wildlife and Parks, said very large hatches of alewives in 1964 and 1965 produced the current abundance. Dr. Cain heads a task force studying the problem. He said the hatch during summer 1967 also was very large. Alewives in the Great Lakes become very susceptible to mass death when 3 or 4 years old.

#### Task Force Report

A task force report said the phenomena of mass fish deaths have occurred since the late 1950's and that Lake Michigan's entire fish population is unstable. The mortality probably will continue in Lake Michigan as in Lakes Ontario and Huron so long as alewives predominate. The report recommended research to produce a better balance among species. Controlled introduction of desirable predators and successful commercial use of alewives may be answers to alewife abundance.

The report also noted: "The expense of cleaning up and hauling away dead fish imposed severe financial losses this summer

[1967] on cities and towns bordering Lake Michigan. The West Michigan Tourist Association estimated that resort owners lost more than \$50 million, and some private owners were forced to abandon their vacation sites."



## Recover Many Tagged Columbia River Chinook Salmon

During the latter part of 1967, there was good recovery from commercial and sport catches of marked adult fall chinook salmon produced in Columbia River Fishery Development Program hatcheries. Through September 9, 4,678 marked fish were recovered from northern California to Alaska. Biologists and technicians from the State fisheries agencies and BCF cooperated in examining 20-25 percent of the fish landed at various Pacific coast ports. Canadian fisheries personnel helped the program on a voluntary basis.

Of the recoveries, 4,150 were from commercial catches; about 46.5 percent of them were from British Columbia. As the season progressed, a larger proportion of marked fish was recovered in the Columbia River catches and at the hatcheries. A complete tabulation should be available shortly after Jan. 1, 1968.



## Pacific Shellfish Sanitation Workshops Well Attended

Workshops organized to stress the importance of good sanitation practices in the shellfish industry were sponsored recently in Eureka, Calif., and Newport, Oregon, by the Food and Drug Administration in cooperation with the states. More than 100 management and plant workers from Pacific coast shrimp and crab plants attended each meeting.

Congress and regulatory agencies have shown interest recently in overall processing sanitation. BCF technologists participated in the workshops.



## Task Force Studies Overfertilization of Lakes

The government-industry group investigating ways to control overfertilization of lakes (eutrophication) will develop a procedure to determine how much various chemicals and waters contribute to the growth of algae.

Eutrophication is the natural aging process of lakes. It causes trouble when the addition of nutrients, mainly phosphates, speeds the process. Phosphates are a common element in municipal sewage, human waste, agricultural fertilizers, detergents, and industrial discharges. Nitrates too contribute to the problem.

### Man Adds Nutrients

The activities of people add more nutrients to the lakes and the aquatic plants increase and die. Organic deposits rise from the lake bottom. "The lake becomes shallower, smaller, warmer, and organic decay depletes the supply of oxygen." Over the centuries, the lake becomes a marsh and, eventually, disappears. Lake Erie is an example of seriously accelerated eutrophication in the U.S. There, algal growths occur with increasing frequency. Obnoxious slimes and odors prevail. Parts of the lake bottom have no oxygen at all. The value of Lake Erie for recreational purposes is threatened seriously.

### Seeking Answers

The task force considers the development of a procedure to determine algal growth potential (AGP) of various chemicals and waters an important first step in fighting eutrophication. Algal blooms on lakes can be a sign of accelerated eutrophication, but there is little agreement among scientists on a best or "standard" technique to measure a lake's capacity to grow algae--and the tendency of chemicals to stimulate algal growth.

In its search, the task force is consulting scientists at the Federal Water Pollution Control Administration laboratories, technical personnel from industry, university experts, independent research institutions, and private specialists.



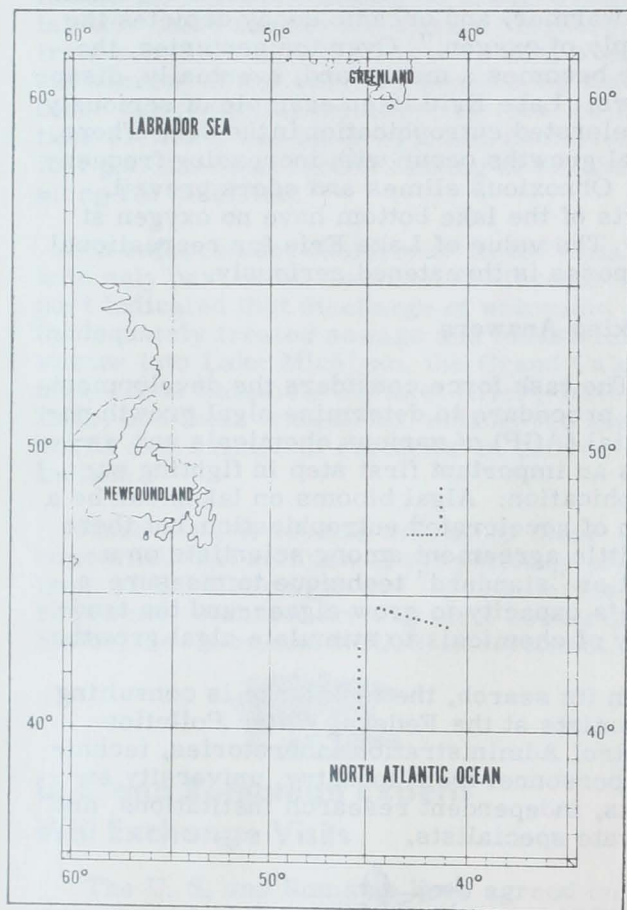


## OCEANOGRAPHY

### Grand Banks International Ice Patrol

On March 28, 1968, the U. S. Coast Guard vessel "Evergreen" will begin the first of 4 consecutive 30-day oceanographic cruises to the Grand Banks. The main purpose of these cruises will be to collect data to support the iceberg drift prediction requirements of the International Ice Patrol. The secondary purpose will be a study of the structure and migration of the semipermanent eddy at the Tail-of-the-Banks, delineate the cold core of the Labrador Current, and continue the investigation of iceberg drift and deterioration in this region.

Temperature and salinity data will be collected by Nansen casts and/or automatic Salinity-Temperature-Depth system from the surface to 1,500 meters at each station along 3 standard monitoring sections. (See chartlet.) Temperature data also will be obtained by



Expendable Bathythermographs (XBTs). All data collected will be processed at sea by digital computer.

A recording temperature sensor will be placed in the cold core of the Labrador Current for about two months to study time changes in the current. The sensor will be anchored in 3,000 feet of water on a tautline moor.

"CGC Evergreen is equipped to make precision depth measurements, dissolved oxygen determinations, collect bottom sediment samples, and collect and preserve water samples for subsequent special chemical constituent determinations."



### Buoy Beaming Data to Ships

The U. S. Naval Oceanographic Office now has an undersea radioisotope generator to power an oceanographic buoy platform that will beam scientific data to ships, planes, and satellites. The buoy platform contains an Interrogation Recording Location System. It is an experiment to determine the feasibility of finding and obtaining scientific surface data from ocean platforms by unmanned satellites. It is one of the experiments being conducted in connection with the Nimbus-B weather satellite program.

The radioisotope generator is a 25-watt undersea model produced commercially. Attached to a taut wire moored buoy 250 feet beneath the Atlantic Ocean's surface, the generator will supply electrical power to the Interrogation-Recording-Location-System (IRLS) surface spar float.

### Moored Off Puerto Rico

Sensors will be put on the buoy platform, moored off the coast of Puerto Rico, to make environmental measurements--sea states, ocean currents, wind velocities, etc. The IRLS transmitter will telemeter the data from a specially designed antenna mounted atop the spar float. As the Nimbus-B satellite passes overhead twice a day, it will interrogate the platform and store the data for

later playback as it crosses a central ground command station at Fairbanks, Alaska.

If the IRLS experiments prove successful, similar unmanned scientific data collection stations using radioisotope power could be placed at remote spots throughout the world. Their data, plus that from orbiting satellites, will provide a modern technique for data collection and telemetering for oceanography. They also will permit precise global location of data stations without sophisticated navigational aids.



### Coast Guard and BCF Cooperate to Aid ICNAF Research

The U. S. Coast Guard and BCF are conducting cooperative oceanographic cruises to support the research program planned by ICNAF (International Commission for the Northwest Atlantic Fisheries). The 2 U. S. agencies are studying the offshore resources fished by the United States and other member nations of ICNAF. The aim of the international program is to understand natural fluctuations in abundance of commercial fishes and to assess the effects of fishing. BCF's Biological Laboratory in Woods Hole, Mass., is coordinating U. S. efforts.

From Jan. 15-Jan. 26, 1968, the Coast Guard's Boston-based "Evergreen" conducted an environmental survey of Continental Shelf waters between Nova Scotia and Long Island. The hydrographic data collected will supplement earlier data collected in the same area by BCF's "Albatross IV." During the Evergreen's cruise, the Fisheries Research Board of Canada's "Cameron" conducted a similar survey in the Bay of Fundy and Scotian Shelf area.

#### What Evergreen Did

At each station occupied, a Salinity-Temperature-Depth recording instrument (STD) was lowered, plus a Nansen bottle cast to obtain water samples to determine dissolved oxygen and chlorophyll. Also, drift bottles were released--and seabed drifters at stations shoaler than 275 meters. Water temperature profiles were obtained at about 43

locations along the trackline by Expendable Bathythermograph System (XBT).

The Evergreen's regular crew was increased by a Coast Guard Oceanographic Unit Field Party of Oceanographers and Oceanographic Technicians.

#### Studied Cape Cod to Cape Hatteras

From Dec. 11-22, 1967, the Evergreen conducted an intensive hydrographic survey of coastal waters between Cape Cod., Mass., and Cape Hatteras, North Carolina. Thirty-four stations were occupied. The hydrographic data collected will be used to evaluate groundfish surveys conducted in the same area by BCF's Albatross IV and the Soviet's "Albatros."

Results of these cruises will appear in joint BCF-CG post-cruise documents. They will become part of the report on the cooperative U. S.-USSR Middle Atlantic Study.



### Oceanographic Projects Continue at 4 N. Atlantic Stations

Oceanographic projects are continuing at the 4 North Atlantic Stations--"Bravo" "Charlie," "Delta," and "Echo"--manned by U. S. Coast Guard Cutters. The stations are occupied on a 3-week patrol basis.

The oceanographic program consists of time-series observations of temperature and salinity. Nansen casts are made daily to 1500 meters depth. Once during the 3-week patrol, casts are made to near bottom, if weather and other operations permit. Observations are made at 14 or 15 depths. The temperature data are transmitted by radio teletype to the U. S. Coast Guard Oceanographic Unit for real-time processing, quality control, and distributed to users. Salinities are determined at sea by inductive salinometers. Occasionally, other oceanographic observations are made on request--biological sampling, collection of samples for chemical analysis, bathymetry, wave-height measurements, etc.



## Foreign Fishing off U. S. Coasts in November 1967

### IN NORTHWEST ATLANTIC

During November 1967, 46 individual foreign fishing vessels--from Poland, East and West Germany, and the Soviet Union--fished off New England. Weekly sightings noted fleets of 30 to 35 vessels; not all stayed the entire month.

Early in November 1966, only about 15 Soviet vessels fished on Georges Bank, then dwindled to an occasional few by month's end; there were no Polish or German vessels.

**Polish:** Poland continues to lead in number of foreign vessels off New England. Throughout November, 30 individual vessels were identified as 4 freezer stern trawlers, 23 large side trawlers, 1 factory base ship, and 2 supply vessels.

Early in month, 28 Polish vessels were scattered along eastern slopes of Georges Bank. Moderate catches observed on several vessels appeared to be herring and some haddock.



Fig. 1 - Polish freezer stern trawler "Albakora" (SWI-183), fishing for herring on Georges Bank, September-October 1967.

By mid-month, the fleet was reduced to about 20 along southeast part of Georges Bank. The limited catches of fish on deck appeared to be scrod haddock. (U. S. vessels located slightly northwest of the Polish fleet on the winter fishing grounds of Georges Bank reported haddock fishing generally poor.)

Late in month, most Polish vessels shifted to southern New England fisheries south of Martha's Vineyard and Nantucket Island. Again, large catches of herring were observed on deck and in nets. This was the first instance of any significant activity by Polish vessels in those two areas. In the same areas in recent years, large Soviet fleets had developed an extensive red hake and whiting fishery during winter.

Several times during month, Polish trawlers were anchored or nested alongside large factory base ship and other supply vessels stationed about 22 miles southeast of Gloucester, Mass. This general area has been used during past two months for transferring fish and replenishing supplies.

**Soviet:** Since late October, only 5 or 6 factory stern trawlers were scattered between Georges Bank and southern New England searching for concentrations of fish. The occasional catches observed on deck appeared to be whiting. The same was observed during November 1966.

**East German:** One freezer stern trawler was observed fishing among vessels of other nations south of Martha's Vineyard and Nantucket Island during second part of November. Large catches of herring were observed.



Fig. 2 - East German freezer stern trawler (ROS. 705). Name and vessel class unknown. Sighted Georges Bank October 1967. Large catch of fish believed herring.

(Photos: Resource Management, BCF, Gloucester, Mass.)

**West German:** Early in month, 5 to 7 freezer stern trawlers fished east of Cape Cod (Great South Channel). By month's end, fleet increased to 10 and shifted operations south of Martha's Vineyard and Nantucket Island. Heavy-to-moderate catches of herring were observed. Like the Poles, this is first time West Germans fished off southern New England.

On Nov. 24, the freezer stern trawler "Eric Ollenhauer" entered Boston Harbor to pick up supplies at Everett, Mass. A BCF resource management agent visited vessel. He reports that it had been midwater trawling about 50 feet off bottom for herring on Georges Bank. Catches were excellent, averaging 20 to 30 tons per tow; some tows yielded up to 50 tons. The captain said 15 West German vessels were fishing Georges Bank during the latter part of November. He thought more might be coming because fishing was excellent. The catch is unloaded at St. Pierre et Miquelon Islands because there are no fish transports or motherships

in the area. The 40-man stern trawler is equipped with the latest electronic devices, including a "netsonde machine" (a recorder showing depth of trawl and amount of fish entering the net).

#### IN THE GULF OF MEXICO

No foreign vessels were sighted off U. S. during October.

#### OFF CALIFORNIA

Soviet: During November, number of vessels fluctuated greatly. No sightings were reported during first half but, by mid-month, 7 vessels were fishing north of San Francisco (two 20 miles west of Eel River and the rest 28 miles west of Orick, off Humboldt County). In third week, no vessels were sighted; toward month's end 7 vessels again were sighted

off Bodega Head and Crescent City. Although they were in area of good shrimp beds, they were catching fish.

It can be expected that with the end of hake fishing off Pacific Northwest and beginning of stormy season in more northern latitudes, more Soviet vessels will tend to concentrate off California. A similar movement occurred in 1966 when, in the first week of December, the 60-vessel hake fleet off Oregon and Washington left; 20 vessels moved south and began fishing off San Francisco south of Farallon Islands.

No information is available on species caught off California.

#### OFF PACIFIC NORTHWEST

Soviet: During November, 27 to 59 vessels were sighted off Washington and Oregon. The number of fishing, support, and research

Table 1 - Soviet Fishery Vessels Sighted Off Pacific Northwest in November 1967

Week Ending	Area	Type of Vessel				Total
		Medium Side Trawlers	Stern Factory Trawlers	Support Vessels	Research Vessels	
Nov. 2 . . . . .	Wash. Oregon	21	3	7		31
		1	17	3	1	22
Total . . . . .		22	20	10	1	53
Nov. 9 . . . . .	Wash. Oregon		not available (bad weather)			
			not available (bad weather)			
Nov. 16 . . . . .	Wash. Oregon	23	6	9	1	39
		1	15	2	2	20
Total . . . . .		24	21	11	3	59
Nov. 23 . . . . .	Wash. Oregon	1	2		1	4
		1	18	2	2	23
Total . . . . .		2	20	2	3	27
Nov. 30 . . . . .	Wash. Oregon			1		1
		13	12	8	2	35
Total . . . . .		13	12	9	2	36

Table 2 - Soviet Fishery Vessels Sighted Off Pacific Northwest in November 1966

Week Ending	Area	Type of Vessel				Total
		Medium Side Trawlers	Stern Factory S Trawlers	Support Vessels	Research Vessels	
Nov. 3 . . . . .	Wash. Oregon	31		17	2	50
			12		1	13
Total . . . . .		31	12	17	3	63
Nov. 10 . . . . .	Wash. Oregon	42	3	19	3	67
		1	7			8
Total . . . . .		43	10	19	3	75
Nov. 17 . . . . .	Wash. Oregon	40	3	15	3	61
			1			1
Total . . . . .		40	4	15	3	62
Nov. 24 . . . . .	Wash. Oregon	38	4	16	3	61
			5			5
Total . . . . .		38	9	16	3	66
Dec. 1 . . . . .	Wash. Oregon	37	1	14	3	55
			4			4
Total . . . . .		37	5	14	3	59

vessels increased during first 2 weeks to 59. In remaining two weeks, only 27-36 vessels operated off Pacific Northwest. (In November 1966, 59 to 75 vessels were sighted in same coastal area.)

Of the vessels sighted in November 1967, most were large stern factory trawlers, with a smaller number of medium side trawlers. There were the usual number of support vessels, and also 1 to 3 research vessels. This is significantly different from November 1966, when there were almost half as many large stern trawlers and more medium side trawlers. A large stern trawler (2,600-3,200 gross tons) can catch up to 6-7 times as much fish as a medium side trawler (500-700 gross tons) during same time and under similar conditions.

In November 1966, there were more processing and other support vessels; in 1967, only 9 to 11 were sighted during most of month. This means fewer support vessels are needed because larger self-supporting stern trawlers can also process fish.

During first-half November, the Soviets fished off Washington and Oregon; in third week, they switched almost entirely to Oregon; some of those vessels were heading for California.

#### OFF ALASKA

Soviet: Fishing continued at low level; 20 or fewer vessels fished for Pacific ocean perch.

Within Gulf of Alaska, about mid-November, 4 more factory trawlers joined 6 sister-ships. Major emphasis was on lower Alba-

ross Bank near Chirikof Island where, in mid-month, 2 large stern factory trawlers (BMRT's) were joined by 5 others and a refrigerator vessel. On outer Portlock Bank east of Kodiak, one stern trawler fished throughout month. West of Yakutat Bay, 3 large stern trawlers fished during first-half November, but only one about mid-month.

There was a corresponding reduction in fishing along Aleutians during first two weeks of November, from about 12 to about 6 factory trawlers. Most apparently were fishing in Seguam-Amukta Passes region.

Japanese: Withdrawal of factory trawlers in November reduced number of vessels off Alaska to less than 10 by month's end--lowest level this year.

By month's end, 5 factory trawlers had been withdrawn from Gulf of Alaska, leaving 2 such vessels operating full time. Remaining factory trawlers operated principally west of Yakutat Bay. A second group of 4 factory trawlers appeared intermittently along southern boundary of Dixon Entrance. Apparently, it is fishing along west coast of Queen Charlotte Islands.

It is believed the typically inclement, late-fall weather also curtailed Japanese perch fishing in southeastern Bering Sea and along Aleutians. Only 1 factory trawler was working just north of Unimak Pass at month's end.

During November, at least 6 Japanese longline vessels fished for sablefish in the Alaska area: 4 of these in central Gulf near Middleton Island, 1 in western Gulf off Chirikof Island, and the sixth north of Fox Islands in eastern Aleutians.



## STATES

### Alaska

#### SPOT SHRIMP FISHERY DEVELOPS

In 1967, landings of spot shrimp (*Pandalus platyceros*) in the developing fishery in southeastern Alaska were 32,000 pounds. At least 20 vessels were active at some time during the year; 4 of these fished consistently since the end of the salmon season.

Explorations by BCF had found commercial concentrations of the large shrimp. BCF technologists worked on handling and processing methods. These 2 events led to the fishery's beginning.

\* \* \*

#### OIL POLLUTION IS POTENTIAL DANGER TO FISH AND WILDLIFE

During November 1967, a combination of storms and tides pushed ducks into contact with an oil spill in Cook Inlet, Alaska. An estimated 1,800 to 2,000 ducks were killed; the Pacific eider was hardest hit.

The incident substantiates warnings by BCF, Bureau of Sport Fisheries and Wildlife, and Federal Water Pollution Control Administration against the potential danger of extensive oil pollution in Cook Inlet to fish and wildlife.

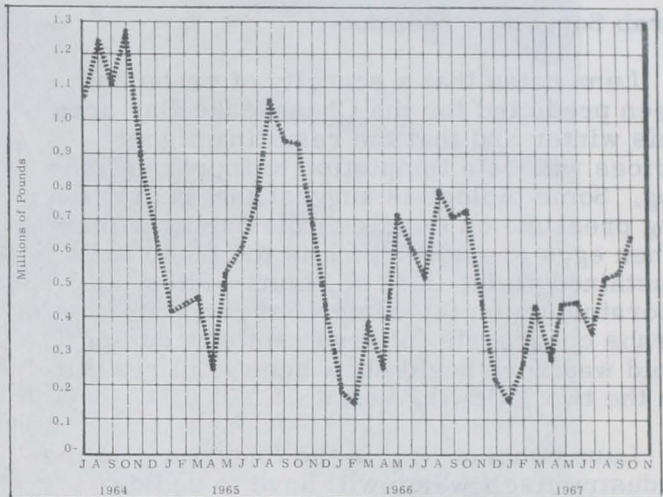


### South Carolina

#### CRAB INDUSTRY WARNED OF ECONOMIC RUIN

In a report to the South Carolina crab industry on Dec. 1, 1967, C. Robert Lunz of Bears Bluff Laboratories on Wadmalaw Island warned the industry to protect itself from "economic ruin, an inevitable conclusion," if the production decline of recent years continues. In February 1966, he noted, Bears Bluff released a report entitled: "An Interim Report to the Crab Industry on Studies Being Made on Blue Crabs in South Carolina". The chart showed the relative abundance of blue crabs throughout the state from 1955 to 1965 and was based on data from

experimental trawling. The decline of male crabs, which began in 1959, and of female crabs in 1963, caused some concern, but it was hoped these fluctuations were part of a "normal" cycle.



South Carolina crab harvest.

Since that time, however, there have been two large and widespread kills of crabs. After reviewing the commercial crab harvest month by month since July 1964, Lunz is concerned about the future of the crab industry.

A steady decline in crab production for all South Carolina producers is shown in the accompanying graph. There has been an almost 25 percent decline in harvest each year from 1964 to November 1967.

Crab kills from North Carolina down into Georgia have been studied by Bears Bluff, aided by U. S., state, and county biologists from all along the coast. The industry has cooperated. "Certainly the as yet unknown cause of these crab kills is a very important factor in the decline in the blue crab populations," writes Lunz, "but there is reason to believe that other factors are involved."

He states: "It would behoove everyone in the crab industry to exert every effort to keep intact the marshes so essential for the growth and development of crabs; to guard against pollution; and take an active part in seeing that pesticides are used with as much care as possible. Changes in marshes, increased pollution and unwise use of pesticides coupled with adverse meteorological conditions could

well be among the responsible forces causing the crab decline.

"There is some evidence to indicate that overfishing and intensive fishing pressure is not ordinarily a factor in the decline of crab populations. This evidence is not altogether conclusive. These past few years have not been 'ordinary' years in South Carolina."

#### Crab Scarcity Predicted

Lunz notes that a scarcity of crabs has been predicted for the Chesapeake Bay area this winter and that the resulting higher prices will be a temptation to increase fishing. Some biologists suggest that heavy fishing pressure on female crabs during winter when eggs are developing is too much for a sustained yield. If is so, Lunz writes, a moratorium on the winter fishery where crabs congregate in large numbers during cold weather should show beneficial results in the two following years.

Lunz concludes: "In the long run it is the industry itself which will have to decide whether or not to adopt a moratorium, but this letter sounds a warning to the industry and urges that all join in whatever efforts may be necessary to find answers to why crabs are declining."



## Florida

### ARMY ENGINEERS AID MILLIONS OF SPAWNING MULLET THROUGH OKEECHOBEE WATERWAY

Hundreds of thousands of black or striped mullet making their annual migration from Lake Okeechobee to the Atlantic and the Gulf to spawn are being helped through the locks of the Okeechobee waterway by the U. S. Army Corps of Engineers. This year's mullet run is extremely large. It started at the beginning of December 1967. More than 500,000 mullet were "locked through" the St. Lucie facility, near Stuart, Fla., on Sunday, December 3. Millions of mullet will be locked through during the following 2 to 3 months. Army Engineer locktenders work around the clock during mullet runs to get them through the boat-lift facility.

The roe mullet ranged up to 6 pounds and probably averaged about 3 pounds.

#### 1955 A Milestone

The phenomenon of the mullet run was not fully realized until winter 1955. Before, there never had been any need for special assistance at the navigation lock during the spawning migration. But in 1955 an unprecedented mullet population swam furiously down the St. Lucie Canal, gasping for air and competing with boats to get through the lock. The regular lockages were insufficient and many mullet died.

Since 1955, Army Engineers have worked with the U. S. Fish and Wildlife Service, state biologists, and the State Board of Conservation to cooperate with the mullet run. The engineers make special lockages when necessary to get the mullet to salt water, where they deposit their eggs.

During their frantic spawning trip, the mullet rarely take a hook. But when they return to Lake Okeechobee's fresh water from the estuaries in early spring, they usually are very hungry and will take many types of bait.

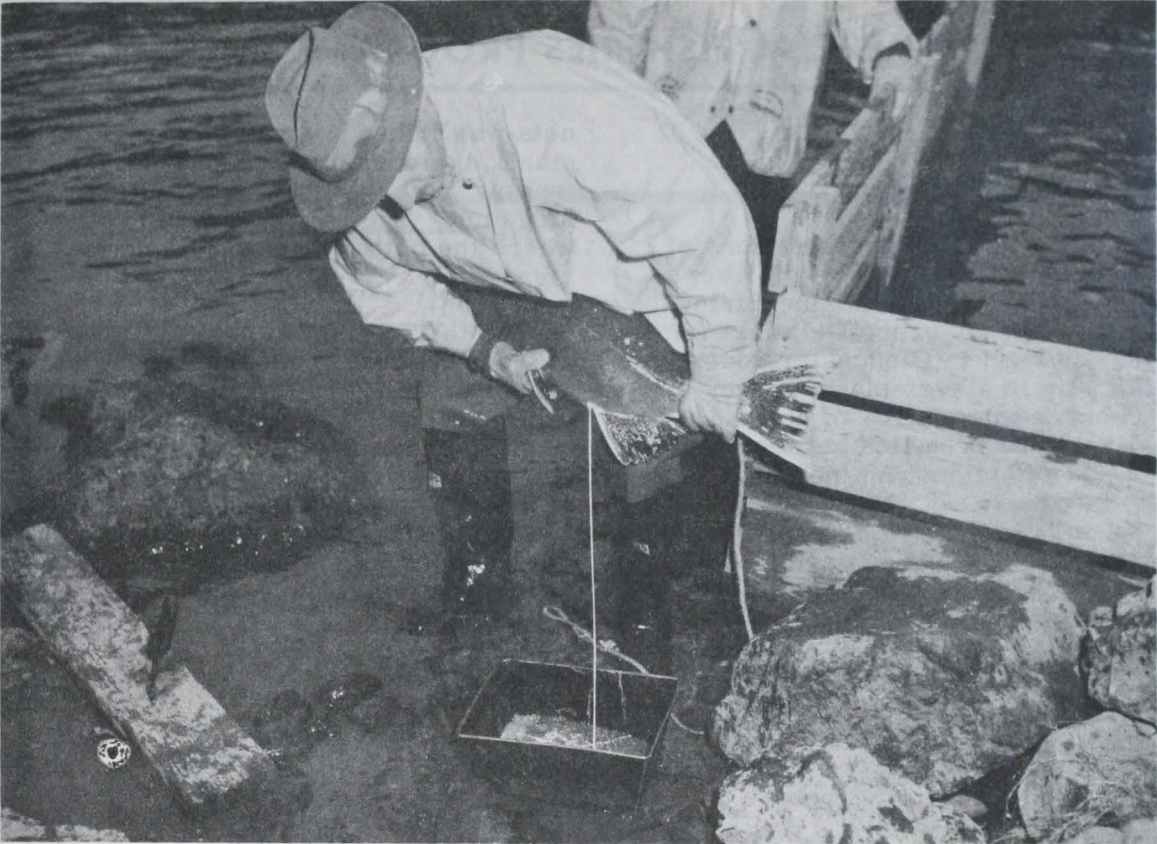
Meanwhile, the engineers at St. Lucie Lock watch and wait to respond to the mullet runs. They know that wind and temperature apparently have a great effect on size and length of the run. When the wind shifts from the northwest to the east, the heavy spawning run slows to a halt.



## Oregon

### SALEM CITY PARK TO REAR SALMON

A 12-acre pond in Salem's Cascade Gateway Park has been selected for a pilot project that may lead to a series of ponds producing over 10,000,000 fall chinook salmon a year for release into the Willamette River, reports the Oregon Fish Commission. The Regional Parks Agency and the commission are cooperating to have 2,000,000 tiny fall chinook from one of the commission's Columbia River hatcheries released into the pond in March 1968--for eventual release into near-



Male salmon being milked of sperm. (USIA in National Archives)

by Mill Creek, a Willamette River tributary. The young salmon will be planted in the pond, fed, and liberated before public use of the park becomes heavy again in June.

If the program is successful and money available, Fish Commission biologists envision a series of ponds throughout the Willamette basin producing more than 10,000,000 small fall chinook ready to begin their downstream migration. Future pond sites have been located tentatively on the Molalla, North Santiam, South Santiam, and the main stem Willamette near Eugene.

#### Pond-Rearing Research Since 1961

The pilot program at the Salem park follows experimental work at the Commission's Wahkeena Pond in the Columbia River gorge. There, biologists have carried out natural pond-rearing research since 1961 under contract to the U. S. Bureau of Commercial Fisheries.

Sometime during the latter part of March 1968, 2,000,000 small fall chinook will be placed in the pond, fed the Oregon Pellet, and be released eventually into Mill Creek--to travel through the heart of Salem to the Willamette, the Columbia River, and on to the sea.

\* \* \*

#### CONFERENCE ON MARINE AQUICULTURE

A Conference on Marine Aquaculture will be held at the Oregon State University Marine Science Center, Newport, Oregon, May 23 and 24, 1968. Invited participants will present formal papers on 8 topics: fish culture, shellfish culture, behavior, genetics, nutrition, disease, economics, and engineering.

Address inquiries to: William J. McNeil, Oregon State University, Marine Science Center, Marine Science Drive, Newport, Oregon 97365.





## BUREAU OF COMMERCIAL FISHERIES PROGRAMS

### "Delaware" Finds Commercial Amounts of Northern Shrimp

Commercially usable concentrations of northern shrimp (*Pandalus borealis*) were found in the western Gulf of Maine during the 6-week shrimp survey of the Delaware (67-9). The vessel returned to Gloucester, Mass., on Dec. 8, 1967, after a systematic survey of shrimp resources in an area of about 3,600 square miles. The area lies between Cape Cod, Mass., and Portland, Maine, from 10 to 80 miles offshore.

Trawl tows were made in depths of 28 to 150 fathoms. Catches of shrimp up to 1,000 pounds per 1-hour tow were made. Count per pound (heads on) for all shrimp taken was well within the range desired for commercial use--30 to 60 per pound. This cruise was the first of several planned to complete a survey of shrimp resources in the Gulf of Maine.

#### Cruise Purposes

The purposes of the cruise were: (1) to locate commercially potential concentrations of northern shrimp that could be harvested during this period prior to the normal shrimp-ing season, (2) to determine the boundary limits of these concentrations, (3) to ascertain the production potential of shrimp populations located, and (4) to collect data on the behavior and accessibility to fishing gear of northern shrimp populations.

#### Procedure

210 tows were made using (1) a 30-foot (headrope length) chain-rigged try-net, (2) a roller-rigged 70-foot Maine shrimp net, or (3) a chain-rigged 70-foot Maine shrimp net. When the cruise began, comparison tows were made to determine catch ratios between the try-net and the two 70-foot nets. One comparison tow was made between the roller net and the chain-rigged net; the chain net caught about 60 percent more shrimp than the roller-rigged net.

The tows were located generally at the intersection of grid lines spaced about 5 miles apart. Preliminary exploratory tows were made with the try-net. If the catch was large enough to indicate good concentrations of shrimp, 20 pounds or more, one of the larger

nets was fished. If the try-net catch was small, the vessel proceeded to the next designated station without making a tow with a large net. The roller-rigged net was used where the bottom was too rough for the chain-rigged net.

The total weight of shrimp in each tow was determined by measuring the catch in bushel baskets and taking the average weight of the baskets of shrimp. Samples were taken to determine the count per pound and shrimp lengths. During the first two parts of the cruise, work proceeded around the clock; during the last part, the work period was reduced to coincide more nearly with daylight hours, when catches were somewhat better.

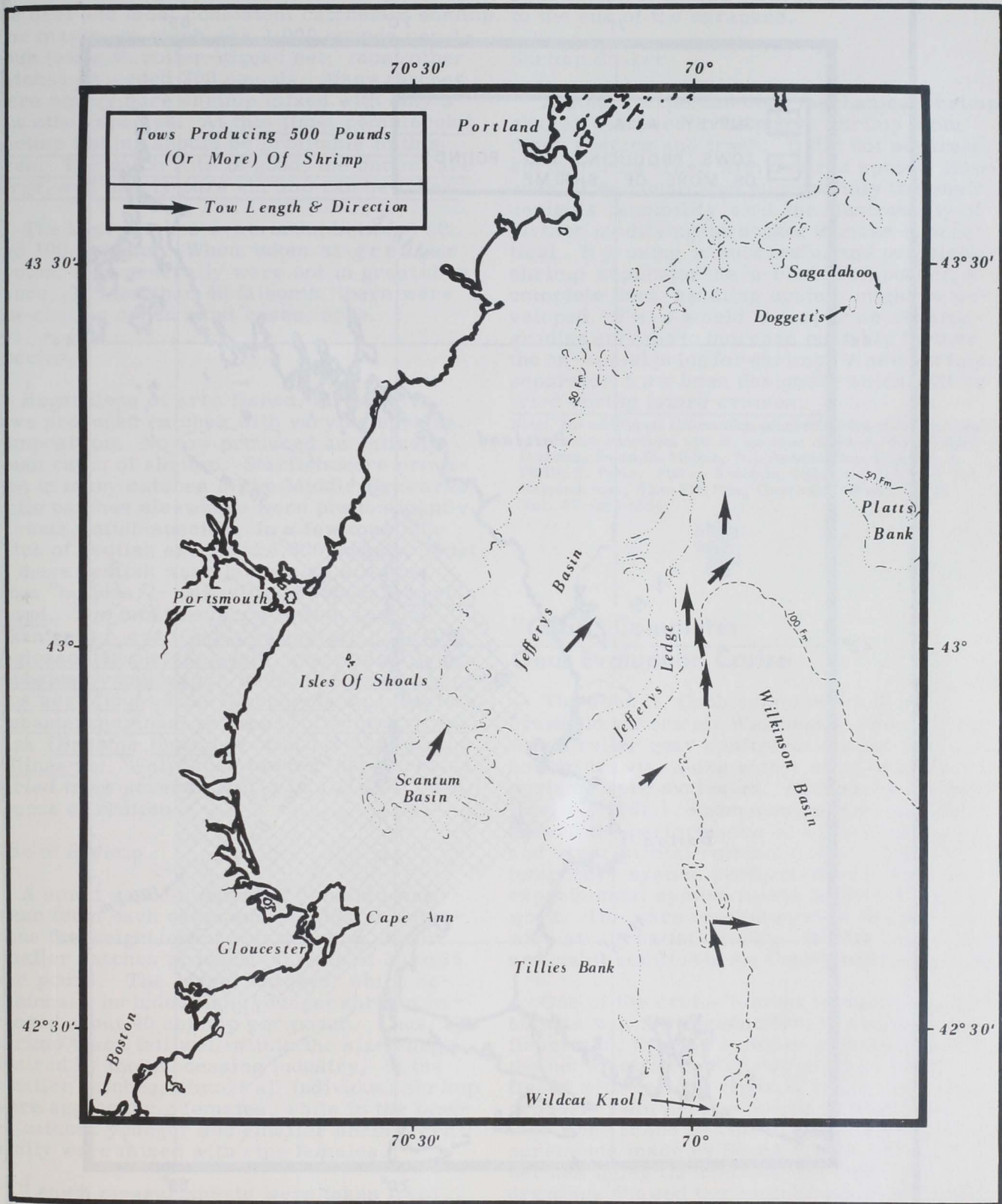
#### Results

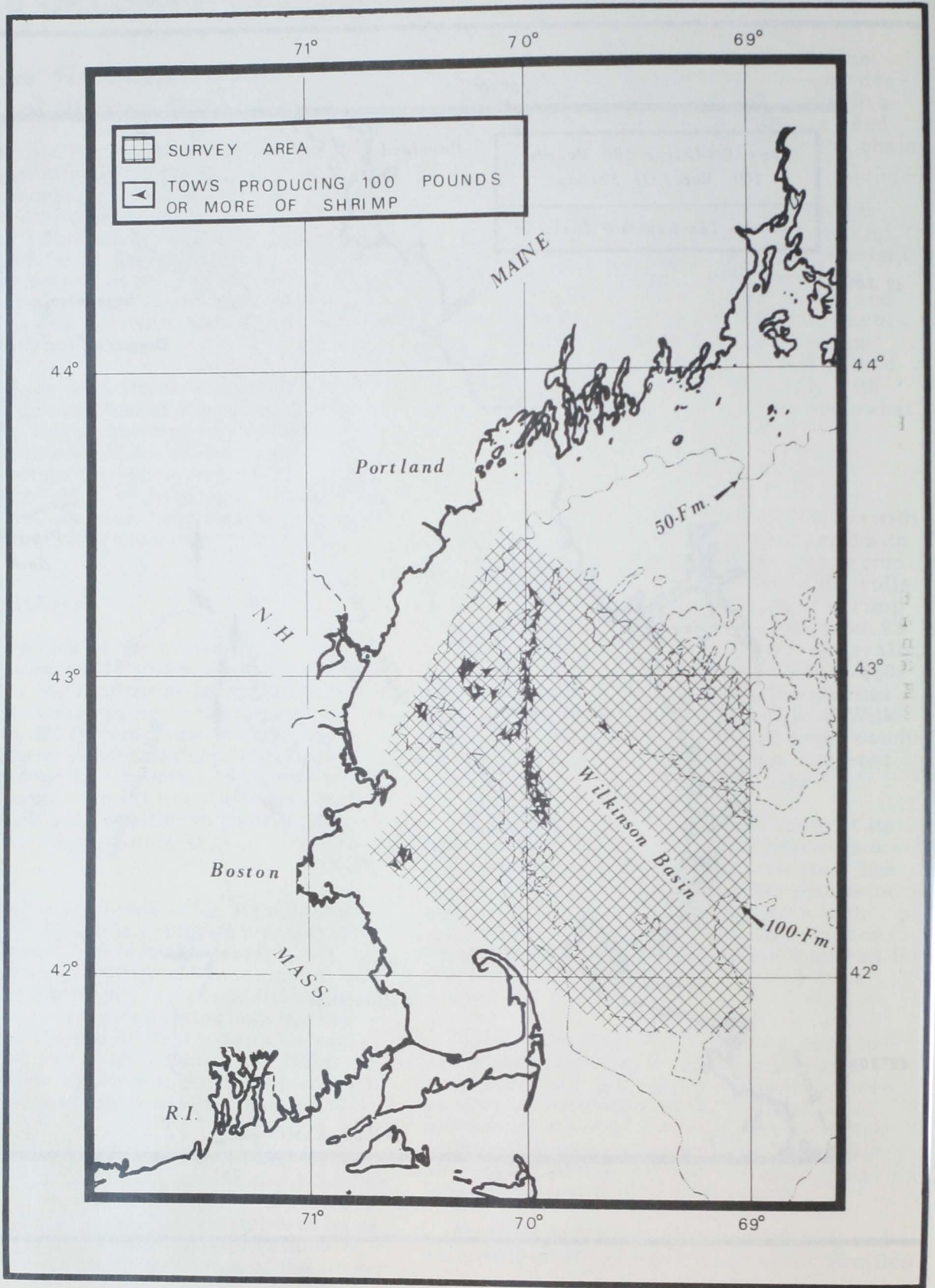
Of the 210 tows made, 137 were made with the try-net, 67 with the roller net, and 6 with the chain net. Catches in the try-net varied from zero to 55 pounds. Catches in the roller net varied from 4 to 1,000 pounds of shrimp per hour tow, and the chain net took from 23 to 400 pounds of shrimp per hour. Generally, the larger catches were taken in 40- to 110-fathom depths. Offshore of the 100-fathom contour bordering the western edge of Wilkinson Basin, most tows produced small catches of shrimp from either the small try-net or the larger commercial size nets.

Except for a small area just south of its western tip, tows made in the Middle Bank area produced generally poor results. The best catches here were about 400 pounds of shrimp per hour. All tows caught a high percentage of trash and other fish species. Separation of shrimp from other material in these catches was difficult and time consuming.

Good concentrations of shrimp were located west of Jeffreys Ledge, where up to 700 pounds per tow were taken. However, here, as around the Middle Bank, the amount of associated species mixed in with the catch makes this area somewhat less than desirable--when compared with the area lying along the eastern side of the ledge.

Starting just north of Wildcat Knoll, and extending northward to a point about 30 miles





south of Casco Bay, is the area that produced the best and most consistent catches of shrimp. The maximum catch was 1,000 pounds per 1-hour tow with roller-rigged net; most other catches exceeded 200 pounds. Many catches were nearly pure shrimp mixed with only a few other species. At this time, commercial shrimp fishing should be profitable in this area. The catch rate is good, the shrimp are large, and nearly pure shrimp can be taken.

The best catches were taken between 80 and 100 fathoms. When taken at greater depths, they generally were not in great abundance. In less than 40 fathoms, there were few shrimp or, in most cases, none.

### Species

Regardless of area fished, all positive tows produced catches with varying species composition. No tow produced an entirely clean catch of shrimp. Starfish were prevalent in many catches in the Middle Bank area, while catches elsewhere were predominantly various finfish species. In a few tows, the catch of redfish exceeded 1,000 pounds. Most of these redfish were large size and free from "buttons,"--parasitic copepods *Sphyrion lumpi*. The most common finfish species taken were: cod (*Gadus callarias*), dabs (*Hippoglossoides platessoides*), gray sole (*Glyptocephalus cynoglossus*), haddock (*Melanogrammus aeglefinus*), hake (*Urophycis* sp.), redfish (*Sebastes marinus*), pollock (*Pollachius virens*), cusk (*Brosme brosme*), whiting (*Merluccius bilinearis*). Weight per tow for these species varied from several individuals to 5,000 pounds of redfish.

### Size of Shrimp

A small random sample of shrimp was taken from each catch and weighed to determine the weight/count relationship. Most smaller catches produced shrimp of 30 to 35 per pound. The larger catches, which occasionally included many younger shrimp, averaged about 40 shrimp per pound. Thus, all shrimp taken fell well within the size range desired by the processing industry. In the smaller catches, almost all individual shrimp were egg-bearing females, while in the larger catches younger and smaller shrimp generally were mixed with ripe females.

Length measurements were taken from selected samples at most stations. Lengths varied between 20 to 34 millimeters for cara-

pace length from the back of the eye socket to the end of the carapace.

### Shrimp Shaker

A small, experimental, mechanical shrimp shaker was used to help sort shrimp from other species and trash. It did not separate shrimp from trash with desired speed. However, it demonstrated successfully the basic design's feasibility and the desirability of further modifying the shaker to make it practical. By using a successful and practical shrimp separator as a basic component, a complete deck-handling system might be developed. This would incorporate shrimp-grading screens to increase possibly further the ex-vessel price for shrimp. A new shrimp separator has been designed, which will be tried during future cruises.

Note: For additional information concerning this cruise and program work associated with it, contact: Keith A. Smith, Base Director, Ernest D. McRae, Jr., Assistant Base Director, or Phillip S. Parker, Fishery Biologist, Exploratory Fishing & Gear Research Base, State Fish Pier, Gloucester, Mass., 01930. Tel. 617-283-6554.



### "Cobb" Completes Gear Evaluation Cruise

The John N. Cobb completed a 3-week cruise in waters off Washington State during which roller gear configurations for use on bottom trawls, along with a warp tension system, were evaluated. (Cruise 91, ended Nov. 17, 1967.) Scuba-equipped divers observed the performance of a contemporary and experimental roller system. The contemporary system performed well, but the experimental system needs further design work. The warp tension system monitored wire strain satisfactorily. It was considered a valuable addition to the Cobb's fishing system.

One of the cruise's most valuable contributions was the presentation to commercial fishermen, through a series of drawings, of the net's actual configuration when being fished with various types of roller gear and dropper chain arrangements. These drawings were based on observations and measurements made by Scuba divers while the net was being fished from the Cobb. The drawings showed the configuration of the net, and distance of footrope and headrope above the seabed, along various sections of the net.

## Objectives

The primary objective of Cruise 91 was to test the BCF Lampara trawl as a bottom net and evaluate its commercial potential. Other objectives were to evaluate an acoustic gear spread measuring system; the effect of door tilt on spreading ability; the standard BCF Universal trawl; Mark II Universal trawl; and handling characteristics and buoyancy of naturally buoyant and externally buoyed gangion twine for use in longline fishing.

## BCF Lampara Trawl Evaluation

**Methods:** The BCF Lampara trawl was fished in coastal waters from Cape Flattery to Destruction Island, Wash., in the Strait of Juan de Fuca near Port Angeles, and in Holmes Harbor, Puget Sound. Comparative tows were made from the Cobb with a 400-mesh Eastern otter trawl. Catches with the Lampara trawl were also compared to those of a commercial trawler working the same area. The Lampara trawl was towed at similar ground speeds to the 400-mesh Eastern net; however, the 400-mesh Eastern net was towed at 240 r.p.m., while the Lampara was towed at 310 r.p.m.

		Comparison of Catches of Salable Fish by 2 Trawls	
Location		Lampara Trawl	400-Mesh Eastern Trawl
Offshore	Drag 91-92	1,800 lbs./hr. English sole	Catch rate of trawler "Eagle" towing same location, direction, and speed with net similar to 400-mesh Eastern--2,500 lbs./hr.--mostly English sole.
Offshore	Drag 91-41	500 lbs./hr. Dover sole 1,500 lbs./hr. sablefish	Drag 91-39 1,800 lbs./hr. Dover sole 3,000 lbs./hr. sablefish
Offshore	Drag 91-42	50 lbs./hr. Dover sole 100 lbs./hr. sablefish	Drag 91-40 1,200 lbs./hr. Dover sole 2,000 lbs./hr. sablefish
Strait of Juan de Fuca	Drag 91-45	900 lbs./hr. all fish mixed (not all salable)	Drag 91-43 200 lbs./hr. Dover sole 350 lbs./hr. sablefish
			Drag 91-44 2,800 lbs./hr. all fish mixed (not all salable)

**Gear:** The BCF Lampara trawl was constructed of 3-inch 18-thread nylon web. The net had a 200-mesh long 4-panel body, 240 meshes wide per panel at the mouth, and 40 meshes wide per panel at the junction with the cod end. The wings were 1,225 meshes long, tapering on the top edge from 0 to 240 meshes high. The headrope was a 500-foot section of  $\frac{3}{8}$ -inch, manila-wrapped steel cable with 130 8-inch aluminum trawl floats attached. The footrope was  $\frac{1}{2}$ -inch manila-wrapped steel cable 500 feet long. The net was weighted with 500 feet of  $\frac{5}{16}$ -inch chain hung to the footrope. A 12-foot section of  $\frac{7}{8}$ -inch chain was used for additional weight on each wing where towing bridle was attached. A special bridle arrangement was used to reduce variation in door attitude with changes

in scope ratio by raising towing point about 3 feet above sea bed.

The 400-mesh Eastern otter trawl used for comparative tows had a 94-foot-long footrope and was made of nylon webbing with  $4\frac{1}{2}$ -inch mesh wings and  $3\frac{1}{2}$ -inch mesh intermediate and cod end; 100 feet of  $\frac{1}{4}$ -inch chain was hung to the footrope and eleven 8-inch aluminum trawl floats were attached to the headrope. The first 20 fathoms of the 25-fathom,  $\frac{1}{2}$ -inch steel bridles were single; the last 5 fathoms were double.

The trawl doors used to spread both nets were 6- by 10-foot steel V-doors made of reinforced  $\frac{5}{32}$ -inch plate and weighted 860 pounds each.

**Results:** Eleven 1-hour tows were made offshore with the Lampara trawl between Destruction Island and Cape Flattery. Two of these tows could be compared with tows made by a commercial vessel in the area; 3 others could be compared with 400-mesh Eastern tows made by the Cobb offshore and in Strait of Juan de Fuca.

## Pertinent catch data:

Test fishing in Holmes Harbor and Saratoga Passage, Puget Sound, produced incomparable data. One Lampara tow produced 1,800 lbs. of hake and 100 lbs. of bottomfish, but the bottom body panel was ripped out of the net. Subsequent prospecting with the 400-mesh Eastern produced highly variable catches--with very small quantities of salable fish: 30 to 300 lbs. These test results indicate Lampara trawl is less satisfactory for bottom fishing than conventional 400-mesh Eastern trawl when used from 200 hp. boat (effective towing output of Cobb at 310 r.p.m.).

The trawl door spread with Lampara trawl was about  $\frac{2}{3}$  the door spread obtained with 400-mesh Eastern with same length of towing cable-out. The bottomfish catch rate of

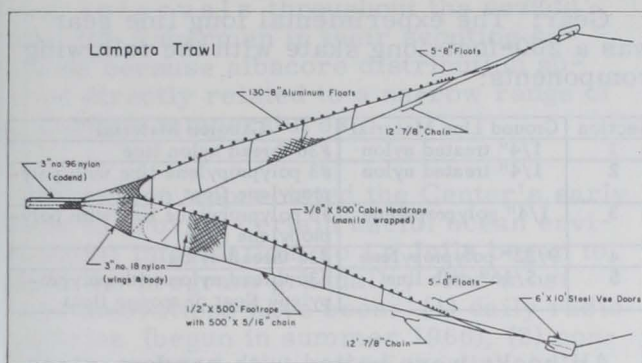


Fig. 1 - Schematic drawing of Lampara trawl rigged for bottom fishing.

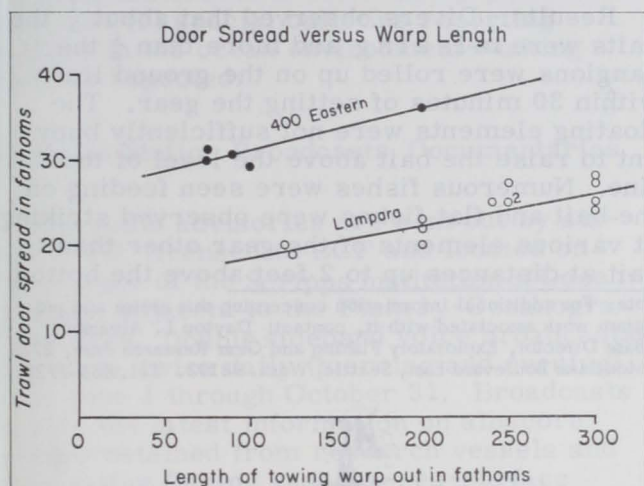


Fig. 2 - Relation of door spread and warp length for the Lampara trawl and 400-mesh Eastern. Both nets were towed at similar speeds over the bottom--Lampara at 310 r.p.m., and 400 Eastern at 240 r.p.m.

Lampara net was always lower in comparative tows than 400-mesh Eastern trawl.

### Acoustic Spread Measuring System

Acoustic measuring equipment was operated during all tows in an effort to obtain information on trawl door spread.

**Method and Materials:** The measuring system consisted of the ship's echo sounder, 2 modified magnetostrictive transducers, and an oscilloscope. The transducers were installed in streamlined fiberglass-reinforced epoxy housings and mounted facing each other, one attached to tailchains of each trawl door. Electro-mechanical towing cable provided a circuit from transducers to boat. The transducers were connected in parallel through a transfer switch in wheelhouse to ship's sounder. An oscilloscope was connected across transducer leads to present a visual display of the signal.

**Results:** The gear spread measuring system produced useful information on trawl door spread. Unfortunately, the oscilloscope readout system apparently did not function because signal was too weak. The sounder's amplifier, though, increased signal so during most drags a reading was obtained on the recording paper.

### Door Attitude Studies

The results of the door attitude studies were inconclusive because the adjustments resulted in only minor variations in spread. Initial attempts indicate that large changes in tailchain length are needed to produce measurable changes in door attitude.

### Universal Trawl Evaluation

The Universal trawl, designed to fish on and off bottom, was the principal trawl used in the 1967 offshore hake fishery. Although the trawl was successful from the standpoint of production, its configuration had not been evaluated. Also, since the degree of ribline hang-in has been changed, it seemed desirable to have divers examine the trawl when fished in midwater. The divers measured the mouth opening with strings and depth gauges and photographed the net while towing.

**Gear:** The BCF Universal trawl body is 650 meshes wide at the mouth and 300 meshes long, with  $2\frac{1}{2}$ -inch #21 thread nylon top and sides, and  $2\frac{1}{2}$ -inch #36 thread nylon bottom and wings. The net has a 121-foot headrope with sixty-seven 8-inch trawl floats, and a 121-foot,  $\frac{1}{2}$ -inch manila-wrapped steel cable footrope with 26 feet of  $\frac{5}{8}$ -inch chain at each lower wingtip. The 6- by 10-foot V-doors were used to spread the net.

**Results:** The configuration of the Universal trawl was found satisfactory. The net opened 46 feet vertically and 33 feet horizontally. Although the footrope was hung in too much, and the after part of the body not hung in enough, the net's overall appearance was good.

### Mark II Universal Trawl Evaluation

The standard Universal trawl is difficult to tow due to its large size and small-mesh construction. Therefore, a scaled-down, large-mesh version (Mark II Universal trawl), which might be more efficient at taking the faster swimming roundfish species, was designed and built.

**Methods:** The Mark II Universal trawl was examined by divers and test fished in a hake school. Net measurements with strings and depth gauges and photographs were taken by divers during a midwater tow in Puget Sound. Diver observations were also made during one bottom tow. Test fishing was conducted near the north end of Saratoga Passage, Puget Sound. Three tows were made with the doors on bottom because depth telemetry was not readily available.

**Gear:** The trawl is of the same design but smaller than the standard Universal net. The mouth is 260, 5-inch polyethylene meshes wide, and the headrope 94 feet long with 67, 8-inch floats attached. The footrope is  $\frac{1}{2}$ -inch polypropylene-wrapped steel cable with 20 feet of  $\frac{5}{8}$ -inch chain at each wing tip. The after body intermediate area is made of  $3\frac{1}{2}$ -inch mesh polyethylene web. All tows were made using the 6- by 10-foot V-doors.

**Results:** The trawl looked well underwater. It was much easier to tow than the standard Universal net and had a horizontal opening of 36 feet and a vertical opening of 32 feet. With the doors on bottom, the footrope was  $3\frac{1}{2}$  feet off bottom.

The trawl was fished successfully on hake. The catch rates in all tows were good considering that the fish were well up in the water column. A catch rate of 12,000 lbs. per hour was obtained on one tow, although the echosounder indicated most fish were well above bottom and probably not available to the net during the tow. Heavy gilling of small hake occurred in the  $3\frac{1}{2}$ -inch mesh rear body panels.

#### Evaluation of Buoyant Long Line Gear

Recent observations by commercial fishermen indicate that long line gear could be made more effective for sablefish if the gangions could be kept off bottom. An experimental skate of gear therefore was put together to test this hypothesis.

**Methods:** The experimental long line gear was set in shallow water in Puget Sound. A diver examination was carried out after setting, then the gear was left untouched for 3 days. A second diver examination was carried out just before recovery of the gear.

**Gear:** The experimental long line gear was a 200-foot-long skate with the following components:

Section	Ground Line Material	Gangion Material
1	1/4" treated nylon	#36 thread nylon line
2	1/4" treated nylon	#3 polypropylene line with polypropylene float
3	1/4" polypropylene	#3 polypropylene line with polypropylene float
4	9/32" polypropylene	#36 thread nylon
5	5/16" crab line	#36 thread nylon with polypropylene float or sponge float

All hooks were baited with random-sized chunks of fish.

**Results:** Divers observed that about  $\frac{1}{3}$  the baits were missing and more than  $\frac{1}{2}$  the gangions were rolled up on the ground line within 30 minutes of setting the gear. The floating elements were not sufficiently buoyant to raise the bait above the level of the line. Numerous fishes were seen feeding on the bait and flat fishes were observed striking at various elements of the gear other than bait at distances up to 2 feet above the bottom.

**Note:** For additional information concerning this cruise and program work associated with it, contact: Dayton L. Alverson, Base Director, Exploratory Fishing and Gear Research Base, 2725 Montlake Boulevard East, Seattle, Wash. 98102. Tel. 583-7729.



### La Jolla's Information on Ocean and Albacore Aids Fishermen

For the past 7 years from April 1 to October 31, BCF's Fishery Oceanography Center at La Jolla, Calif., has made easier the jobs of west coast albacore fishermen by providing them with an increasing amount of information about the ocean and the albacore. It was in 1960 that BCF scientists routinely began publishing and mailing to fishermen monthly sea-surface temperature charts of the eastern Pacific Ocean. During the summer months, they issued 15-day sea-surface temperature charts for the ocean area just off the west coast where the albacore occur regularly each year. In 1961, the laboratory started pre-season predictions (issued in May) for the seasonal albacore tuna fishery. The annual forecast indicated the region where the bulk of albacore should be present in July, attempted to foretell when the fishery would begin and estimated the relative abundance of albacore at the beginning of the season. Up-to-date temperature charts issued at

15-day intervals throughout the season helped the fishermen in their scouting operations because albacore distribution appeared directly related to a narrow range of sea-surface temperatures.

Fishermen appreciated the Center's early efforts to provide certain useful ocean environmental information, so La Jolla began to expand the program gradually. The most recent innovations have been: (1) daily radio advisories (begun in summer 1966), (2) continuously updated analyses of the fishery's seasonal progress (included with sea-surface temperature charts in the monthly publication), and (3) special bulletins reporting changes in the ocean environment--taking place or expected.

#### Its Radio Station Broadcasts Documentaries

The radio advisories are sent out by station WWD, licensed to BCF and located on the campus of the Scripps Institution of Oceanography, adjacent to the Fishery-Oceanography Center. Double sideband voice broadcasts are made twice daily (morning and evening) from June 1 through October 31. Broadcasts include the latest information on albacore catches obtained from research vessels and cooperating fishing vessels, sea-surface temperatures observed at selected points, and weather information. At the end of each 15-day calendar period, the BCF staff also codes and transmits (twice daily for two consecutive days) key isotherms from the 15-day sea-surface isotherm charts routinely mailed to fishermen. The coded message provides fishermen at sea with current information on the location of the 60°-66° F. temperature zone--from which more than two-thirds of the total Pacific coast albacore catches are produced. In the future, a prognostic 15-day sea-surface temperature field also will be included. These advisories are a fast way of reporting significant changes that sometimes occur suddenly in the ocean and atmosphere, affecting albacore distribution and fleet operation.

The radio broadcasts have helped the Center's efforts to provide information on a timely basis. Unfortunately, many fishing vessels do not have radio equipment adequate to receive the broadcasts consistently. These vessels must depend on relay from other

vessels with good radio gear. And, in the relay process, much detail and timeliness are lost.

#### Computer Helps Lab

In summer 1967, full-scale operation began at La Jolla of the U. S. Naval Weather Service Environmental Data Network link. Its master computer facility at Monterey will augment the Center's understanding of oceanographic and climatological events. The Center now receives computer-analyzed products updated at 3-, 12-, and 24-hour intervals. This permits the scientific staff to monitor environmental changes in the north Pacific almost as they occur. One immediate result of this service has been the development of a capability to anticipate environmental events on a scale heretofore impossible. As the staff's experience in using and interpreting the FNWF Monterey products increased, it has successfully remained "on top" of situations that developed rapidly. Now continuous, quickly published reviews of seasonal events are possible; so too timely bulletins when needed.

#### Problems Remain

The Center's staff believes that expansion and refinement of the ocean information service can advance only as fast as resources and experience permit. There is need to increase understanding of the effect of ocean changes on the distribution of albacore. There still is the problem of obtaining appropriate information on the ocean environment and the fishery on a synoptic (current) basis. And there must be improvement in the means of getting to fishermen information immediately applicable to their operations.

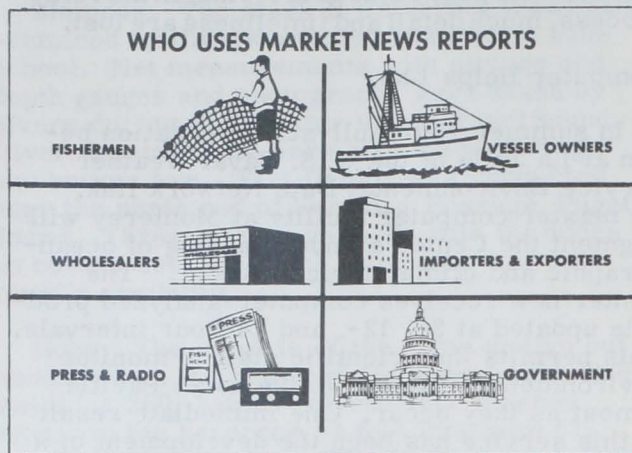
The experience being gained with the west coast albacore fishery is expected to be useful to other fisheries. It may well establish in the future a nationwide pattern.



#### 'Market News' Begins 31st Year of Serving Fishing Industry

BCF's Market News Service is beginning its 31st year of providing timely and important information about fish, fishery products and the many-faceted industry to 10,000 subscribers in the U. S. and around the world.





Its network of 7 field offices is located strategically to report the activities in principal fish-landings ports and wholesale centers. Their staffs process a welter of information to provide authentic data that put buyer and seller on an equal footing--and expedite transactions. The Service's reporting ranges from prices paid at the vessel, in wholesale centers for fish and processed fishery products, to research findings about fish populations and developments in fishing gear, fish processing and packaging techniques.

The mimeographed reports of the Service--"Fishery Products Reports," a different color for each office--are issued daily from field offices in Boston, New York, Hampton, Va., New Orleans, Chicago, Seattle, and San Pedro, Calif. A subsidiary station in Baltimore covers the local industry and relays information to its parent office at Hampton.

Market information also is passed to the public by telephone, collect telegrams, or teletype, personal contact, and through the press and radio broadcasts.

#### 'Service' Adapted to Industry Changes

When the Service began in 1937, most fishery market activity was centered on fish landings, wholesale market receipts, and the marketing of wet (iced) fish. In its 30 years, the Service adapted itself frequently to reflect the changes and developments in the harvesting, processing, and distribution of fishery products in the U. S.

Today, Market News Service also reports on a wide variety of processed and ready-to-

serve products--fish sticks and portions, other portion-control items, all processed shrimp, and specialty seafood items. And it provides information on fishery products--fish meal, oil and solubles--and future trading in fish meal on New York and London commodity exchanges.



## Seattle Lab to Study an Aleutian Area

BCF's Biological Laboratory in Seattle, Wash., has contracted with the Atomic Energy Commission to study the ocean environment and marine ecology near Amchitka Island in the western Aleutian chain. The project is part of a general study to understand the undisturbed aquatic environment before underground nuclear testing is begun.

The January-February 1968 study will focus on the distribution and abundance of plankton and fishes near Amchitka Island--and on the distribution and magnitude of the ocean currents.



## 10 U. S. Firms Taking Part in London and Milan Fairs

Ten U. S. firms are showing 23 fishery products in food fairs being held at London, Jan. 9-18, and Milan, Italy, Jan. 20-27. Both fairs are aimed at the institutional and catering trade.

The participation of U. S. firms in international food fairs is organized by BCF's Office of International Trade Promotion (OITP). The London Fair is OITP's fifth promotion in the United Kingdom and the first since the pound was devalued. The fair may indicate what effect devaluation will have on British imports of U. S. fishery products.

#### Excellent Results Obtained

U. S. participation in previous fairs led to new markets for Maine shrimp and frozen lobsters. Also, sales were greatly expanded for salmon, Gulf of Mexico shrimp, and Alaska king crab meat.

