



Lobster catch in North Atlantic aboard BCF's 'Delaware.' (Photo: R. C. Wilson)

U.S. GROUND FISH INDUSTRY HURT BY IMPORTS

"It is evident that the United States groundfishermen are suffering economically in a cost-price squeeze precipitated by the depressing effect of large quantities of imports on groundfish prices," Secretary of the Interior Walter J. Hickel wrote to President Johnson on May 21. The Secretary introduced the report of a study by BCF economists. The study had been asked by major parts of the industry concerned over the effects of imports and changes in U.S. tariff structure for groundfish products.

"During recent years," Mr. Hickel added, "the total and per capita consumption of groundfish increased continuously; imports of groundfish doubled; while the quantity of fish landed by United States vessels and the number of fishermen employed declined."

The report--"The Effects of Imports on the United States Groundfish Industry"--covered cod, cusk, haddock, hake, ocean perch, and pollock. Flounder was added to meet requests. Groundfish live on or near the ocean bottom. On the Pacific Coast, they are called bottomfish.

Fillets and blocks are the principal forms in which species are imported. Fillets are the sides of fish cut lengthwise, separating the side from skeleton. They are marketed fresh, frozen packaged, breaded and frozen--or frozen into blocks for more processing.

Blocks are fillets and other parts frozen into blocks. Each block weighs 10 or more pounds. Frozen blocks are used to prepare fish sticks, portions, and other processed products.

REPORT HIGHLIGHTS

- In 1967, U.S. landings of groundfish were 427.4 million pounds--a 25% drop from 1954. Overall, landings have "trended downward" at annual average rate of 4.5 million pounds, although Pacific coast landings have been "fairly constant."

- In 1967, U.S. processors produced 121.5 million pounds of fillets and steaks, 4% below 1956-58 annual average. (Steaks are $\frac{5}{8}$ - to 1-inch-thick cross-section slices from large dressed fish. They are sold fresh and frozen packaged.)

- From 1956 to 1967, consumption of groundfish rose 48%--from 315.8 to 468.8 million pounds.

- During 1954-67, groundfish imports increased sharply. Imports were 107% higher in 1967 than in 1954-56: in frozen fish blocks and slabs for processing industry. In 1956, U.S. imported less than half the groundfish it used--but now imports more than two-thirds.

- In 1966, vessels catching groundfish employed 3,778 fishermen--down 347 from 1957.

- Rapidly increasing imports in 1953-67 resulted in a current price about 1.6 cents per pound lower than would be true if imports had the same relative relation to total consumption that they had in 1947-52.

- From 1956-58 to 1967, costs of catching and processing rose 35-40%. Exvessel price of fish increased 24% or less during 1953-55 to 1967. Catch rates did not improve, so domestic industry has been caught in a cost-price squeeze.

● U.S. Tariff Commission investigations in 1954 and 1956 found serious economic injury from imports to groundfish industry. The BCF study, which covers 1956-1967, found further deterioration "due in a large part to rising imports."

Groundfish imports in blocks and slabs have boosted total imports. They are cutting into basic markets for U.S.-caught groundfish. Per-capita consumption of fillets and steaks has fallen because sticks and portions have been substituted. Industry's fishing segment has not grown with stick-and-portion processing business. A principal reason appears to be industry's inability to compete with foreign block and slab products. Foreign costs of catching fish are lower: 1) lower vessel-construction costs; 2) subsidies to fishermen.

People in the industry are concerned about its future, particularly the future impact of concessions made in the Kennedy Round tariff negotiations. Lower customs duties on frozen blocks and slabs are expected to "intensify the present adverse cost-price squeeze."

The 1956 Tariff Commission study had found serious economic injury, so the duty on fresh and frozen groundfish fillets was exempt from the Kennedy Round. But recent technological developments cutting costs have made it easier for Canada to export to U.S. fresh groundfish fillets and steaks. Limited data reveal that Canadian exports to the U.S. in 1967 of these products were 14.1 million pounds; in 1961, the figure was only about 5.6 million pounds. This influx of fresh products appears one of the immediate and major concerns of industry; it threatens the domestic industry with loss of a large part of that market.

Industry consists of fishermen operating principally otter trawl vessels; fish processors; a marketing system serving U.S. and world markets; and suppliers to fishing vessels.

Fishing Areas

The principal grounds are over the Continental Shelf of Northwest Atlantic and North Pacific Coast. Over $\frac{3}{4}$ of U.S. catch is landed on east coast, mainly New England ports. Landings in the west are concentrated in Oregon and Washington.

The NW Atlantic area, which extends from Long Island, N.Y., to Newfoundland, covers about 260,000 square miles. It includes the very productive areas of Georges Bank, Browns Bank, Nova Scotia Banks, and Grand Bank. Most of U.S. catch is from Georges Bank, which is fished intensively also by foreign vessels. Large- and medium-sized U.S. vessels fish these areas about 50 or more miles out. Smaller U.S. vessels normally fish close to Massachusetts and Maine. In 1966 about 312.1 million pounds of groundfish were landed at New England ports, half of all fish landed there.

Pacific groundfish are caught from Santa Barbara, Calif., to northern British Columbia. California forbids extension of groundfish operations south of Santa Barbara. In 1966 U.S. vessels caught about 69.5 million pounds--6% of all west coast landings.

GROUNDFISH PRODUCTS

Groundfish are marketed from whole or eviscerated fresh (unfrozen) fish to highly processed convenience food forms: breaded precooked fish sticks or fish portions. Most processed products have been emphasized

Increasingly in recent years. Fish sticks and portions now comprise over 60% of total U.S. processing of packaged groundfish products; in 1958, the figure was less than 40%. But the marketing of fresh groundfish fillets also increased significantly. So frozen fillets now comprise only 17% of all packaged groundfish--compared to about 40% in 1958.

From the dollar standpoint, significant increases have taken place in the relative marketings of fresh flounder and haddock fillets--with a corresponding decline in frozen Atlantic ocean perch fillets.

GROUNDFISH CONSUMPTION

Groundfish consumption has been increasing steadily in the past 15 years. In 1967, it was about 48% higher than in 1956. Increasing population and per-capita use produced it. The relative importance of different products has changed: the greatest increase was in groundfish blocks, the raw material for the rapidly growing fish-stick-and-portion industry. As use of groundfish blocks increased substantially, consumption of cod and haddock fillets declined. Only flounder fillets increased steadily. Per-capita consumption of ocean perch trended downward slightly.

GROUNDFISH LANDINGS

During 1954-67, U.S. groundfish landings averaged 517 million pounds annually. However, landings declined an average annual rate of 4.5 million pounds: around 5 million on Atlantic coast; on Pacific coast, landings fluctuated widely but trended upward slightly.

Overall decline in groundfish landings resulted primarily from the great drop in quan-

tity of Atlantic ocean perch and declines in pollock and haddock. Only Atlantic coast flounder and Pacific coast ocean perch landings increased.

Resource abundance was not a factor. The major decline was in production of ocean perch--due to less fishing effort, which resulted from cost-price squeeze on fishing vessels. On the other side of the ledger, increased abundance of yellowtail flounder resulted in increased landings in 1962 and 1963.

In Northeast Pacific, foreign fleets have increased greatly in the past 10 years, yet a much larger harvest could have been taken by U.S. from demersal species. Trawlers are capable of increasing the harvests of bottom-fish, but cost-price relationships have kept U.S. fleet from expanding its catches.

Domestic Fillet, Steak, & Block Production

Most U.S. landed fish is processed and sold as fresh or frozen fillets. Domestic block production, though increasing, is still only about 6 million pounds a year. Fresh (nonfrozen) fillet production is trending upward; frozen-fillet production is declining correspondingly.

Flounder-fillet production is increasingly important: over $\frac{1}{3}$ of U.S. production of groundfish fillets, steaks, and blocks.

GROUNDFISH IMPORTS

Groundfish are imported primarily as fresh and frozen fillets and steaks--and frozen blocks and slabs. In 1967, imports of these groundfish were 316.9 million pounds, double the 1956-58 annual average. The figure was 68% of U.S. consumption of groundfish in 1967.

Blocks

Beginning in 1960, imports of groundfish blocks and slabs exceeded fillets and steaks. In 1967, frozen block and slab imports were 189.5 million pounds, almost 4 times the 1956-58 annual average. However, since 1965, block-and-slab imports have declined slightly. These imports have fed the developing fish-stick-and-portion industry that began in the early 1950s. In 1967, the U.S. produced only 6.2 million pounds of blocks and slabs--about 3% of imports.

Fillets and Steaks

In 1967, imports of groundfish fillets and steaks were 127.4 million pounds, a rise of 18% from the 1956-58 annual average. Continued growth in imports of fresh fillets "will likely make major inroads" into markets for U.S.-produced fresh groundfish products, one of principal outlets for U.S. fleet.

Imports in Relation to Consumption

As imports grow and landings by U.S. groundfish fleet decline, imports have become the larger part of U.S. groundfish consumption. In 1965, 1966, and 1967, imports reached nearly 70% of groundfish consumption. In 1956-58, imports were less than half of groundfish use.

Imports by Species

In 1967, imports of ocean-perch fillets and steaks of 36.3 million pounds were the largest of any other species. Cod fillet and steak imports were 32.1 million pounds. The remaining species totaled 59 million pounds. In fillet-and-steak category, only imports of

ocean perch and flounder have been rising in recent years. In 1967, 33.3 million pounds of flounder fillets were imported--235% of 1956-58 annual average.

Exporters to U.S.

The principal exporters of groundfish blocks and fillets to U.S. are Canada, Iceland, Norway, Denmark, W. Germany, and Greenland. Canada and Iceland provide about 90% of U.S. groundfish imports as fillets and steaks.

GROUNDFISH PRICES

The BCF report states: "The impact of imports on domestic prices ranges from actually depressing prices in short-run periods to offsetting some of the effect of increasing demand on price in longer-run periods. This tends to limit the rate of price increase in the long run."

On Atlantic and Pacific coasts, from 1953-1967, prices received by fishermen at dockside (exvessel prices) trended upward. But a comparison of harvesting costs during this period shows these rises have been less than increases in costs. Costs in 1967 were 35-40% above 1956-58; prices increased only 24% between 1953-55 and 1967. Product costs of groundfish species that make up 90% of the landings increased more than exvessel prices; only pollock prices increased more than costs.

Wages

During 1958-67, wages of fish processing plant workers increased steadily. Rising labor costs in the processing industry

retarding effect of imports on wholesale and retail prices have slowed the rate of increase in vessel prices. This has produced a cost-price squeeze at the harvesting level. In 1966, the costs of catching fish by Canadian trawlers were 60% below U.S. costs. Lower labor and vessel-construction costs were principal reasons. Despite transportation costs, Canadian products had "substantial price advantage" in U.S.

Effects of Imports on U.S. Prices

Imports have an "overall dampening effect" on domestic prices. One analysis showed that the "current price for groundfish is about 1.6 cents a pound lower" than if imports were same proportion of total consumption that they had been in 1953-67. Downward pressure on prices and the resulting decreased income for the sale of groundfish by vessel owners "contributed to making many vessels unprofitable to operate."

The report explains how imports are increasing cost squeeze: "Thus, the domestic fisherman is in a squeeze between increasing costs and imports in that as domestic prices rise, imports are likely to rise significantly and thus exert downward pressure on domestic prices. This is the likely explanation for

the small percent increase in price in relation to increasing costs over the past decade."

Wholesale Prices, Frozen Blocks & Slabs

In 1967, imports of frozen blocks and slabs of groundfish were about 60% of groundfish imports. Prices averaged 22.9 cents per pound. In 1956, average annual price was 18.8 cents per pound. The average price for 1965-67 was 26% over 1956-58.

Fillet & Steak Prices

In 1965-67, the average price of U.S.-produced fillets and steaks was 44% above the 1956-58 average price. Prices of imported groundfish fillets were about 38% above 1956-58 average price.

JOBS

Atlantic Coast

In the Atlantic groundfish fleet, the number of fishermen dropped 12%: from 3,316 in 1957 to 2,912 in 1966. "This was a consistent year-after-year decline with the exception of 1966."

In the Boston fleet, one of the major groundfish fleets, the average hourly wage rate is below U.S. average for workers in nonsupervisory jobs in mining, contract construction, and manufacturing. Full-time

deckhands, on the average, had to work 3 hours for every 2 hours by other industry workers.

Most full-time fishermen--over 2,520 hours per year--"earned well over \$6,000 from commercial fishing," near the U.S. median of \$6,283 for all "year-round" full-time male workers. Most of those fishermen who worked between 1,560 and 2,520 hours earned less than \$4,000. However, the report makes clear, "it is important to note that fishermen are required to work an average of 60 hours per week in order to achieve a standard level of income. Those who worked

the national average earned an income which was almost half the national standard."

In 1964, 83% of U.S. labor force was under 55 years; only 38% of Boston's fishermen was under 55.

Pacific Coast

During 1957-66, despite annual fluctuations, there were no important changes in the number of fishermen in the Pacific coast trawler fleet. However, for 5 straight years before 1966, the number had trended generally downward. In 1966, there was a sharp increase.



WHO OWNS THE WATER AREAS OFFSHORE AND HOW FAR?

Ownership of offshore waters is one of the major problems to be resolved before the sea can be exploited peacefully. No country owns the floor of the open ocean. In the past, the traditional limit was 3 nautical miles, the effective distance a cannonball could be fired in the days of sailing vessels.

Now nations choose a distance between 3 and 12 miles from their shores. Within these limits they may exercise control of shipping; there is, however, no clear requirement for other nations to recognize this sovereignty. The United States recently changed its territorial water claim from 3 to 12 miles.

Although waters were originally designated territorial for defense purposes, nations are now also concerned with protecting their fishing and mineral rights. The continental shelves are important for future harvest of marine life and minerals. The Geneva Convention of 1958 provides for a nation the sovereignty over its continental shelf to a depth of 200 meters or to the depth of exploitation of natural resources. Several Latin American countries have made claims of exclusive fishing rights to a distance of 200 miles from their coasts. ('Questions About The Oceans,' U.S. Naval Oceanographic Office.)

UNITED STATES

Secretary Hickel Aids New England Haddock Fishery

Secretary of the Interior Walter J. Hickel determined on June 19 that a commercial fishery failure due to a resource disaster had occurred in the New England haddock fishery. The fishery has declined significantly since 1955. Secretary Hickel cited the Commercial Fisheries Research and Development Act of 1964, which authorizes funds to assist a commercial fishery struck by a resource failure.

Research by BCF, which administers the Act, showed that haddock spawning has been very poor since 1965. Heavy exploitation, in large part Soviet, contributed to the decline.

From 1935-1963, average annual landings were 50,000 metric tons; for 1969, predicted landings are less than 10,000 metric tons.

Governors of several New England States, Congressmen, and the fishing industry, expressing concern over the haddock industry, have urged Federal assistance.

Many Fishermen Hit

Secretary Hickel stated that more than 90 New England fishing vessels, primarily from Boston, Gloucester, and New Bedford, Mass., normally depend on haddock for over 50% of their catches. They now face a severe loss of income. Also, nearly 400 other vessels that take incidental catches of haddock face losses.

One remedial measure proposed by BCF is to divert fishing effort to pollock, an underutilized species. BCF's 'Delaware II' and other operating industry vessels already are testing the effectiveness of gear adapted especially for catching pollock.

BCF marketing specialists are working with the industry to increase consumer acceptance of pollock as a replacement for haddock.



BCF Estimates Sustained Yield & Use of Pacific Hake

The maximum annual sustained yield of Pacific hake from southern Oregon to Cape Spencer, Alaska, is 300-540 million pounds. This is the rough estimate of BCF scientists.

In 1966, Soviet hake catches were 300 million pounds; in 1967, 350 million.

U.S. Hake Fishery

There is no U.S. fishery on this offshore stock. U.S. fishermen, however, have been engaged in a small fishery in Puget Sound. They have landed an annual average of 8 million pounds.

During 1964-1967, these were the total Pacific hake catches and the Puget Sound catches:

	Total Pacific Hake	Puget Sound
 (Pounds)	
1964	878,000	715,800
1965	3,146,000	1,527,900
1966	11,833,000	8,032,200
1967	28,818,000	9,564,900

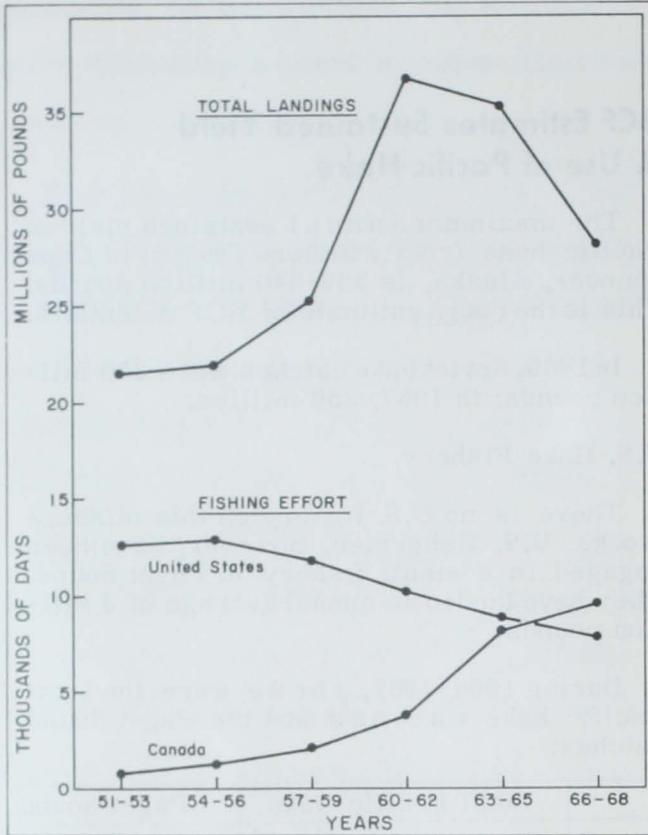
Hake Potentially Useful

Pacific hake are potentially useful as human and animal food. So BCF believes it important to continue studying and monitoring the resource to evaluate the effects of these levels of exploitation.



U.S. Atlantic Coast Sea Scallop Fishery Declines Further

The decline of the United States fishery for sea scallops and the rise of the Canadian fishery continue, reports J. A. Posgay, BCF Biological Laboratory, Woods Hole, Mass. The U.S. share of this fishery was only 45% in 1966-68, compared to 94% in 1951-53. In 1951-53, total annual landings were 21.5 million pounds of meats. These rose to 36.7 million pounds in 1960-62, and dropped to 28 million pounds in 1966-68.



Average annual landings and fishing effort in the Atlantic coast sea scallop fishery by three year time intervals.

Years	Fishing Effort (Thousands of Days/Year)				Average Annual Landings (Millions of Lbs.)
	U.S.	Canada	Total	%U.S.	
51-53	12.6	0.8	13.4	94	21.5
54-56	12.9	1.3	14.2	91	21.9
57-59	11.8	2.0	13.8	85	25.3
60-62	10.1	3.7	13.8	73	36.7
63-65	8.8	8.1	16.9	52	35.4
66-68	7.8	9.5	17.3	45	28.0

There also has been an interesting diversion of the fishing effort. In the earlier years, Georges Bank (ICNAF Subarea 5) supplied most of the landings; but, since 1965, the U.S. fleet has abandoned Georges Bank to the Canadians and concentrated on the Middle Atlantic grounds (ICNAF, Statistical Subarea 6).



Incidental Catch Lowered for Yellowfin Tuna

BCF has announced that tuna bait boats in the regulated area of the eastern Pacific Ocean are restricted to an incidental catch rate of 15% for yellowfin tuna taken with other tuna--and with bonita, billfishes, and sharks. Bait boats are tuna boats that use hooks and lines.

Regulations published in the Federal Register, May 3, 1969, permitted bait boats fishing regulated area during closed season to land yellowfin tuna up to 50% of vessel capacity, or 130 tons per vessel, whichever was less, until a total of 1,500 tons was reached.

Also, the regulations provided that when the limit was reached, the incidental catch of yellowfin would revert to 15% maximum.

An announcement that the 1,500-ton limit was reached appeared in the June 11 Federal Register. The limitation became effective on June 13.



Purse Seining for Winter Industrial Fishery Deemed Impractical

Purse seining is not economically feasible for the menhaden industry to catch a winter supply of industrial fish in the mid-Atlantic coastal area. This is a preliminary finding of a study by the Virginia Institute of Marine Science (VIMS) under a grant from the Bureau of Commercial Fisheries. The purse seine is used to catch dense schools of menhaden during spring, summer, and fall.

Dr. Jackson Davis, head of VIMS' Ichthyology Department and of the study, said menhaden have been in short supply lately along mid-Atlantic shores. They are not available at all during winter and spring when they are thought to be in deeper waters. If other fish could be harvested for manufacture into industrial fishery products during this off-season, the industry could operate year-round. The possibility of using sea herring as an alternate was evaluated. Sea herring, coast to the river herring caught by the millions in Chesapeake Bay each year, offers great potential.

Hatteras-Block Island Study

Cruises were made in the area from Cape Hatteras, N. C., to Block Island, Rhode Island, from February through May in search of sea herring and mackerel. Most explorations were along the inner two-thirds of the continental shelf, but deeper water up to 4,800 feet was checked. Davis reported modern electronic fish-finding equipment located schools of fish averaging less than 50 yards apart. These were mostly along the 30-fathom contour, where foreign vessels also were fishing.

Schooling During 2 Periods

Sea herring and mackerel were plentiful but were too scattered most of the time to make harvesting practical with a purse seine. The seine is effective when fish concentrate in dense schools. But fish did school briefly during 2 periods of the day: just before dawn and again just before dusk.

During first period, schools broke up into small groups with dawn's first light. The groups settled to the bottom and remained there until late afternoon. During second period, fish schooled up in later afternoon but stayed deep until sunset. Then they rose quickly to the surface and scattered.

Schooling lasted no more than 4 of each 22 hours. In March, these fish were south of the Virginia Capes; by May, they had moved to the south of Long Island. This migration pattern is typical of fishes that winter in the North Atlantic. Harsh winter weather hampered experimental fishing. Only 40% of the scheduled work days were calm enough for the boats to operate.



Shrimp-Separator Trawl Tests Continue

The M/V 'Baron,' chartered by BCF's Seattle (Wash.) Exploratory Base, recently completed fishing efficiency studies of 6 different designs of experimental shrimp-separator trawls.

Conclusions drawn from the field testing included: (1) The optimum mesh sizes for the capture of pink shrimp appear to

be 1 to $1\frac{1}{8}$ -inch in the outer portions of the body and $1\frac{7}{8}$ to 2 inches in the separator panels. (2) All separator trawls require weighting with chain to facilitate fishing near bottom. (3) Optimum-sized catches of shrimp appear to be related to the height of footrope over the bottom. (4) The 10- to 12-foot trash chutes resulted in best performance. (5) The separator trawls harvest nearly pure shrimp of much better quality than those taken in conventional trawls simultaneously with much greater quantities of fish and debris.

Future Testing

Future field work will capitalize on these findings and center on 2 of the separator trawl designs tested that showed more promise than the others. The objective of future testing will be to increase shrimp catch rates of the separator trawl to equal, or exceed, those of conventional shrimp trawls used in Pacific Northwest waters.



Certain Sounds Attract Sharks

Some of the sounds that attract sharks have been determined by researchers at the University of Miami's Institute of Marine Sciences. They also discovered that the lemon shark can perceive the displacement of water due to the passage of sound waves. This shark may use the information and pressure signals to locate prey.

Irregularly pulsed signals, 800 Hz and below, accounted for over 370 shark sightings. The tests were conducted by A. A. Myrberg Jr., J. D. Richard, and Arnold Banner. They used the Institute's underwater video-acoustic installation off North Bimini.

The Operation

Most sharks appeared at the test site in 11 to 54 seconds from onset of the signal. The signal was a low-frequency sound simulating one made by a struggling fish. On a screen inside a dry laboratory, the researchers observed various species approaching the underwater sound projector and television: the sharpnose, reef, nurse, and a silky or dusky shark. As sharks increased, their swimming activity resembled a feeding frenzy. No sharks appeared at test site when either pure tones, or signals with components only



Underwater Television. (Ed Fisher)

above 100 Hz, were generated by the sound projector.

Shark's Receptors

Dr. Myrberg said: "Because these sharks detected the signals, apparently oriented quickly to them and rapidly reached the test site, the importance of certain acoustic stimuli to these animals is assured. Our work has also revealed that the lemon shark can perceive displacement of water due to the passage of sound waves. All sharks have a great many displacement receptors arranged along their lateral line or scattered about their bodies. . . ."

Underwater TV

A unique underwater television enables the researchers to observe sharks on a screen in the Institute's small monitoring station at North Bimini. (Diving in a test area may influence animal behavior.) The TV is mounted on the sea floor at 60 feet about a mile off the coast. It can scan the underwater scene 360 degrees horizontally and 70 degrees vertically. It has a zoom lens for closeup to wide-angle viewing. Periodically, the TV's dome is automatically cleaned by a "windshield wiper" impregnated with a toxic material.

"The underwater installation also includes hydrophones, acoustic projectors, and an environmental sensor system that records temperature, current, and turbidity information. All of the instruments can be monitored and controlled by researchers in the laboratory.



National Water Commission to Consult With Governors

The National Water Commission (NWC) will hold a series of conferences Aug. 26-27, Nov. 7-8 regional and 1 national--on its tentative program of studies, Charles F. Luce, Chairman, announced on June 27.

The Commission is inviting the 50 Governors and representatives of municipal and intergovernmental water agencies and private organizations.

NWC is a nonpartisan group of 7 private citizens appointed by the President. It has a 5-year statutory assignment to develop an overall national water policy.

NWC's Job

The law establishing NWC directs it to review present and future U.S. water problems, assess future water needs, and identify several ways of meeting these needs. Also, it requires Commission to consider both economic and social consequences of water resource development. These include impact on regional economic growth, institutional arrangements, and on esthetic values.

Luce emphasized that the Commission's approach will recognize that it is impossible to consider water-resource development as an independent problem. This problem must be viewed as an integral part of a great U.S. effort to protect and improve the quality of man's environment.

Regional Conference

Luce said the main purpose of the regional conferences will be to get the views of state and local agencies, and organizations on the scope of NWC's tentative program of studies. The 2-day Washington conference will include national nongovernmental organizations.

concerned with water-resource care and development. More than 50 nationwide associations, clubs, societies, etc., will be offered an chance to submit statements or to appear.

The conferences will be open to press and public. Participants will be encouraged to file written statements and to avoid long treat.

... wrote to the governors that the act establishing NWC "requires the Commission to consult with the Federal Water Resources Council (FWRC) and to furnish its reports to the body for review and comment prior to their submittal to the President and the Congress."

... added: FWRC was "primarily an organization for coordinating the work of the agencies that actually plan and carry on the Nation's water activities impartially, without being involved in day-to-day operations, and to recommend improvements in policy, procedures, and institutional arrangements."



BCF Lists Wrecks on Georges Bank and Nantucket Shoals

BCF's Fishing Vessel Safety Unit has listed the location of 36 fishing-vessel wrecks known to be on or near productive fishing grounds on Georges Bank, Nantucket Shoals, and South Channel. Latitude, longitude, and depth in the immediate vicinity are included. The list will be distributed to the fishing industry of New England and fishermen using these areas for otter-trawl fishing.

With few exceptions, the vessels were sunk during the past decade. Reports of hang-ups and loss of fishing gear resulting from encounters with the wrecks have been reported by many fishermen.

Copies are available to the fishing industry from BCF, 408 Atlantic Ave., Boston, Mass. 02210.



Conferences Scheduled

The 22nd annual meeting of the Gulf and Caribbean Fisheries Institute, sponsored by the University of Miami's Institute of Marine Sciences, will be held at the Carillon Hotel, Miami Beach, Fla., Nov. 16-20, 1969. For more information, write to Executive Secretary, Gulf and Caribbean Fisheries Institute, 10 Rickenbacker Causeway, Miami, Fla. 33149.

The 14th annual meeting of the International Game Fish Research Conference, sponsored by the International Oceanographic Foundation, will be held at the same hotel, Nov. 21-22, 1969. Write: International Oceanographic Foundation, 10 Rickenbacker Causeway, Miami, Fla. 33149.



U.S. Fishery Products to be Promoted at Overseas Trade Shows

BCF has invited producers and processors of fishery products to participate in two overseas food trade fairs this fall. Bureau personnel will coordinate all efforts to introduce and promote U.S. fishery products at the shows. Fishery products must be U.S.-caught, or processed in the U.S. to be eligible. Floor space, adequate storage space, and interpreter services will be provided free. Participating firms are not required to send representatives.

H. E. Crowther, Bureau director, said that the purpose of the overseas trade shows is to develop and expand foreign markets for U.S. fishery and agricultural products. The Bureau has participated in 20 previous trade fairs, which have attracted leading tradespeople in Europe.

The shows are scheduled for Sept. 3-8 in Brussels, Belgium, and Oct. 4-10 in Cologne, Germany.

Participation agreements will be accepted on a first-come, first-serve basis. Deadline for receipt of the agreements is August 1. Further information may be obtained from Office of International Trade Promotion, Bureau of Commercial Fisheries, 1801 N. Moore Street, Rm. 401, Arlington, Va. 22209. Telephone: area code 703, 557-4731.



Certified Shellfish

J. David Clem

People who eat oysters are usually more familiar with the injunction to avoid this favorite seafood in the "non-R" months than they are with the unique public health problems associated with these molluscan shellfish. These problems of food sanitation and safety involve edible molluscan shellfish, especially fresh and frozen oysters, clams, and mussels, and arise because of the peculiar life cycle and environment of these marine animals.

For 44 years, the shellfish problem has been accorded official recognition in the creation and continuance of a voluntary three-way (State, Federal, and industry) consumer protection activity known as the National Shellfish Sanitation Program. Last July, the Program was transferred to the Food and Drug Administration as part of FDA's new Bureau of Compliance.

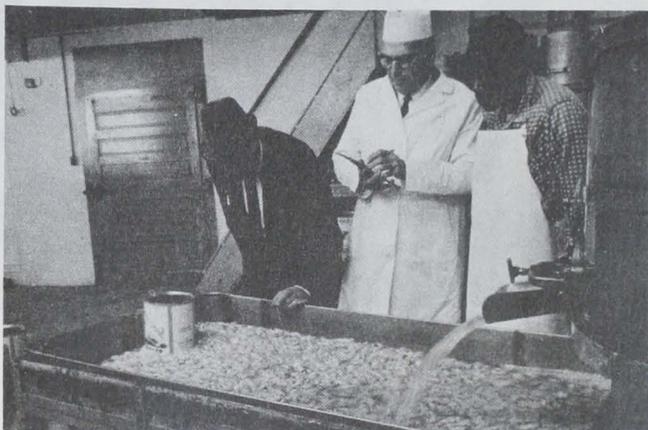
Why public health officials are concerned over these shellfish involves many facets, including reproduction and growth habits, methods of harvesting and processing, and other problems that have troubled the shellfish industry since the turn of the century.

Oysters, clams, and mussels must breed and live in estuarine waters. The estuary, defined simply, is a coastal zone where sea water and fresh water mix. These mollusks feed by pumping estuarine water through their gills, filtering into their digestive systems such substances as algae, detritus, bacteria, and whatever other suitable sized particulate and dissolved matter might be present. An oyster, through movement of its cilia, can transport water through its crude but highly coordinated anatomy at the rate of 20 liters an hour. This feeding action, however, concentrates substances with little selectivity. Therefore, the chemical and microbiological quality of a mollusk's visceral mass is a reflection of the quality of the estuarine water it inhabits. If the water is polluted, so is the mollusk. It is because of the ecology of these marine species and their method of feeding, along with the continuing degradation and pollution of our estuarine waters and our habit

of eating shellfish in a raw or partially cooked state, that special health controls have had to be imposed and enforced.

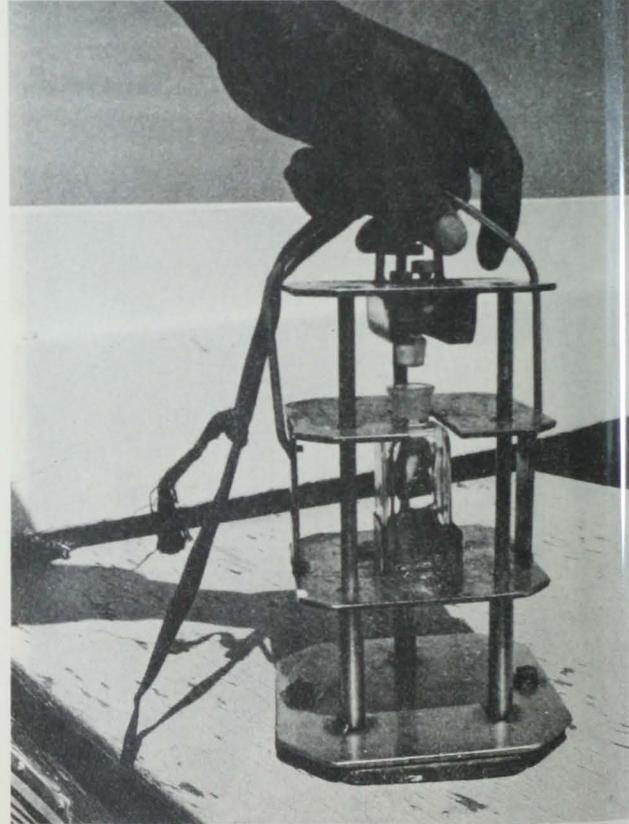
Oyster production in the United States reached a peak in 1910, before the present sanitary control program began. Its decline since that time has been caused by an excess of indiscriminate harvesting and exploitation of this natural resource, uncontrolled pollution of many shellfish waters, shellfish diseases, a meagerness of technological advances in production, and an increasing loss of consumer confidence in the sanitary quality of shellfish. Human consumption of sewage-polluted shellfish has caused numerous outbreaks of infectious disease. Because there were no sanitary controls, the consumer could never be sure that the oyster, clams, or mussels he was purchasing were safe to eat. Consumer concern was voiced in an editorial in the 'Journal of the American Medical Association' in 1905: "Consumers of raw oysters at present are quite at the mercy of oyster dealers, presumably of varying intelligence and conscientiousness. There should be some means of preventing the distribution of sewage-saturated oysters in any part of the country. Is this something that the Public Health and Marine-Hospital Service should take up?"

Despite the AMA editorial suggestion, it took 20 years and an unprecedented outbreak of disease to prompt action in shellfish sanitation. Late in 1924, major typhoid fever outbreaks occurred, resulting in 1,500 cases with approximately 150 deaths, all traced to the consumption of contaminated oysters. The country was shaken by what later became known as the "oyster scare." Sales dropped dramatically. In 1925, the Surgeon General of the Public Health Service called a conference of representatives from the shellfish industry, the Department of Agriculture's Bureau of Chemistry (now FDA), the Commerce Department's Bureau of Fisheries, State conservation agencies, and State and local health agencies. This conference marked the beginning of an unparalleled cooperative agreement in the form of measur-



Chesapeake Bay between Maryland and Virginia and the bay's tributaries are plentiful in both oysters and clams. Oysters are harvested with both hand tongs and power dredges, and oystermen use both sailboats and power boats under State regulations covering the operation. On Maryland's Nanticoke River (2 and 3), workers tong up oysters and cull or discard those under legal marketable size. The bay and rivers are patrolled by Maryland Marine Police for illegal oystering in uncertified waters and for other violations as those involving times and methods of harvesting. Power dredging for oysters in the Nanticoke is shown (4). The oysterman at the pier (1) is tending a "wet storage" operation in which harvested oysters are suspended live in "float" containers under water by ropes and winches until ready for processing. In a processing plant (5), shucked oysters are washed with clean ice water in a

(Continued following page.)



"blow tank," which removes impurities and brings temperature down to 38-40° F. for storage and shipping. Checking are William Russell (center), FDA Baltimore District Inspector, and Frank Hobbs (right), Chief, Shellfish Section, Maryland Department of Health Division of Food and Milk. Live whole clams are desanded in clean salt water treated with chlorine and ultraviolet light to kill bacteria (6). The chlorine is later removed from the water. Mr. Hobbs (right) watches with the plant owner and a plant employee. Clam shucking is shown in a packing plant (7). Charles Harmon, a Wicomico County sanitarian's aide, takes a sample of water (8) from the bottom of an oysterbed for coliform bacteria analysis. Detail (9) shows how the stopper stays in the bottle until the holder hits bottom, is unstopped when tension is released on the string, and restoppered when lifting retightens the cord.

insure the future safety of shellfish. Both concepts and the agencies represented at conference are still very much in evidence today in the National Shellfish Sanitation Program--a consumer protection program that has made considerable progress strengthening sanitary controls, administrative procedures, and State regulatory activities.

Each member of the National Shellfish Sanitary Program's three-way State, Federal and industry partnership has a defined area of responsibility. The basic premise of the Program is that coordination and uniformity of control may be achieved best by mutual agreement among the States, which individually bear the chief responsibility for the sanitary control of the shellfish industry. The Federal Government coordinates program activities through the Food and Drug Administration, which assumed the shellfish sanitation function after a reorganization within the Public Health Service. FDA is responsible for operating the Federal Government's share of the program through administrative and technical machinery in its new Bureau of Compliance. A Shellfish Sanitation Branch has been established and staffed with personnel who were associated with the program in its former PHS location.

All the coastal shellfish-producing States participate in and subscribe to the procedures outlined in the National Shellfish Sanitation Program's manuals of operation, which have been published by the Public Health Service. The States have adopted uniform rules and regulations administered principally by health and conservation agencies for the sanitary control of the shellfish industry. Their responsibilities span a total range of controls which begin at the shellfish growing areas and continue through the processing and distribution phases. Typically, a shellfish control agency makes sanitary and water quality surveys of growing areas, classifies and patrols closed shellfish waters, inspects harvesting methods and shellfish plants, makes laboratory investigations, and provides any additional surveillance measures necessary to assure that the shellfish that reach the consumer have been grown, harvested, and processed under sanitary practices. The State health departments issue operating certificates to those shellfish shucking, packing, and shellstock plants whose equipment, method of operation, basic construction, and product meet cooperative program

standards. Every package of fresh or frozen oysters, clams, or mussels shipped in interstate commerce from a State certified plant has been marked with an identifying number preceded by an abbreviation of the State name. These "certified shellfish" are guaranteed to have been grown, processed, and packaged under strict sanitary controls.

It is not easy for States to apply the necessary controls. Trained and experienced personnel are needed in the biological and physical sciences, public health, engineering, law enforcement, and several other disciplines to effectively administer an adequate sanitary control program. State agencies employ a total of 1,200 such personnel, either full or part time. The bulk of their effort is in making comprehensive surveys and resurveys of shellfish-growing waters, and preventing illegal harvesting of shellfish from closed areas. A joint study by the Public Health Service and States in 1965 disclosed that two million acres of shellfish waters have been closed or restricted to the taking of shellfish. A total of 8.2 million acres are approved. The national trend is to close more estuarine waters where the shellfish grow, because they fail to meet the rigid water quality requirements of shellfish-approved waters.

FDA's part in the Shellfish Sanitation Program is not only a continuation of former PHS activities, but also a strengthening of the coordination and assistance given to a State program. The FDA field staff, headed by Regional Shellfish Consultants in the six HEW Regions that have coastal waters, will continue to conduct annual evaluations of State control programs. Each review will include an analysis of the legal and general administrative procedures, inspection of a representative number of shellfish plants, and review of laboratory procedures and the effectiveness of closed area patrols. From the information thus obtained, Federal endorsement of a State program is either given or withheld, depending on the State program's degree of compliance with national program standards. This regulatory procedure is a strong incentive for the State control agencies and the shellfish industry to encourage and follow good sanitary practices and to comply with the Manuals of Recommended Practice, issued jointly with the National Shellfish Sanitation Program participants.

Every 2 weeks, the FDA will be issuing the familiar national list of some 1,400 State-certified interstate shellfish shippers for the information of food control officials throughout the country. FDA would like to see a greater distribution and use of this list to assure that consumers get shellfish from certified sources.

Cooperative efforts to combat pollution of the water habitat of shellfish is a never-ending job and the smallest relaxation of vigilance could result in a fresh outbreak of some health hazard to shellfish consumers. Beginning in the 1960's, there have been seven outbreaks of infectious hepatitis, affecting 867 people, associated with the consumption of shellfish harvested from polluted waters. Although the hepatitis virus is still to be isolated by the laboratory, recurrence of such outbreaks can be and is prevented through the effective application of program standards based on the use of indicator organisms.

Responsible Federal and State officials must continue to promote fundamental and applied research. FDA will obtain shellfish research support from three laboratories administered by the Environmental Control Administration. These facilities are located at Purdy, Wash., Dauphin Island, Ala., and Narragansett, R. I. In addition, research grants also will be available to qualified non-profit institutions with worthwhile study projects in shellfish sanitation problems. A total of 11 such grants totaling \$690,000 has been committed for the current (1969) fiscal year.

If conditions affecting our estuaries remained unchanged, the need for research and technical assistance to other Federal departments and State agencies would not be great. But the rate of man-induced degradation of our estuaries is alarming. Each time a ship channel is dredged, a new sewage treatment plant is constructed, a subdivision is made possible by filling a salt marsh, or a new industry locates near shellfish-growing areas, the possible changes these alterations may cause in the water quality must be evaluated. National Shellfish Sanitation participants are working with conservation groups, water pollution agencies, water resource planning agencies, and fishery groups to try to protect and preserve the remaining natural oyster beds and clam flats from pollution. Enhancement and restoration of some shellfish resources may be achieved through concerted

and cooperative efforts, but more rigorous pollution prevention and abatement actions needed to reverse the national trend of steadily closing productive shellfish-growing areas subjected to hazardous pollution.

FDA will continue to provide the leadership and coordination necessary to focus attention on the needs of State agencies and to offer technical assistance and training programs for State and local health and conservation personnel. For assistance to State agencies in special studies, laboratory methods, consultation, and training, FDA has two Technical Service Units, one located at Dauphin Island, Ala., and the other at Davieville, R.I. Some current activities in the units include studies about the effectiveness of practices involving chlorination of sewage effluent, the fate of those bacteria of sanitary significance in estuaries, the effect of dumping sewage sludge at sea, ways to naturally purify polluted shellfish, and the design of cold water wash systems for chilling shellfish.

Periodically, members of the National Shellfish Sanitation Program meet at workshops to discuss proposed technical and administrative changes, new developments, and research findings. In recognition of the prehistory of the shellfish industry in the United States and of the relationship of the National Shellfish Sanitation Program to the effective use of this natural resource, the 1964 National Shellfish Sanitation Workshop endorsed the following principles:

1. Shellfish are a renewable, manageable natural resource of significant economic value to many coastal communities, and should be managed as carefully as other natural resources such as forests, water, and agricultural lands.

2. Shellfish culture and harvesting represents a beneficial use of water in the estuaries. This use should be recognized by State and Federal agencies in planning and carrying out pollution prevention and abatement programs and in comprehensive planning for the use of these areas.

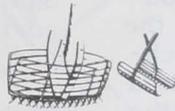
3. The goals of the National Shellfish Sanitation Program are: (1) the continued safe use of this natural resource, and (2) active encouragement of water quality programs which will preserve all possible coastal areas for this beneficial use.

The more progressive oyster and clam fishermen are looking to the future for ways to effect better controls over the growing, harvesting, and processing of shellfish. Culturing methods that are being successfully used in Japan and some of the European countries on the Atlantic and the Mediterranean offer one way to avoid some of the calamities that beset shellfishermen who in this country are mainly on Nature's vicissitudes to produce a sustaining crop year after year. Controlled cultivation and adoption of good conservation practices have provided the more resourceful U.S. shellfishermen with a dependable supply and uniform quality product.

In those countries that practice extensive artificial shellfish culture and scientific shellfish farming controlled breeding, selection of disease resistant strains, and close scrutiny from spat or juvenile stage to market size have produced desirable characteristics and made high-yield shellfish farming possible. These controlled methods allow harvesting of excellent market quality oysters within a year to 18 months after spawning. Because of site selection and preservation, these techniques offer relative freedom from

contamination by human diseases. The oysterman and the clammer in this country may be able to return to something of their former production levels by taking better advantage of such proved culturing methods.

We believe that the shellfish sanitation program of the United States, which is administered jointly by the States, the Food and Drug Administration, and the shellfish industry, has been highly successful in preventing transmission of disease through shellfish. We believe the program affords a challenging example of the achievements that are possible through cooperation of the State agencies, the Federal Government, and the affected industry. This general type of program will be continued by the FDA, subject only to those modifications necessary to meet changing conditions. Program improvements will be effected through increased research, development of better standards, assurance of adequate surveillance by State and FDA shellfish sanitation personnel, and through an increased awareness of the program objectives in shellfish receiving areas. FDA will make every effort to ensure and maintain consumer confidence in a safe and wholesome shellfish product.



OCEANOGRAPHY

New Ocean-Current Tracking System Tested Successfully

ESSA has tested successfully a new ocean-current tracking system that uses a satellite and a free-drifting buoy. This system also can provide satellite transmittal of oceanographic and atmospheric data collected by the drifting buoy. The test was conducted in the Gulf Stream by ESSA and NASA.

Test's Significance

The test represents the first successful attempt at tracking a free-drifting buoy in the deep ocean with satellite telemetry. M. E. Ringenbach, Acting Director, Engineering Development Laboratory, Rockville, Md., said: "The potential implication to the public and to the community of environmental scientists, as a result of the success of this experiment, cannot be overemphasized. Not only can ocean currents be traced accurately in this manner, but sensors on the drifting buoy can acquire oceanographic and atmospheric data, which can be transmitted with the navigational information. Through this technique, oceanographic and atmospheric data can be acquired from remote regions of the world."

The Test

In the test, a buoy equipped with Omega Position Location Equipment (OPLE) was allowed to drift freely in the Gulf Stream off Florida's east coast. An Applications Technology Satellite (ATS-3) interrogated the buoy upon command. The buoy's navigational data were relayed through the satellite to the Goddard Space Flight Center at Greenbelt, Md., for processing.

The buoy was released about 15 miles off Miami, permitted to drift 24 hours, and recovered about 18 miles off West Palm Beach. It had traveled 66 nautical miles. During its course, it was tracked concurrently by an ESSA Coast and Geodetic Survey launch, by the 'Gulf Stream' (an oceanographic vessel operated by Nova University of Ft. Lauderdale, Fla.), and via satellite by NASA in Greenbelt, Md.

A drogue chute was attached to the buoy at a depth of 90 feet. As a result, the buoy's movement was affected primarily by ocean current, not by wind and waves.



New Nautical Chart Issued for New England Coast

A new small-craft nautical chart covering New England's coastal waters from Boston, Mass., to Portsmouth, New Hampshire, has been published by ESSA's Coast and Geodetic Survey.

The accordion-folded chart (613-SC) is on a scale of 1:40,000. It is sufficiently detailed to provide safe and efficient navigation for a large part of the more than 100,000 small craft registered in Massachusetts and New Hampshire. The harbors of Boston, Portsmouth, Salem, Gloucester, Rockport, and Newburyport, all shown, support much commercial and recreational boat traffic.

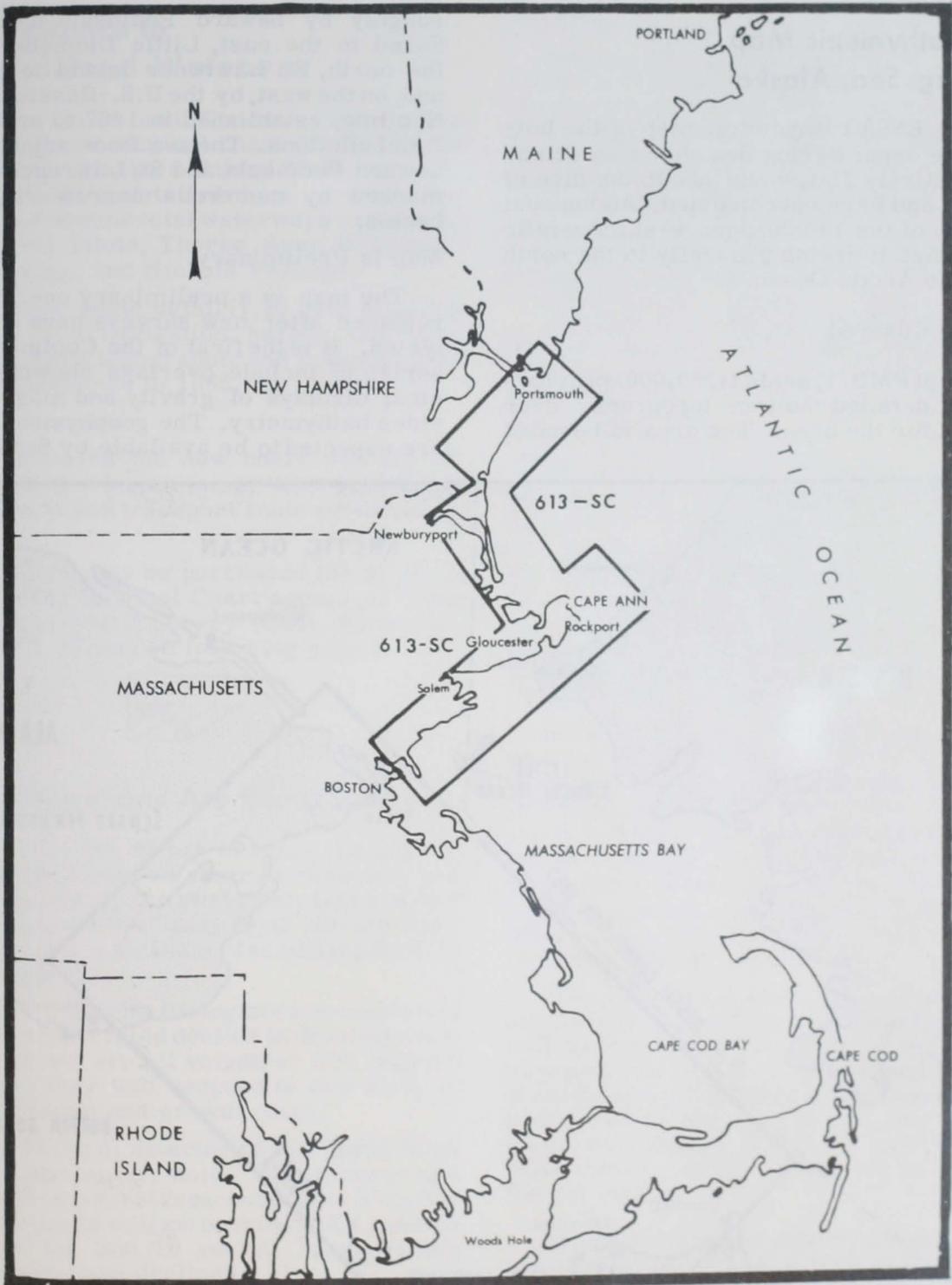
Fishermen's Favorite Area

Color and infrared photography taken by the Coast and Geodetic Survey in 1965 was used in the chart's development to depict the rocky coast and offshore features. Hydrographic information was updated from 1967 Coast and Geodetic Survey surveys near Cape Ann.

This section of the New England coast has been a favorite of sport and commercial fishermen since the days when whalers put to sea from the area. In 1967, commercial fishermen from Massachusetts and New Hampshire caught nearly 400 million pounds of fish and shellfish worth about 40 million dollars.

Chart 613-SC may be purchased for \$1.50 from Coast and Geodetic Survey agents, or from Coast and Geodetic Survey (C44), Rockville, Md. 20852.





Blocked area shows region covered by ESSA's new small-craft nautical chart (613-SC).

New Bathymetric Map of Bering Sea, Alaska

A new ESSA bathymetric map of the bottom of the upper Bering Sea shows an extensive, relatively flat, basin about the size of Maryland and Vermont combined. An unusual feature of the 19,000-square-statute-mile basin is that it drains generally to the north toward the Arctic Ocean.

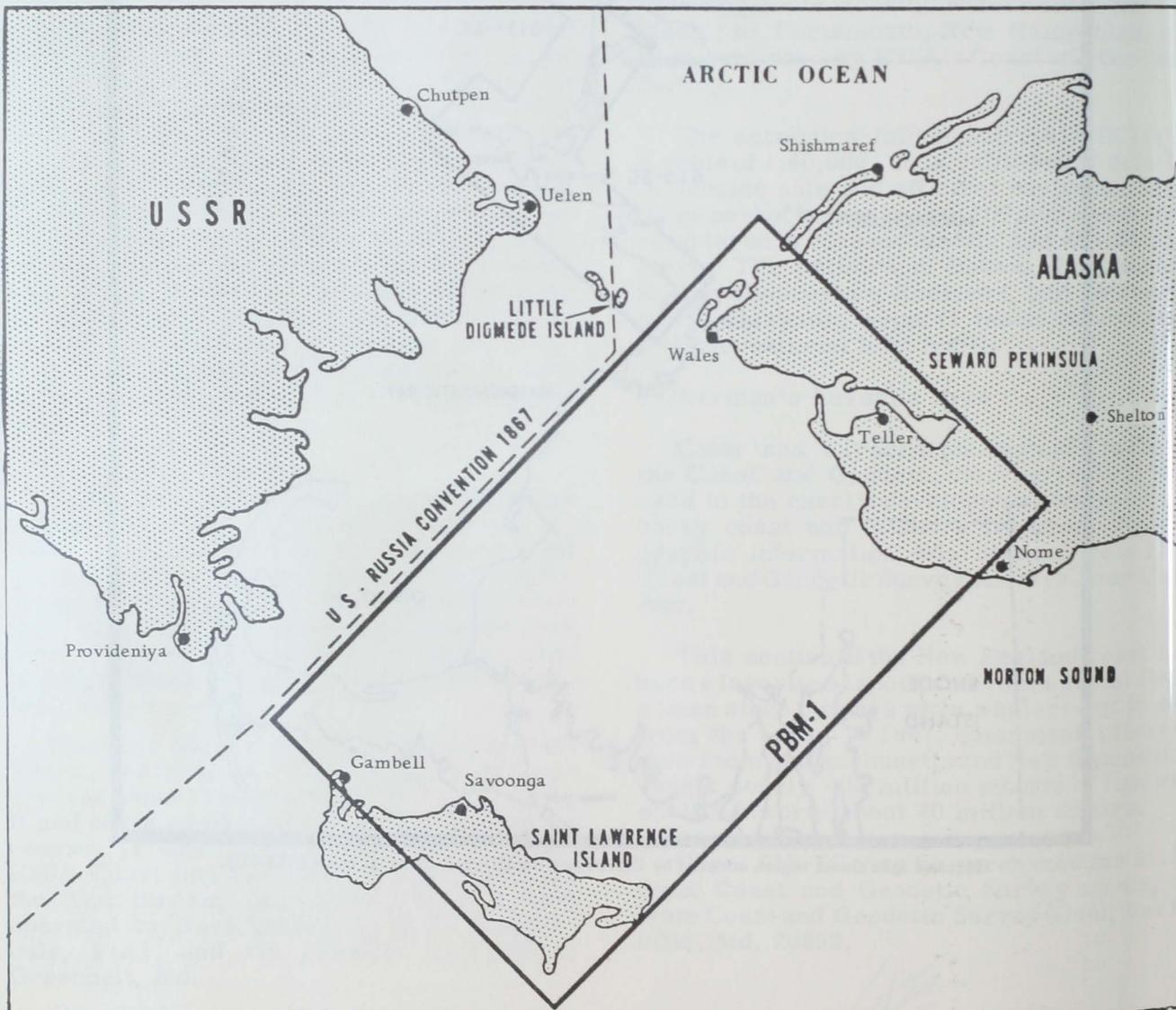
The Area Covered

The map (PMB-1, scale 1:250,000) provides the most detailed bottom topography ever published for the area. The area is bounded

roughly by Seward Peninsula and Norton Sound to the east, Little Diomedede Island to the north, St. Lawrence Island to the south, and, on the west, by the U.S.-Russian Convention line, established in 1867 to separate the two jurisdictions. The sea floor adjacent to the Seward Peninsula and St. Lawrence Island is marked by numerous narrow ridges and basins.

Map Is Preliminary

The map is a preliminary one. It will be replaced after new surveys have been completed. It is the first of the Continental Shelf series to include overlays showing geophysical displays of gravity and magnetics besides bathymetry. The geophysical overlays are expected to be available by September



Seabottom of 19,000 square statute miles, equal to Maryland and Vermont, covered by ESSA's new bathymetric map. Unusual feature of the largely flat undersea basin is that it drains toward the Arctic Ocean.

Chart Entrance to Alaska's Inland Waterway

ESSA's Coast and Geodetic Survey has published a new nautical chart (8080) for the entrance to Alaska's Inland Waterway. It provides the first detailed chart coverage for each major commercial waterways as George and Carroll Inlets, Thorne Arm, Revillagigedo Passage, and Nichols Passage.

The large-scale detail (1:40,000) displays the new aids to navigation, harbor improvements, and new topographic and hydrographic surveys conducted to 1965.

To Aid Industries

It is believed the new chart will aid the fishing, lumbering, mining, and petroleum industries, which transport their products by sea.

Chart 8080 may be purchased for \$1 from Coast Survey Nautical Chart agents, or from Coast and Geodetic Survey (C44), Rockville, Md. 20852. (Chart on following page.)



Fluke's Migrations Are Being Tracked

A cooperative effort to track the migrations of the fluke, or summer flounder, has been launched by the American Littoral Society (ALS) and the Sandy Hook Marine Laboratory, reports Graham Macmillan, Society vice president.

He said: "Marine biologists are concerned about the recent rapid decline in fluke catches. Our members are all volunteer fish taggers and I know they will respond to this study of fluke migration and growth rates."

L. A. Walford, director of the Sandy Hook Marine Laboratory, notes that commercial fluke catches from Massachusetts to Virginia dropped from 19 million pounds to 8.4 million pounds in the last 10 years. Sport-fishing catches also have declined.

At the Sandy Hook Marine Laboratory, tank studies on adult fluke are underway. Offshore expeditions have been sampling waters for spawning fluke and for fluke larvae and fry.

Spawning Areas & Season

Marine biologists have found that fluke spawn in the fall in areas 10 to 30 miles offshore from Cape Cod, Mass., to Cape Lookout, N. C. When they are less than an inch long, they migrate into estuaries. There, they live for a year before venturing again into the open ocean. Some biologists believe juvenile fluke survive well only in southern waters--and that Long Island waters are supplied mostly by North Carolina fluke.

Much of this is theory, ALS states. But, it is a fact that in recent years no baby fluke have been reported from waters north of Chesapeake Bay.

Urges Members' Help

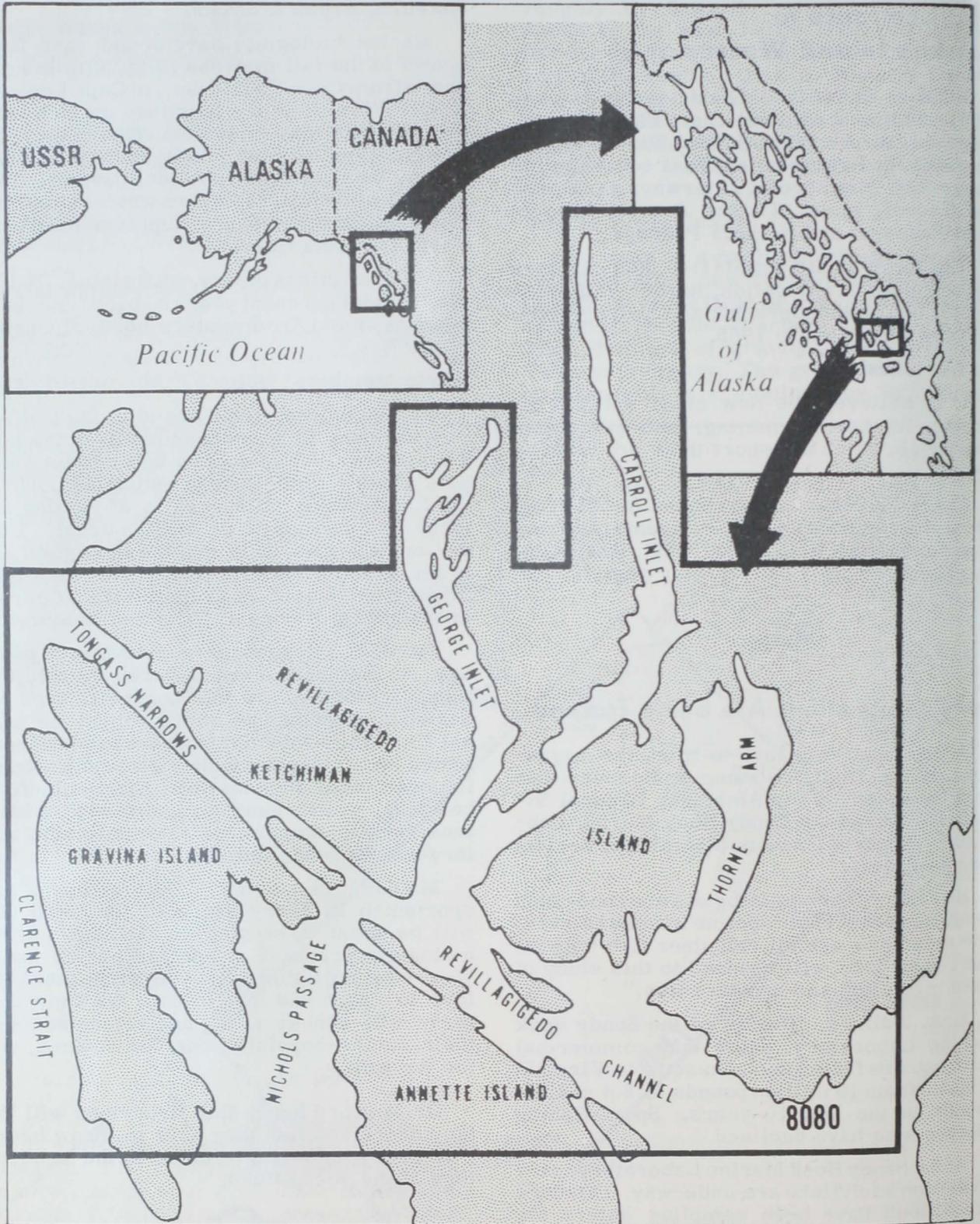
ALS members will be urged to tag and return as many fluke as possible over the next 2 summers. The members will collect samples of very small fluke in estuaries north of the Chesapeake. The results of tagging returns are published in ALS' journal. They are made available to marine biologists and to the Atlantic States Marine Fisheries Commission because of the Commission's interest in the status of coastal fisheries resources.

Since ALS' tagging program began 5 years ago, its members have ordered over 15,000 tags. These tags are the "spaghetti" type inserted through the fish's body behind the dorsal fin. While volunteer taggers have concentrated on striped bass, they also have tagged flounder, sailfish, tarpon, shark, bluefish, bonefish, grunt, spot, cod, croaker, tautog, tuna, bonita, dolphin, pike, smallmouth and largemouth bass, and muskie.

Macmillan notes: "Our members are sportsmen in every sense of the word and will be most interested in helping marine biologists preserve a species on the wane. We are asking fishermen to tag a fish that they love to catch and love to eat. We know that many will choose to tag and return some of their catch--hopefully, one for science, one for the pan."

Dr. Walford hopes that fishermen will tag the undersized fish they have to throw back. "We are especially interested in the wanderings of the young fluke."





Area covered by ESSA's new nautical chart 8080 for entrance to Alaska's Inland Waterway.

Foreign Fishing Off U.S.

May 1969

OFF ALASKA

Soviet: A sharp decline began in April and continued in May. Gulf of Alaska shrimp fishery ended, and the king crab and groundfish fleets withdrew from eastern Bering Sea. Nearly 80 vessels were sighted in early May; 20 remained at month's end (nearly twice as many as at end of May 1968).

Pacific ocean perch fishing along the Aleutians increased from 5 stern trawlers to 10 stern trawlers and 1 refrigerator, primarily in the Samalga-Segum Passes region, in eastern and central Aleutians. However, at least 5 stern trawlers were fishing off the western Aleutians by late May. The western Gulf fishery declined rapidly--10 stern trawlers and 2 refrigerated fish carriers in first week, 5 stern trawlers by mid-month, and 1 stern trawler at end. Catches were poor, both in the Gulf and off Aleutians.

Five medium side trawlers and a refrigerator fished bottomfish along Continental Shelf edge in central Bering Sea through May. Two medium trawlers fishing west of the Pribilofs were joined by 2 stern trawlers in late May. Sablefish, Alaska pollock, arrowtooth flounder, and rockfish were trawled in depths down to 500 fathoms. A 20-vessel fleet that had shifted from flounder to pollock and sablefish, south of the Pribilofs, had shrunk to less than 10 by mid-month. It disbanded in a few days after shifting to fishing off the Alaska Peninsula.

Apparently king crab catches again were poor this year. The 2 tangle-net fleets withdrew in mid-May. In 1968, they had withdrawn by May 2, with a total catch of 22,442 cases. This year's catches are probably not much larger--far below the 52,000 case catch quota.

By mid-month, 2 fleets fishing shrimp east of Kodiak Island had joined a third in the western Gulf, east of the Shumagins. The Soviets said that catches east of Kodiak were not good and that they had been hampered by bad weather. Catches observed east of the Shumagins appeared to be good. All 3 fleets had withdrawn by late May, about the same time as in 1968.

Japanese: The arrival of part of the 1969 high-seas salmon fleets, and of herring fishing vessels off Bristol Bay and in Norton Sound, raised the number of vessels to over 300 by end of May.

The longstanding ocean perch fishery in the Gulf was at a low level; only 2-3 stern trawlers were fishing, primarily in the western Gulf. Perch fishing along the Aleutians was observed in early May. By month's end, 2 stern trawlers were intermingled with the Soviets' in the Samalga-Segum Passes region, and a third was near Amchitka Island.

About 10 stern trawlers, taking pollock, sablefish, arrowtooth flounder, and ocean perch, remained along the Shelf edge in eastern and central Bering Sea throughout month.

By mid-May, 2 more factoryship fleets had joined the minced meat and meal fishery in eastern Bering Sea, making a total of 5 factoryships and about 84 trawlers. During first half of month, all 5 fleets centered on the Continental Shelf, northwest of Unimak I. About mid-May, 2 shifted to the Shelf edge north of the eastern Aleutians.

Two to 3 longliners sought sablefish in the Gulf, one off southwest Kodiak Island, the others off southeast Alaska.

By mid-month, the 2 crab fleets had moved from outer Bristol Bay to east of Pribilofs. Unlike Soviets, they fished both tangle-nets and pots, and sought tanner rather than king crab. The 2 fleets are expected to continue until summer or early fall to achieve the quotas of 85,000 cases of king crab, and 16 million tanner crabs (principally frozen in sections).

The 11 factoryship fleets in the high-seas salmon fishery left Japan May 15. By end of May, 4 fleets (132 gill-net vessels) were located far south of western Aleutians.

In mid-May, at least 14 stern trawlers, 3 smaller trawlers, and 6 longliners fished herring south of Kodiak Bay, in northern Bristol Bay. The longliners, and some stern trawlers, fished with surface drift gill-nets. A second gill-net fishery for herring, with at least 2 longliners, was sighted in Norton Sound. (Japan had conducted a similar fishery in same areas April-June 1968.)

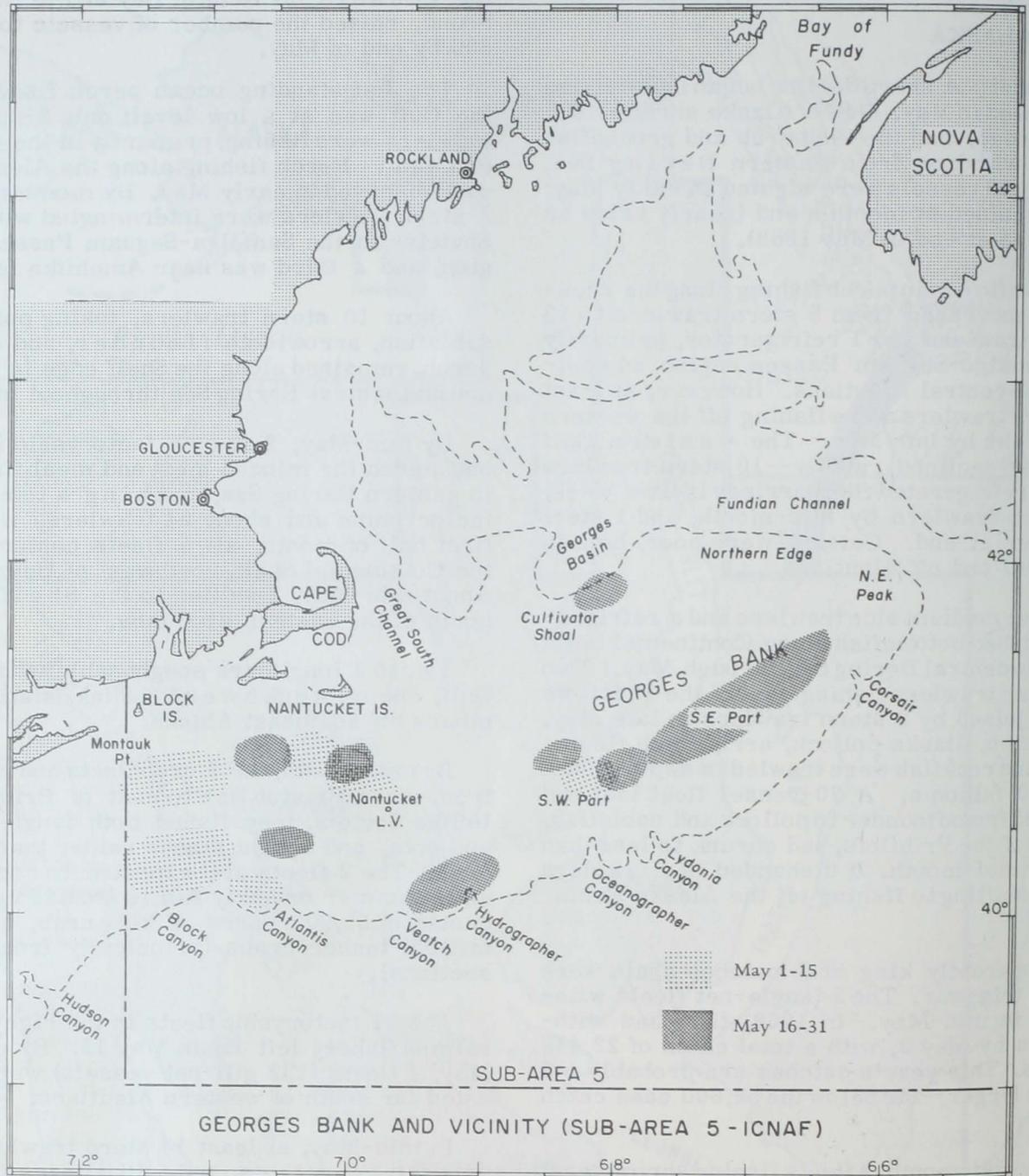


Fig. 1 - Principal New England waters fished by foreign vessels during May 1969.

South Korean: The lone factory trawler that had fished about a month along Shelf Edge in eastern Bering Sea returned home by mid-May.

In early May, a second South Korean fishing operation--1 processing refrigerator and small trawlers--appeared. This fleet was observed when it sought shelter in U.S. territorial waters on northwest Unimak I. It was reported nearly identical to a fleet that had fished unsuccessfully in 1967 and 1968; that fleet took very small catches of pollock. In late May, a second refrigerator and another trawler joined the fleet.

OFF PACIFIC NORTHWEST

Soviet: Twenty-eight stern trawlers, 15 side trawlers, and 12 support vessels were sighted. Most had come from off California. They fished almost entirely off Oregon, until last week of May, when 10 vessels moved north off Washington. Large catches of Pacific hake were observed. Some side trawlers had an estimated 20,000-30,000 pounds in their nets, and substantial quantities on the decks. A large single tow aboard one stern trawler was estimated at about 80,000 pounds. (In May 1968, 56 vessels had been sighted.)

Japanese: No fishing vessels were sighted during May. (Two stern trawlers and 2 support vessels had been reported in 1968.)

OFF CALIFORNIA

Soviet: On May 1, 12 stern trawlers were sighted fishing between Cape Mendocino and the Oregon border. One side trawler was northwest of San Francisco. On May 5, an observation flight failed to sight any vessels between Monterey and the Oregon border. In May 1968, 8 Soviet vessels had fished off California.)

GULF OF MEXICO & SOUTH ATLANTIC

No foreign vessels were reported in May.

NORTHWEST ATLANTIC

For a third month, good weather afforded excellent surveillance of New England and Middle Atlantic coasts; 201 individual foreign fishing and support vessels were sighted--18% less than the 237 reported in April. (In May 1968, 207 vessels had been sighted.)

The Soviet fleets included 27 factory stern trawlers, 116 medium side trawlers (131 in April), 4 factory base ships, 1 refrigerated fish transport, 3 tankers, and 1 tug.

OFF SOUTHERN NEW ENGLAND & GEORGES BANK

Soviet: Throughout month, large groups of vessels were dispersed from south of Block Island, R.I., to eastern slopes of Georges Bank. Fishing in those areas increased early in May, when Soviet vessels gradually moved eastward from the mid-Atlantic off New York and New Jersey.

During first half of May, 90 vessels, mostly side trawlers, took herring and some mackerel in a 30-40 mile area, 50-60 miles south of Block Island. Smaller groups, about 50 vessels each (stern and side trawlers), were 24-40 miles south of Nantucket. Those 25 miles south were mostly stern trawlers fishing red hake. A group of stern trawlers has been fishing red hake in this general area since January 1969.

After mid-month, the main fleet shifted to south of Nantucket and the southwest part of Georges Bank. Catches were primarily herring. At month's end, the fleet was spread along eastern slopes (southwest and southeast parts) of Georges Bank, fishing in 30-40 fathoms. Catches were mostly herring. A sizable fleet, including about 20 stern trawlers, remained south of Nantucket fishing red hake.

Late in May, U.S. fishermen sighted about 100 foreign vessels, largely side trawlers, along southeast part of Georges Bank and Cultivator Shoals. The fishermen said 30-35 were seining herring with huge purse seines and power blocks. A BCF Agent, observing from a USCG cutter, May 27-29, reported 44 Soviet vessels fishing in 35-40 fathoms on northeast part of Georges Bank, 15 miles north of Corsair Canyon. About 35, mostly SRTR's, were rigged for purse seining. The gear was used off the starboard side. Seines were deep-water type. Two large power blocks were aft of the superstructure. Fish were brailled out of the seine by a long-handled dip net and lifted on deck. Catches were mostly herring, but fish on one vessel appeared to be pollock. At least 3 factory base ships and 2 refrigerated fish transports were heaped with barrels.

(During April 1968, at least 9 Soviet medium trawlers equipped for purse seining

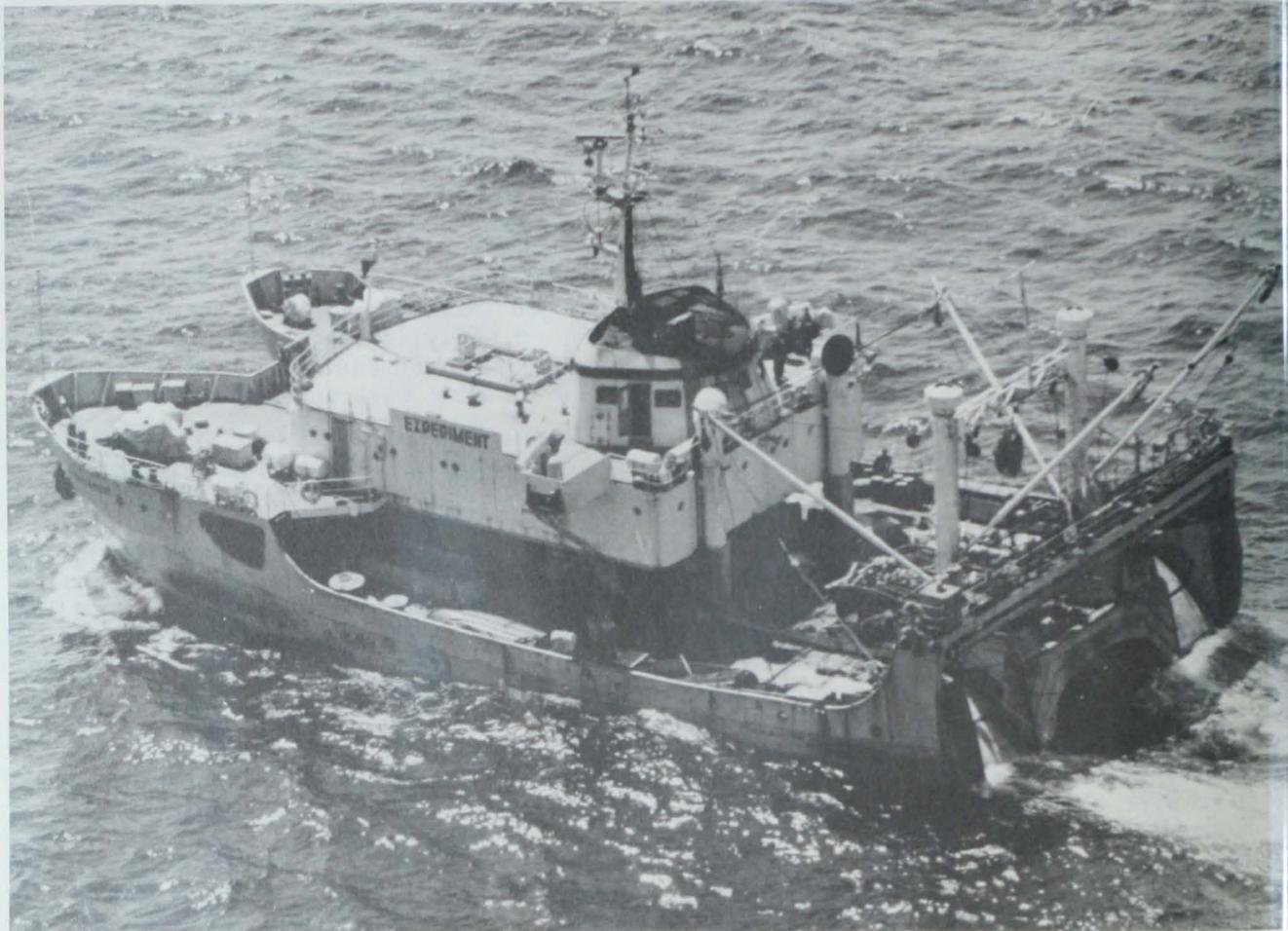


Fig. 2 - Catamaran trawler 'Experiment.'

were sighted off Long Island, N. Y., and Block Island. Seven were actually seen seining for herring. In September 1968, the Soviets had indicated that purse seining off U.S. coast was exploratory, but that favorable results could lead to a more extensive fishery. Seining was described as a lower-cost operation than conventional trawling.)

The catamaran trawler 'Experiment' was sighted on May 27, about 55 miles south of Martha's Vineyard. The first of her kind, she was undergoing sea trials off New England. The 1,000-displacement-ton-twin-hulled vessel, tested earlier in the Baltic, is said to have better maneuverability and stability than single hull trawlers. Each of Experiment's 2 hulls is shaped like a conventional SRT-300 medium side trawler, with 2 stern ramps and trawl decks for continuous fishing. She can be used for bottom and midwater trawling and purse seining.

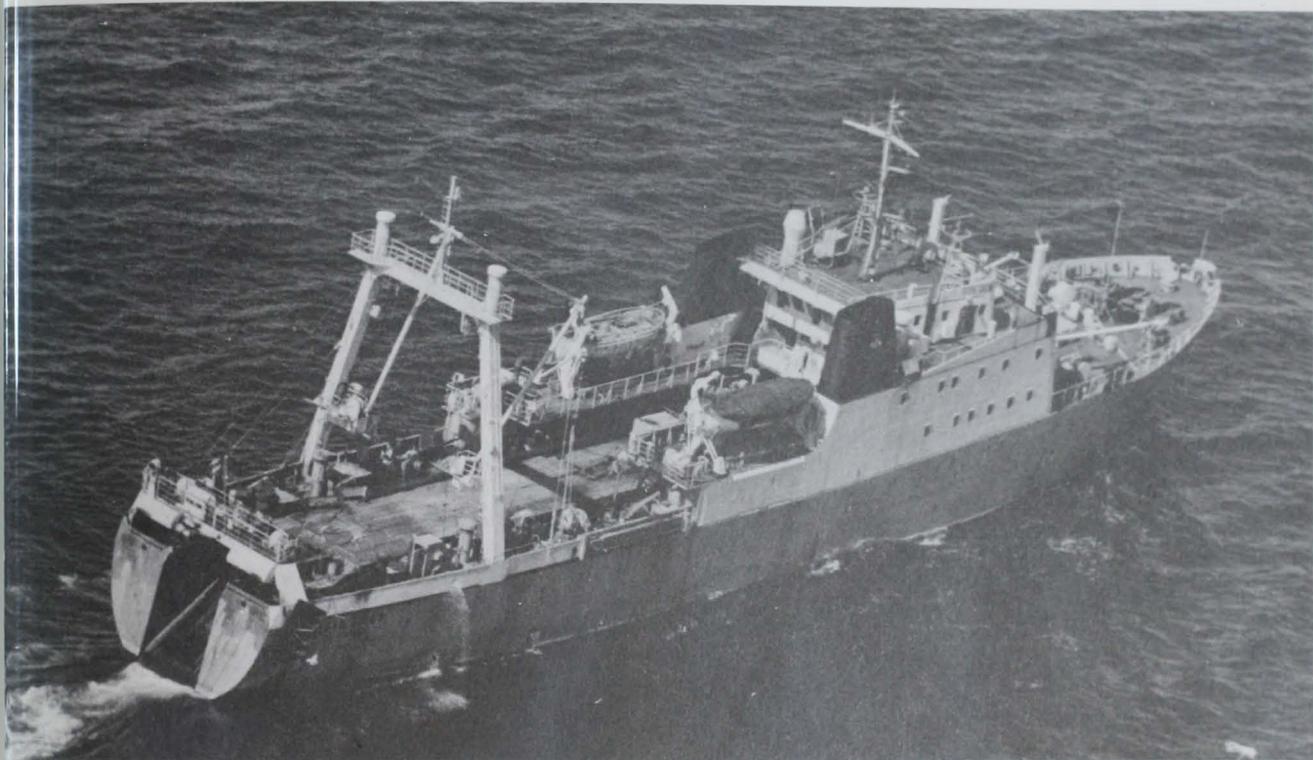
Greek: During mid-May, the trawler 'Paros' was sighted on the Cultivator Shoals area of Georges Bank.

OFF SOUTHERN NEW ENGLAND & MIDATLANTIC COASTS

Soviet: About 30 vessels fished off New York and New Jersey, substantially fewer than the 100 sighted in April. The decrease was caused by an eastward shift of fishing operations to areas off southern New England and Georges Bank.

Early in May, 9 medium side trawlers were 55-60 miles south of Moriches Inlet, L. I. Large catches of herring and mackerel were observed on deck. Five factory stern trawlers fished 80 miles east of Cape May, N. J., but no catches were observed.

By mid-month, 27 vessels (mostly side trawlers) were in a 20-mile area 65 to 85



3 - Cuban freezer stern trawler (Atlantik class) 'Playa Giron.' Sighted during May 1969 south of Block and Nantucket Islands. (Photos - C. Philbrook, BCF.)

les east of Atlantic City, N. J., 10 to 30
les southwest of Hudson Canyon. Limited
catches appeared to be herring.

Polish: Three factory stern trawlers, 25
large side trawlers, 1 factory base ship, and
transport vessels were sighted.

During first half of month, 20-30 vessels
fished back and forth, from Long Island to
south of Martha's Vineyard and Nantucket.
Moderate catches were mostly herring, with
some mackerel. From mid-month, 20 to 25
vessels were dispersed from south of Nantucket to the
western slopes of Georges Bank. Catches
were mostly herring. (A year ago, 25 to 30
Polish vessels had fished off New York, New
Jersey, and southern New England.)

East German: Three stern trawlers and
side trawlers fished among the Polish and
Soviet fleets off southern New England. A few
vessels were scattered off Long Island and
the coast in the month, along the eastern slopes of

Georges Bank. Catches were identified as
herring.

Japanese: Early in May, 2 stern trawlers
fished 85 miles south of Nantucket, and 65
miles south of Montauk Point, L. I. No catches
were noted and no further sightings were
made.

Cuban: One factory stern trawler, 'Playa
Giron,' was sighted among other foreign ves-
sels south of Nantucket. No catches were
noted. This may be the first sustained Cuban
fishery off New England.

Bulgarian: A stern factory trawler was
sighted in early May fishing about 80 miles
southeast of Cape May. In late May, she was
about 60 miles south of Martha's Vineyard.
This was the first sighting of a Bulgarian
fishing vessel off U.S. coasts. Bulgarian
sources have been predicting the beginning of
this fishery for several years. No catches
were observed, but it is believed she was
seeking herring and mackerel.



STATES

Alaska

GOV. MILLER SIGNS 'COAST' COMMISSION BILL

Gov. Keith H. Miller of Alaska has signed legislation creating the Commission for Ocean Advancement through Science and Technology. He said: "With the COAST Commission established, we can proceed with development of a comprehensive coordinated State plan for the wise multiple use and conservation of our marine and coastal resources."

The Law

The law provides for a 10-member commission: 5 Alaskans experienced in oceanographic resources and problems, and 5 non-State members. The Commission is charged to begin a comprehensive study of the marine sciences and the marine and coastal environment in and near the State.

* * *

BCF METHOD SPURS KODIAK'S SEAFOOD WASTE MANAGEMENT

Kodiak plans to ask the Federal Water Pollution Control Administration for a demonstration grant to apply the process for shellfish waste utilization developed by Food Chemical and Research Laboratories under BCF contract. This decision followed meetings coordinated by BCF's Ketchikan Technological Laboratory staff. It culminated in a State-sponsored public meeting in Kodiak on May 21 to discuss harbor pollution.

Plant & Process

A plant would be designed to handle over 80 million pounds of waste now being dumped into Kodiak's harbor each year. The plant would cost more than one million dollars. It would operate by 1971.

The process separates the waste material into 3 products: (1) a high-quality protein concentrate, (2) a calcium chloride brine, and (3) chitin for marketing as valuable separate products.

* * *

PAN ALASKA ORDERS 5 MULTIPURPOSE VESSELS

Pan Alaska Fisheries, Inc., has ordered 5 multipurpose king-crab fishing vessels totaling about \$1,800,000. It is the largest single order ever placed in the king-crab industry. The 93-foot steel-hulled ships are to be owned and operated by the firm.

Capabilities of Vessels

The new vessels are designed to be fully adaptable to the other types of fishing in Northern waters. Besides their king crab capabilities, the sea-water-tanked vessels can be used for scalloping, and in other trawling for bottom fish and shrimp.



Oregon

TUNA SCOUTS SAIL ABOARD 'SUNRISE'

The Oregon Fish Commission's tuna scouts sailed from Astoria June 28 aboard the chartered vessel 'Sunrise' on their annual 800-mile search for early arriving albacore tuna off Oregon's coast. The researchers will monitor oceanographic conditions and test-fish for tuna 30 to 120 miles offshore on the cruise down the Oregon coast to the California border.

Daily radio contact with the commission's Astoria research laboratory will advise researchers and fishermen of ocean conditions and the location of albacore concentrations. This information will be relayed to Oregon tuna fishermen, Oregon State University Marine Science Center, and to BCF, La Jolla, Calif., headquarters for news dissemination to the entire Pacific tuna fleet.

Warm Water Important

The abundance of the elusive albacore off Oregon is related directly to the presence of warm water. Fish Commission biologists are encouraged about Oregon albacore fishing prospects this year because of water temperatures. Through June 15, these were comparable to those through that date last year.

When landings set a record of almost 38 million pounds.

Larry Hreha, Astoria-based biologist in charge of the tuna exploration, believes Oregon will have another good season in 1969--at least about 20 million pounds or more. Through June 23, he reported, there were no known tuna catches in California waters. This was a fairly good indication the fish will be bound off Oregon again this season.

* * *

RECORD SALMON RUN TO FLOOD-CONTROL RESERVOIR

More than 4,000 adult spring chinook have returned to Fall Creek Dam from a 1966 release of 1.1 million unfed fry, the Oregon Fish Commission has disclosed. It was Oregon's most successful attempt to introduce and rear salmon in a flood-control reservoir.

The project on Fall Creek was completed by the U.S. Army Corps of Engineers in 1965. It has upstream and downstream migrant collection facilities. Rough fish in the stream were eradicated before it was filled. Then, early in 1966, 1.1 million spring chinook fry surplus to the Fish Commission's Willamette hatchery were planted in Fall Creek above the dam. They reared that summer in the reservoir and reached an average of 7 inches before migrating during December 1966 and January 1967.

Survival Exceeds Commission's Hopes

The collection facility was monitored, but the exact number of juveniles that migrated from the reservoir is not known because many escaped through the dam's regulating outlet and could not be counted. However, the spectacular return shows that survival far exceeded the commission's hopes.

It was difficult to get young fish into the dam's collection "horns" or exits, but the engineers' procedure of drawing the reservoir down for the anticipated spring run-off helped. Again this past year, the Fish Commission asked the Corps to evacuate the reservoir completely to aid juvenile emigration and to flush out predators above the dam.

The Return

On returning, the 4,000-plus adults, all 4-year-olds, enter a short fish ladder leading

into a trap. The collected salmon, along with other species, are then put into an "anesthetic tank." Rough fish are thrown away and the game species are hauled to a destination above the dam by Corps personnel.

Plants have been made each year since the first in 1966. In 1970, even more can be expected back because both 4- and 5-year-old fish will be returning.

The Fish Commission says this return is an example of the tremendous potential in reservoir-rearing of fish. Its earlier studies revealed excellent growth and survival of juvenile salmon in reservoirs when there were few predators. The commission adds that this does not necessarily mean all dams are good for fishery resources; on the contrary, many problems at dams are unsolved. However, certain impoundments may have considerable potential to enhance a fishery if they are constructed and operated so the young downstream migrants are able to emigrate.

Juvenile Fish

Most attempts at juvenile salmonid passage so far have been unsuccessful because of inadequate collection systems, especially at high dams. Also, at the high dams, there often is no spill and the juvenile fish may not "sound" or go down to enter the low-level entrance of the turbines. So, in the past, runs affected by such structures either have been forfeited or transferred to a hatchery.

Recent commission studies have confirmed that some nonpower-producing flood-control projects might be used to rear salmon without provisions for expensive and complex collection facilities for juvenile fish. One method of passing salmon smolts at these projects can be accomplished by evacuating a reservoir to the level of the stream bed each winter; this is now being done at Fall Creek reservoir.

The Fall Creek study is only one of 7 begun in the mid-50s to evaluate fish passage and fish behavior at public and private projects. The study is guided by a steering committee representing the Corps of Engineers, Oregon Game Commission, the Oregon Fish Commission, BCF, and the Bureau of Sport Fisheries and Wildlife.

* * *

LAST PART OF WILLAMETTE FALLS FISH LADDER BEING BUILT

Construction began June 26 on the third and final phase of the \$4-million fishway at Oregon City's Willamette Falls, reported Ed Neubauer, Director of Engineering for the Oregon Fish Commission. The fishway is funded by BCF (partly by Portland General Electric).

The construction of a 750-lineal-foot ladder and 2 more fishway entrances will greatly improve fish-passage conditions. Also, the perennial "wet hole" problem will be resolved. By filling and capping this pothole, a notorious salmon death-trap on the falls' east side will be eliminated. The naturally occurring holes create a problem each year as the spring flows recede. Previous efforts to remove the stranded fish alive were unsuccessful.

Salvaging Fish

To salvage the fish, commission biologists are gillnetting the wet hole day and night. Carcasses are given to Clackamas County for use in its institutional food program.

Spring chinook escapement above the falls was good this year. The commission's Willamette River hatcheries already have enough returnees to satisfy their artificial-propagation needs.



Maine

MECHANIZED SARDINE-PROCESSING EQUIPMENT TO BE TESTED

Mechanized sardine-processing equipment from Stavanger, Norway, will be tested by the Maine Sardine Council in an attempt to improve and modernize the entire Maine sardine industry. The machinery will be installed in a canning plant at Prospect Harbor.

Goal of Production Test

The Council's Executive Secretary, Richard E. Reed, explained the project. The primary goal is to deliver uniform-size fish speedily and efficiently--with heads and tails removed--to the women who place them in the cans. This would loosen a time-consuming and costly production bottleneck.

He said the Council decision to obtain sufficient equipment for a full-scale commercial production line resulted from promising pilot tests made last year. The tests indicated the production can be increased as much as 100% with uniform pre-cut fish. Also the work will be much pleasanter and easier. Traditionally the cutting is done with hand-held scissors.

Production Line

The production line will consist of a fish sorter or size grader. Three automatic devices will orient and head the fish in one direction and feed them into a high-speed cutter. The cutter also cleans.

The equipment is being leased by the Council. All results will be made available to industry. Reed said this automatic processing machinery is not manufactured in the U.S.



Florida

UNIVERSITY PLANTS 'ARTIFICIAL SEA GRASS'

Some 'artificial sea grass' was scheduled to be laid down along the Gulf bottom in July by Florida State University oceanographers. They are trying to provide a habitat for such valuable shellfish as scallops and shrimp.

Dr. R. W. Menzel, a biologist in the Oceanography Department, said that if the experimental plantings were successful they could show the way toward replacing the coastal natural habitats destroyed through dredging and filling. There, natural grass cannot be started again.

"But we don't know whether it will work," Menzel added. "Barnacles may attach themselves to the blades of grass and weight them down so that the grass doesn't wave like ordinary sea grass."

3 Areas

The ribbon-like, 18-inch long, strands of artificial grass have been attached to pieces of wire fencing. These will be put in 3 locations, each a 30-square-yard area.

One location will be in a dredged area along the channel leading from the marine lab harbor. Another will be in bare areas near where

natural grass is growing. A third will be on bottom where no grass has grown before.

Productivity of the artificial grass areas will be compared with natural-grass-bottom productivity.



California

FISHERMEN VIRTUALLY PAY FOR FISH & WILDLIFE CONSERVATION

The California Department of Fish and Game reported on July 5 that Director Ray Bennett had told Gov. Reagan: "There are some 755,000 licensed hunters and 2,250,000 licensed fishermen in California, and that their license, tag and stamp purchases pay virtually the entire bill for fish and wildlife conservation activities in the State. The remainder of the funds come from fines for fish and game violations, commercial fish taxes and federal aid money from the federal excise taxes on the sale of fishing tackle and sporting arms and ammunition. The Department of Fish and Game does not receive any General Fund money for its operations."

* * *

COMMERCIAL LANDINGS & TUNA SHIPMENTS DECLINED IN 1968

California's Department of Fish and Game provided this report on State fisheries:

"California's commercial fish landings and shipments totaled 567 million pounds in 1968, a decrease of 22 million pounds from the previous year. A 59 million pound decrease in the landings was partially compensated for by a 37 million pound increase in shipments.

"Landings amounted to 445 million pounds, a decrease of 12 percent from 1967. The major factors in this decline were the drop in skipjack tuna landings and the absence of a substantial anchovy fishery early in the year.

"As in 1967, yellowfin and skipjack tuna were the first and second ranked species, together making up almost half of the catch. Jack mackerel was third ranked and anchovy fourth, reversing their 1967 order. Squid replaced Pacific bonito as the fifth ranked species. The next five species, in order of importance, were market crab, albacore, Pacific bonito, bluefin tuna, and rockfish. The top ten species made up 88 percent of the total landings.

"The most significant change in the landings was the drop of 51.7 million pounds in skipjack tuna landings, almost erasing the gain made in 1967. The anchovy catch declined by 38.6 million pounds, reflecting poor economic conditions for the reduction fishery early in the year. Other major decreases were a 6.3 million pound drop in Pacific bonito landings and a 2.8 million pound decrease in albacore. Bigeye tuna landings were down by 1.0 million pounds, reflecting a change in reporting procedures.

"The most important gain was made by jack mackerel; landings increased by 17.5 million pounds as fishing effort increased. Yellowfin tuna landings increased by 12.7 million pounds even though international controls limited the take. Squid landings jumped by 27 percent because of good market demand, and reached the highest level since 1946. Market crab landings were up by 4.3 million pounds, reflecting a record season in the Eureka area. Pacific mackerel landings rose by 2.0 million pounds to show a very slight recovery from the all time low recorded last year. Dover sole also showed a significant gain with landings increasing by 1.3 million pounds.

"Tuna shipments increased to 122 million pounds, a 43 percent increase from the low level recorded in 1967."

