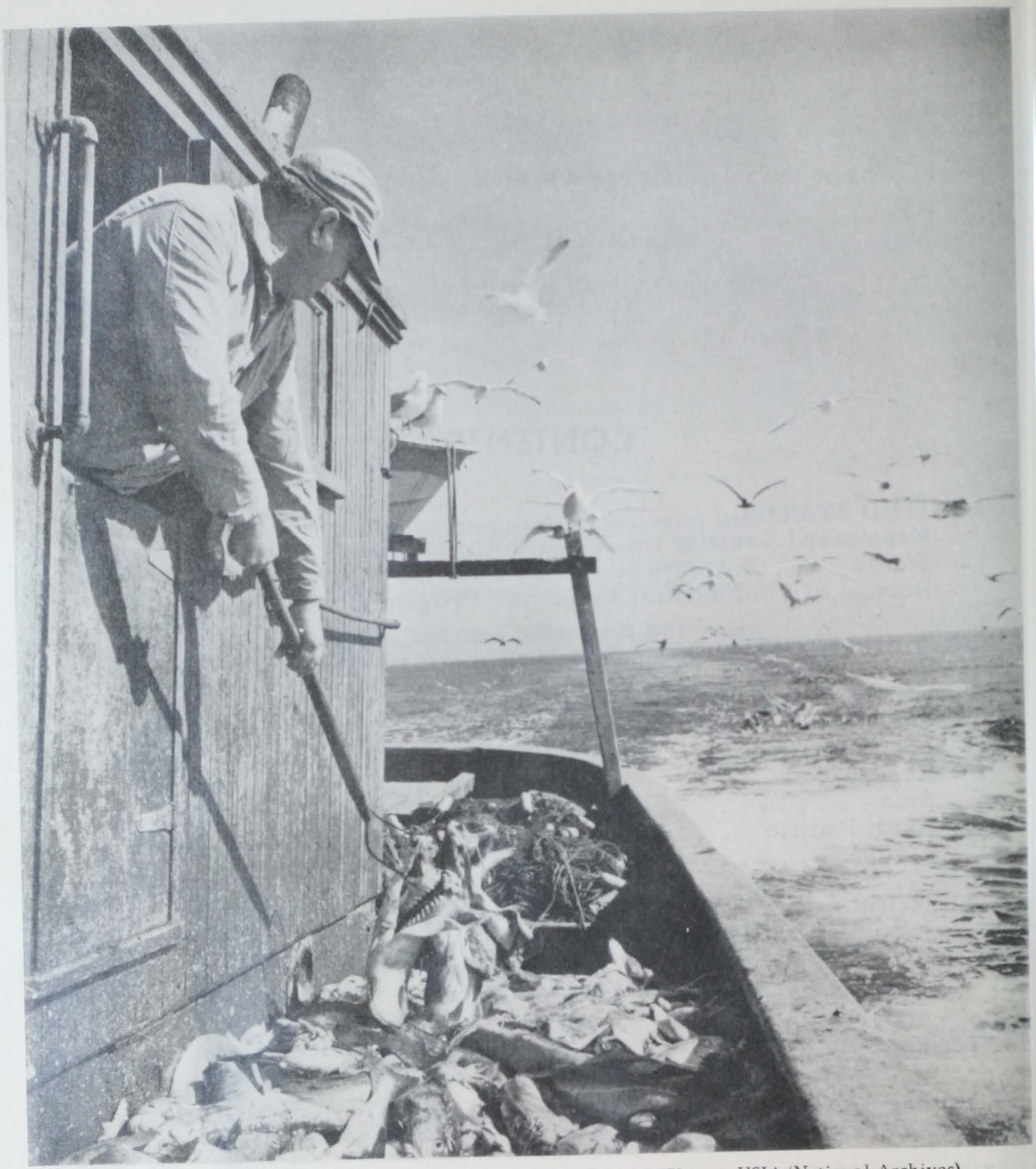


Captain of gill netter checks his catch--mostly cod. (Photo: USIA/National Archives)

PRESIDENT ISSUES FIRST REPORT ON MARINE SCIENCE AFFAIRS

President Johnson has issued the first report to the Congress on marine resources and engineering development. Entitled "Marine Science Affairs--A Year of Transition," it is the work of the National Council on Marine Resources and Engineering Development, chaired by Vice President Humphrey.

The Council, created in 1966, advises and assists the President in planning policy and coordinating the marine science programs of 11 Federal agencies.

The President states that the oceans' resources can help meet many of the challenges facing the Nation and the world. He emphasizes these points:

- "The vast food reserves of the sea must be developed to help end the tragic cycle of famine and despair."

- To safeguard human health and protect the sea's resources, we must stop, and then undo, the continuing pollution and erosion of seashores, bays, estuaries, and the Great Lakes.

- We must understand better the influence of oceans on the environment "to improve long-term forecasting of storms, weather, and sea conditions; protect life and property in coastal areas; and improve the prediction of rainfall in the interior."

- We must take the wealth of the ocean floor to benefit mankind.

- "Finally, the seas must be used as pathways to improved international understanding and cooperation."

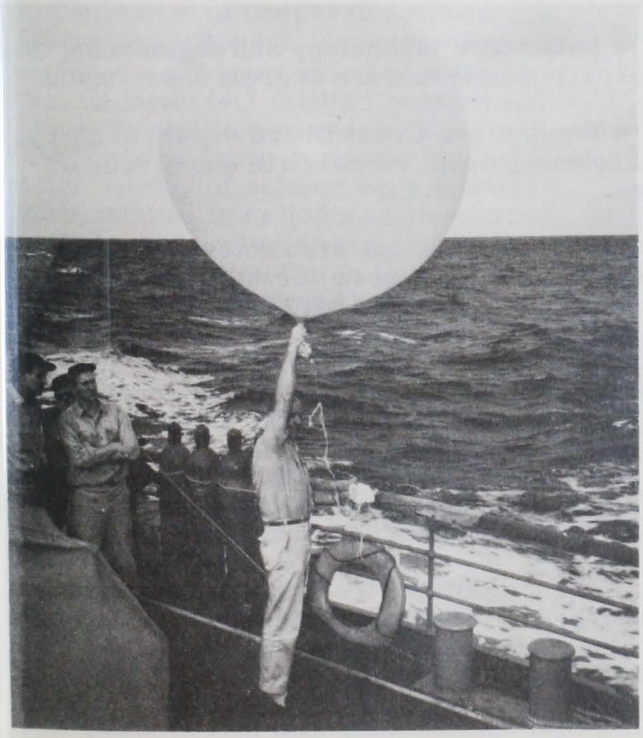


Fig. 1 - Weather balloon launched from ships to gather information on upper air. Weather reports from many ships are used to prepare forecasts for aviation and marine interests. (Photo: ESSA)

The U. S. has recognized the great potential of the seas, the President points out. Over the past 6 years, the U. S. has put more and more money into developing marine scientific and technical manpower, ships, and facilities. "The quality of our research fleet, deep sea vessels, and laboratories is unsurpassed," he notes. The number of highly trained specialists is growing, and this "provides a strong creative base for our marine science and technology."

Fig. 2 - SCUBA diver capturing young salmon for study of fish behavior. (Photo: Oregon Fish Commission)

The President acknowledges the contributions of the 89th Congress to meeting the challenge of the oceans. It enacted:

- The Marine Resources and Engineering Development Act, which calls on the President to develop a long-range, comprehensive, and coordinated U. S. program in marine science--aided by the National Council on Marine Resources and Engineering Development, and an advisory Commission on Marine Science, Engineering, and Resources.

- The Sea Grant College and Program Act. This will improve U. S. capabilities for training and research in marine science and engineering.

Fig. 3 - Red hake is dropped into grinder--producing, after water and fats are dissolved in alcohol, fish protein concentrate (FPC).

Fig. 4 - FPC looks like a light-tan flour and is virtually odorless and tasteless.

• Authorization for pilot plants to produce fish protein concentrate.

The National Council identifies the areas in which the U. S. should carry out these actions:

• Begin a pilot program to help the world's protein-deficient nations increase their capacity to use the ocean's fish resources to feed their people.

• "Implement the Sea Grant College and Program Act to strengthen oceanographic engineering, expand applied research, and improve technical information activities."

• Speed studies to find ways of improving the "collection, storage, retrieval and dissemination of oceanographic data."

• Enlarge the systems of ocean observation to improve near-shore weather prediction services. Study ways to increase the accuracy of long-range predictions of precipitation levels and drought conditions.

• In Chesapeake Bay, determine the effects of estuarine pollution on shellfish, health, recreation, and beauty. Provide a plan to remedy the situation.

• Explore the solid mineral deposits offshore.

• Improve technology and engineering to make it possible to work at great ocean depths.

• Equip a new Coast Guard vessel to carry out oceanographic research in sub-Arctic waters.

President Johnson also notes his recommendation to Congress for a 13-percent increase--from $409 to $462 million--in funds to support marine science activities. The money will permit expansion of the current efforts to understand the sea and develop its enormous resources. It will strengthen the capabilities of private industry, universities, and local government to participate in this undertaking. Also, it will help carry out the recommendations of the National Council.

The report states that significant progress was made in the marine sciences in the 1960s, but the total enterprise today, both public and private, is still small--only about 3 percent of the total U. S. technical effort.

UNITED STATES

Fishery Products Exports Rose 22%

The value of U. S. exports of fishery products rose to a record $84.8 million in 1966--an increase of $15.3 million, or 22 percent, over 1965. Exports were $32.7 million, or 63 percent, greater than the 1961-65 average of $52.1 million. Exports of edible products totaled 109,604,000 pounds valued at $62,882,000. (In 1965, 96,444,000 pounds worth $49,308,000).

Nonedible products were valued at $21,931,000 in 1966 and $20,175,000 in 1965.

There was a large increase in exports of frozen salmon, prepared or preserved fish and shellfish, and unmanufactured shells. Exports of frozen salmon were 9.3 million pounds--88 percent larger than in 1965. Canada, Sweden, United Kingdom, France, and Japan imported larger amounts in 1966. There were no indications of new markets elsewhere.

Exports of prepared or preserved fish (includes canned) increased 5.6 million pounds, or 174 percent. Large shipments went to Japan (4.7 million pounds) and to the Congo (2.5 million pounds). The high value of exports to Japan suggests that they consisted mostly of salmon eggs (soaked in brine, packed in cellophane lined boxes, and frozen) and herring spawn and kelp. The low value of shipments to the Congo indicate mostly canned river herring and Maine herring.

Shellfish Exports

Exports of prepared or preserved shellfish (includes canned) increased 2.4 million pounds, or 60 percent. Large shipments were sent to Sweden, Denmark, United Kingdom, and France. Over one million pounds were sent to France in 1966; only 300,000 pounds in 1965. (Canned king crab and lobster--but not frozen king crab or live lobster--are included.)

Exports of fish oils (77.3 million pounds) were below the 103.8 million pounds exported in 1965. Exports of seal furs were worth $4.1 million; in 1965, $6.1 million. Total exports of nonedible items would have been considerably lower than in 1965 except for the remarkable trade increase in unmanufactured shells. Over 64 million pounds valued at $9.2 million were exported in 1966--compared to 36 million pounds worth $4.1 million in 1965. Of the total, 51.3 million pounds, or 80 percent, were sent to Japan, and 11.3 million pounds, or 18 percent, to Canada. (BCF Branch of Fishery Statistics.)

Breaded Shrimp Production Increased 6%

U. S. production of breaded shrimp during 1966 was 104 million pounds--up 6 percent over 1965.

The Inland and Gulf States ranked first with 63.6 million pounds, followed by the Atlantic States, 33.4 million, and the Pacific States, 7 million.

Fish Sticks and Portions Output Rose Slightly

U. S. production of fish sticks and portions during 1966 was 227.9 million pounds worth $93.5 million--up 2.2 percent in quantity and 1.8 percent in value compared to 1965.

Fish sticks totaled 81.3 million pounds in 1966--1.2 million pounds, or 1.4 percent, lower than 1965. Fish portions amounted to 146.6 million pounds--up about 6.2 million pounds, or 4.4 percent.

Cooked fish sticks (about 77 million pounds) were 94.7 percent of the 1966 fish stick total; the remaining 4.3 million pounds, or 5.3 percent, consisted of raw fish sticks.

Gulf Oil Rigs Are Shipping Hazard

The U. S. Coast Guard says that the large increase in offshore oil rigs and related marine structures in the Gulf of Mexico has created a serious hazard to navigation. To stop the rising number of accidents, the Coast Guard's New Orleans district has accelerated its campaign to tell mariners where 7,000 "artificial islands" and "artificial reefs" are located in the waters off Louisiana and Texas.

The Coast Guard was instrumental in establishing "fairways" for shipping. These are 2-mile-wide channels stretching from a port's entrance to deep water and kept free of oil-drilling equipment. The equipment consists of drilling rigs (from fixed-platform to ship-hulled rigs), processing and storage platforms, producing wells and capped wells. Most of the equipment is scattered in the bays and bayous of Louisiana and Texas.

Many Structures Far Offshore

About 2,000 structures are far offshore, some 70 miles from the coast. Moreover, the number of submerged wells (completed and capped underwater) has increased greatly. Made of heavy steel, these wells could severely damage ships.

As oil wells advance farther into the Gulf, the Coast Guard is urging the creation of fairways running parallel to the shore. Without these connections to the access fairways, ships seeking safe passage must travel long and uneconomic distances to the sea.

Maritime interests and the offshore oil industry are looking for an agreement on these "marine highways."

The offshore operation in the Coast Guard's New Orleans district is the world's largest, says the district's commander, Rear Adm. J. D. Craik. His command sees that all structures have lights and fog horns that work properly. All submerged wells coming to within 85 feet or less of the surface must be worked with a lighted sound buoy to warn navigators.

Coast Guard Checks Structures

The Coast Guard inspects about 14,000 of these private aids to navigation and there are a thousand more of them every year. It issues notices to mariners telling of the structures. It sees that position and signal data are available to charting agencies for inclusion in nautical maps. These maps have to be revised constantly; it is almost impossible for chart makers to keep up with new marine installations.

To ease this problem, the Coast Guard has begun to issue to mariners its own local notices with the latest information. It is urging all navigators to use them. (From article by Tania Long, "The New York Times," April 16, 1967.)

Scientists Warn Against Lake Erie's Increasing Pollution

The growing pollution of Lake Erie must be stopped before it becomes a health hazard and limits the lake's usefulness for industrial purposes, University of Michigan and BCF scientists told a recent meeting of the American Institute of Chemical Engineers. Prof. L. L. Kempe, of the university's department of chemical engineering, and James W. Moffett, director, and John F. Carr, research biologist, of BCF's Biological Laboratory in Ann Arbor, reported that the principal source of pollution comes from the Detroit River and industrial and urban development around the lake.

They said standard sewage treatment methods are inadequate to protect fresh water lakes and streams. Protection must come through the total exclusion of pollutants: wastes must not be dumped into the water, they must be totally distilled, and polluted rivers should be bypassed around the lake.

"Recreational and commercial values of Lake Erie, the world's 12th largest lake, have deteriorated substantially in the past 50 years," and our complex society is "accelerating the decadence of the Great Lakes as we know them."

Sewage systems, industry, and shipping are helping to pollute tributaries and inshore waters and to create an increasingly foul lake bottom.

The Lake's Death Can Be Regulated

The scientists said that "the death of Lake Erie can be regulated, much as we now slow the rusting of steel, the rotting of timbers, or the demise of man himself." Although "changes

in the physical and chemical properties of the water have been relatively mild," they added, the bottom deposits, periodic lack of oxygen, and rapid increase of nutrients have drastically affected plants and animals.

At present, even the best sewage-treatment processes remove only part of the carbonaceous biological oxygen demand; they do little to remove nutrients such as nitrates and phosphates. Complete exclusion of even treated sewage and industrial wastes from surface waters is desirable. This can be done by regulating waste water and permitting its reuse for industrial and domestic water supplies.

Pollution has contributed to an increase in sludge worms and to the elimination of the mayfly, "a clean water insect and a prime source of food to the fishes that inhabit the lake." And this has drastically reduced whitefish and walleye pike and has made blue pike and lake herring "now nothing more than museum pieces."

While noting that current pollution abatement efforts promise direct and immediate benefit, particularly in the tributaries and inshore waters of the Lake Erie basin, the scientists said much more is needed. To save the open waters, research must begin immediately to determine how much pollution Lake Erie can receive without harming the native species of fish and fish-food organisms. Unlike rivers, lakes do not have a great capacity for cleansing themselves. The pollution load entering Lake Erie apparently is being concentrated in the bottom sediments, the major cause of oxygen depletion. New ideas must be developed and used to attack the environmental problems of Lake Erie, particularly those connected with the sediments.

U. S. Commercial Fleet Grows

The U. S. commercial fishing industry added 816 vessels to the fleet in 1966, the highest number since the 1,002 additions of 1949. Nearly half the new vessels--373--list home ports in Gulf Coast states; 202 list Pacific Coast home ports. The vessels range from 20 to 175 feet long.

Oceanography

RESEARCH SHIP "DISCOVERER" COMMISSIONED

The USC&GSS Discoverer, America's newest deep sea research ship, was commissioned April 29 at Commodore Point, Jacksonville, Fla. The $10,000,000 "floating laboratory" is the sister ship of the USC&GSS "Oceanographer," which left Jacksonville March 31 on an 8-month, 37,000-mile, global scientific expedition.

The Discoverer joins a fleet of 15 oceanographic and hydrographic survey and wire drag ships of the Coast and Geodetic Survey, U. S. Department of Commerce's Environmental Science Services Administration (ESSA). She will be based on the east coast.

Her keel was laid in 1963 and the ship launched in 1964. The Discoverer and the Oceanographer are the largest and most automated oceanographic research vessels in the U. S. Each vessel boasts an electronic brain capable of performing 100,000 calculations per second. The computer will gather and process enormous amounts of oceanographic data and monitor the ship's automated central engine room control.

Research ship USC&GSS Discoverer. (Photo: ESSA)

Has the Latest Equipment

The Discoverer is equipped with closed-circuit television to assure proper operation of the electronic equipment. The ship has a central well that extends vertically through the vessel. Special experimental equipment can be lowered through it and oceanographers using diving equipment can enter and leave the vessel.

Special bow-viewing ports below the water line will permit underwater observations.

The vessel is strengthened for navigation in ice and has extensive specialized electronic and mechanical equipment for oceanographic, meteorologic, and geophysical observations. Laboratory space of over 4,100 square feet will allow shipboard analysis of collected data and samples. All living and working areas are air conditioned and served by interconnecting communication facilities.

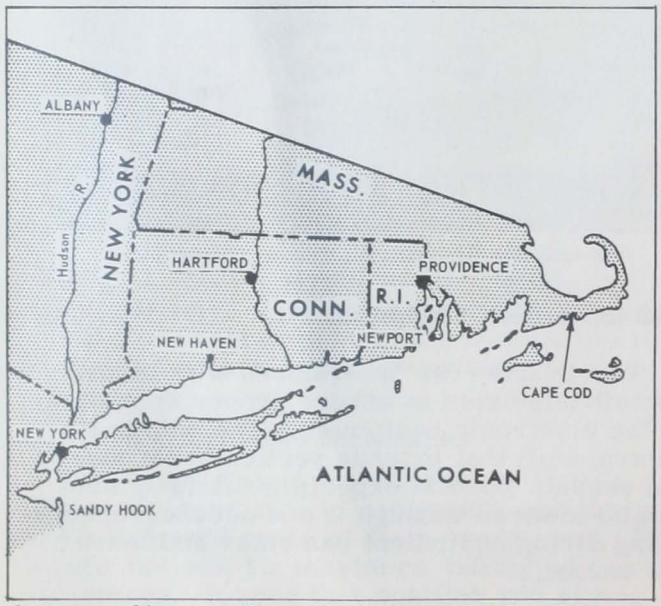
The 303-foot, 3,800-ton Discoverer and her sister ship were constructed as part of a 10-year national oceanographic program to obtain vitally needed knowledge of the seas. The program was developed by the Interagency Committee on Oceanography of the Federal Council for Science and Technology.

* * *

NEW EDITION OF ATLANTIC COAST NAUTICAL BOOK PUBLISHED

The Coast and Geodetic Survey (CGS) has published a new edition of "U.S. Coast Pilot 2," a 230-page nautical book describing a 267-mile stretch of the Atlantic Coast from Cape Cod, Mass., to Sandy Hook, N. J. The last edition of the book was published in 1960. CGS is an agency of the Commerce Department's Environmental Science Services Administration.

CGS publishes 8 Coast Pilots for all U.S. coastal and intracoastal waters. New editions appear every 4 to 10 years. Generally, the books furnish information that cannot be shown graphically on marine charts, e.g., "navigation regulations, outstanding landmarks, channel and anchorage peculiarities, dangers, weather, ice, freshets, routes pilotage, and port facilities." Cumulative supplements contain changes reported since the most recent editions and are published early each year.



Area covered by new edition of U. S. Coast Pilot 2, a 230-page nautical book describing the Atlantic Coast from Cape Cod, Mass., to Sandy Hook, New Jersey.

The first edition of Coast Pilot 2 was published in 1918. The new seventh (1966) edition describes the Port of New York and other deep-water ports at New Bedford, Mass.; Providence, R. I.; New London, New Haven, and Bridgeport, Conn.; and Albany, N. Y. It describes the fishing and recreational waters of Nantucket, Vineyard, Rhode Island, Block Island Long Island Sounds, and the waters off Long Island's south coast.

Cover Other Waters and Ports

The Coast Pilot also covers the waters and ports of Buzzards and Narragansett Bays, Providence River up to Providence, R. I., Thames River up to Norwich, Conn., Connecticut River up to Hartford, Conn., Housatonic River up to Derby and Shelton, Conn., the Hudson River up to Troy, N. Y., and the New Jersey rivers of Passaic, Hackensack, Raritan, Shrewsbury and Navesink.

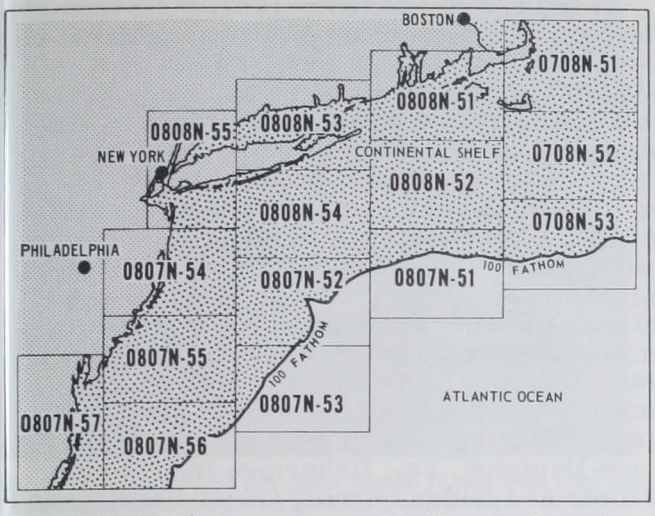
Besides serving the maritime shipping industry, the new edition, coordinated with many of CGS' new small-craft nautical charts, serves the small-boating community.

Copies may be purchased for $2.50 from the Coast and Geodetic Survey (attn. C44), Rockville, Md. 20852, or from Survey sales agents throughout the area. The annual Supplements are free.

* * *

NEW MAPS DEPICT 400-MILE STRETCH OF ATLANTIC SEABED

New maps covering the Atlantic Ocean seabed off a 400-mile stretch of the Massachusetts to Maryland coast have been issued by the Coast and Geodetic Survey of the U. S. Department of Commerce's Environmental Science Services Administration. They depict the mid-Atlantic continental shelf from Cape Cod to Chincoteague Bay--covering an area extending over 100 miles offshore to the shelf's 600-foot edge and beyond, to a depth of 3,000 feet.



Seabed off mid-Atlantic coast covered by 15 new bathymetric maps. Individual maps are identified by number.

The bathymetric maps portray in detail the topography of the seafloor by depth contours at one fathom (six feet) intervals to the 100-fathom curve, and 10-fathom (60 feet) intervals to the 500-fathom curve. Submarine features are emphasized by gradient tints and include Nantucket Shoals; Phelps and Davis Banks; Hudson, Black, Atlantis, Veatch and Hydrographer Canyons; and the approaches to Long Island Sound, New York Harbor, and Delaware Bay.

The maps cover about 40,000 square miles of the Atlantic continental shelf. Produced at a scale of 1:125,000, they represent the most detailed bathymetric coverage ever published of this area's seabed.

Captain Lorne G. Taylor, chief, CGS Marine Chart Division, said the maps will be used by the New England Regional Development Commission and will provide "a foundation for future exploratory efforts and geophysical measurements. Development of the economic potential of the offshore areas is heavily dependent upon maps of this kind. Knowledge of the sea bottom is important for the extension of fisheries, for mineral exploration, for study of shoreline accretion and erosion, and for use in marine engineering."

The maps were produced under a cooperative arrangement between the New England Regional Development Commission, Coast and Geodetic Survey, Interior Department's Bureau of Commercial Fisheries, and Commerce Department's Economic Development Administration.

The series of 15 maps may be purchased for 40 cents each by mail from Coast and Geodetic Survey (Attn. C44), Rockville, Md. 20852; by mail or in person from Coast Survey Chart distribution centers at 121 Customhouse, San Francisco, Calif. 94126, and 602 Federal Office Bldg., 90 Church St., New York City 10007; and in person from Coast and Geodetic Survey, Commerce Building, Room 1127, Washington, D.C. 20230.

Foreign Fishing Off U. S. Coasts, March 1967

IN NORTHWEST ATLANTIC

The surveillance of foreign fishing off the U. S. North Atlantic coast in March 1967 was hampered by poor weather. Only a limited assessment of the situation was possible.

Soviet: The estimated number increased gradually from 35 to 40 vessels early in the month to about 60 by month's end, when additional medium and large side trawlers and support vessels arrived. (During February 1967, 40 vessels were sighted; in March 1966, over 100.)

Soviet fishing generally ranged along the 100-fathom curve of the Continental Shelf from south of Long Island, New York (Hudson Canyon), to south and southeast of the Nantucket Lightship (Hydrographer Canyon). But most fishing was inside ICNAF subarea 5; only a few vessels fished west of ICNAF's western border south of Long Island. Moderate catches of fish on deck appeared to be primarily red hake and whiting, the same species landed in March 1966.

On some large stern factory trawlers, the Soviets have replaced rollers consisting of 30"-diameter steel bobbins with 12"-diameter rubber rollers. An estimated 4 rollers are used for every 6-foot section of the sweep. Three 4"-diameter spacers are attached between each roller. Reducing the size of rollers allows the trawl net to fish considerably closer to the ocean floor--and capture a higher percentage of bottom-dwelling species. These adjustments also will allow the trawl gear to fish effectively on both rough and smooth bottom. This lessens the workload of crews by eliminating frequent changing of gear when bottom conditions suddenly change. Finally, the changes tend to lighten the trawl and could allow the vessel to cover a greater distance during the same towing time.

IN MID-ATLANTIC BIGHT

Soviet: Fishing was discontinued in early June 1966. Soviet vessels were sighted only occasionally, mostly on their way to the newly opened Havana fishing port, and further south into the expanding Soviet fisheries off Argentina. Some limited exploratory research also was done during intervals in the fishing.

At the end of February 1967, the Soviet fleet again reappeared off Virginia, Maryland, Delaware, and New Jersey. Fewer than 10 vessels were sighted; there had been 30 vessels fishing in the area a year earlier. On March 30, 1967, a surveillance flight by U. S. Coast Guard and BCF officers sighted 7 Soviet vessels--5 factory stern trawlers and 2 medium side trawlers. Six vessels were located along the 100-fathom curve from 80 miles east southeast of Cape May, N. J., to 90 miles east of Atlantic City. A single trawler was sighted 25 miles east of Cape Henry, Va. Though all vessels were fishing, no fish was observed on deck. Dehydration plants were operating on several vessels. Reports from Hampton, Va., fishermen indicate the Soviets are taking herring (river herring) and small scup (porgies).

OFF SOUTH ATLANTIC

Japanese: Taiyo Fishing Company's exploratory trawler has found poor fishing for shrimp and bottomfish off the South Atlantic coast. As of early March, catch per day of operation averaged only 5 to 6 metric tons of bottomfish, with very small quantities of shrimp. The vessel is believed operating well beyond the U. S. 12-mile zone.

IN GULF OF MEXICO

No foreign vessels were reported fishing off or near the U. S. Gulf Coast, but several Soviet vessels were sighted on their way south (to Havana port and then to southwest Atlantic) through the Florida Straits.

OFF CALIFORNIA

Soviet: From 1 to 6 vessels were sighted fishing off the California coast during March, indicating fishing is still only exploratory. Most were sighted off the San Francisco area, and some were passing through on their way south to fishing grounds off Mexico.

On March 31, 1967, the U. S. Coast Guard and California Department of Fish and Game identified 6 Soviet vessels 22 miles southwest off Half Moon Bay (San Mateo County near San Francisco) as 5 medium side trawlers and a 3,600 gross-ton refrigerated transport (the "Gutsul", recently constructed in Poland). The trawlers were fishing in 100-130 fathoms; the catch appeared to be rockfish. This was the same area the Soviets explored at end of January.

g. 1 - The refrigerated fish carrier Gutsul (3,600 gross tons) was providing support to 6 Soviet medium trawlers fishing off California's Half Moon Bay in early April 1967.

)FF PACIFIC NORTHWEST

Soviet: During March, there were about 10 oviet fishing and support vessels off the coast f Oregon. They remained for a week, then ost headed north. By month's end, only 4 essels remained off Oregon. No vessels ere sighted off Washington.

The vessels were catching hake, true cod, cean perch, and other rockfish. The catches bserved consisted primarily of hake and true od. The largest amount was about 20 metric ns taken in one drag by a stern trawler, onsisting primarily of true cod with some ean perch.

During the month, several research ves- ls continued to explore the resources off th Oregon and Washington. The "Ogon" as sighted fishing on March 3, about 70 iles northwest of Cape Flattery (Washing- n) in 200 fathoms. By month's end, the gon was exploring about 30 miles off Cape rago (Oregon). Other Soviet research and xploratory vessels were sighted mainly off regon.

Japanese: In March, the Japanese had up o 4 stern trawlers off Washington and Ore- on catching ocean perch primarily. The erch were cleaned and frozen in 60-pound ackages. The viscera were reduced to meal nd oil aboard the vessels.

The captain of the "Taiyo Maru" said in an nterview that the total fish catch did not arrant licensing more Japanese vessels to ish off the U. S. Pacific Northwest. As of March, 3 stern trawlers, each accompanied by a side trawler, were licensed to fish in that area.

OFF ALASKA

Japanese: The number of Japanese vessels fishing off Alaska increased from about 36 to over 90 during March. Most of the increase was in eastern Bering Sea pollock and king crab fisheries.

Pacific ocean perch fishing in the Gulf of Alaska was concentrated on the Yakutat grounds and on Albatross Bank throughout the month. The factory trawler "Kokuyo Maru" fished in Yakutat in early March, shifted briefly to Albatross Bank, and then presumably returned to Japan. The factory trawler "Kirishima Maru" fished for perch in Yakutat during second half of March. Perch fishing on Albatross Bank was conducted throughout the month by the factory trawlers "Daishin Maru No. 12" and "Yutaka Maru." The factory trawler "Ryuyo Maru" departed Albatross Bank in early March and returned to Japan. The factory trawlers "Akebono Maru No. 72" and "Aso Maru" and another trawler were fishing for perch along the 100-fathom curve south of the Pribilof Islands in late March.

The factoryship fleets in the Alaska pollock fishery north of the Fox Islands in the eastern Aleutians increased from 2 to 4 during March. Active at month's ends were the factoryships "Soyo Maru," "Chichibu Maru," "Shikishima Maru," and "Gyokuei Maru." Those vessels are licensed to be accompanied by 62 trawlers. Independent trawlers also active included the "Zuiyo Maru No. 2," "Akebono Maru No. 52," "Inase Maru No. 5," and the "Tenyo Maru No. 3." The Tenyo Maru No. 3 returned to Japan at month's end.

The Japanese eastern Bering Sea king crab fishery started in early March. The vessels were the factoryships "Keiko Maru" and "Tainichi Maru," each accompanied by 5 net-setting trawlers.

Sablefish operations were conducted by the long-line vessel "Kotoshiro Maru No. 25" off Chirikof Island in early March. One long-liner off Cape St. Elias, and one off Southeastern Alaska, were reported in late March.

Soviet: Fishing and support vessels off Alaska increased from about 130 in early

March to over 150 by month's end. The number was about the same as in March 1966.

During the month, a significant shift occurred in the Soviet eastern Bering Sea flounder fishery; most of the effort, over 70 vessels in early March, was switched to Gulf of Alaska ocean perch fishing.

In the Bering Sea flounder fishery, the catch rates had dropped off sharply as the large schools of fish began to disperse. Early in the month, several vessels were detached and sent to Gulf of Alaska to explore for Pacific ocean perch. Because ocean perch were located, some flounder-fishing vessels moved into the Gulf. Decreasing flounder catches in early March in the Bering Sea prompted a large exploratory effort. Many vessels were temporarily assigned to exploration and soon found new resources. As a result, the flounder fleet in the Eastern Bering Sea increased somewhat by mid-March; catches were moderate to good. But the rally was short-lived. By month's end, it appeared the flounder season was about finished. Only about 30 vessels remained.

The Gulf of Alaska ocean perch fishery effort doubled during March as more fishing and support vessels entered the area--some from the Bering Sea flounder fishery and some new arrivals from Siberian ports. The main perch fishing areas were on Portlock Banks (east of Kodiak Island), near the Yakutat Bay in the Central Gulf, and off Southeastern Alaska. Early in March, 30 fishing trawlers and 4 support vessels fished for perch on Yakutat grounds. By mid-March, that group broke up and fishing operations were switched west to Portlock Bank and southeast below Chichagof Island.

Portlock Bank was fished for only a short time; by month's end, all vessels returned to Yakutat grounds, further southeast along Alaska's and Canada's coasts, or returned home.

In mid-month, about 15 trawlers were perch fishing off southeastern Alaska (from Chichagof Island to Canadian border). At end of March, about 25 trawlers, joined by 5 processing and support vessels, were there.

The continuous shifting from area to area indicates extensive exploration was conducted on the by-now traditional Soviet ocean perch grounds in Gulf of Alaska and adjacent areas. As perch schools were found, the fleets followed the scouting vessels. Despite some success, the size of perch schools reportedly was small both in the Gulf and along Aleutians. It is not impossible that the abundance of virgin perch stocks fished by Soviets since 1962 has decreased considerably. In 1966, only about 250,000 metric tons of Pacific ocean perch were caught off U. S. coasts by Soviets, compared to 392,000 tons landed in 1965.

Only a few vessels fished for perch along tip of Alaska Peninsula, and along Aleutian Islands. Their number increased to 6 fishing trawlers and 1 refrigerated transport by end of March.

Shrimp fishing on Continental Shelf near Shumagin Islands continued with 20 medium freezer trawlers serviced by floating cannery "Vasilii Putintsev." Shrimp were unusually abundant and, by end of February, the Soviets processed over 5,000 metric tons of small Pacific shrimp. Since shrimp are more abundant closer to shore, vessels were fishing inside newly established 12-mile fishery zone until U. S. Coast Guard seized 2 shrimp vessels, both fined in U. S. courts. Soon afterwards, many shrimpers left Shumagin area and continued operations off Afognak Island (adjacent to Kodiak Island). By end of March, 15 medium trawlers, one canning factoryship, and one refrigerated transport were sighted off Afognak; only 5 trawlers still remained on Shumagin shrimp grounds.

The king crab fishery in eastern Bering Sea began in first week of March, when one floating cannery accompanied by 3 net-setting medium trawlers arrived from Vladivostok. Soon 2 more sisterships arrived, also with net-setting trawlers. As in 1966, it is believed the 1967 effort will not exceed 3 canning factoryships, 9 medium trawlers, and 33 pick-up boats. But unlike 1966, the Soviets began somewhat earlier this year.

The king crabbing is regulated by U. S.-USSR agreement. In 1966, Soviet vessels in eastern Bering Sea caught 2.6 million adult male crabs and produced 104,700 cases (48 $\frac{1}{2}$-lb. cans) of canned crab meat--only 88 percent of agreed yearly quota of 118,600 cases. During February 1967 negotiations, it was agreed that the 1967 Soviet pack should be 15 percent less, or 100,000 cases. It is believed the Soviets will try their best to achieve the agreed-on quota.

SOVIET FISHING VESSELS SEIZED

During a fishery patrol on March 2, 1967, the U. S. Coast Guard cutter "Storis" observed Soviet medium freezer trawler "SRTM-8413" fishing close to U. S. shore off southern Alaska Peninsula (158°56' W. and 55°50' N., or about 1.3 miles off Mitrofania Island, northwest of Shumagin Islands). The Storis ordered the vessel to stop for boarding, but captain attempted to leave area. While steaming full speed towards international waters, the vessel dropped its trawl and also dumped unspecified material overboard. Overtaken 13 miles off U.S. coast, the SRTM finally stopped and allowed an armed Coast Guard party to board her. The Soviet captain was told that he had broken U. S. law and the vessel would be escorted into the Sand Point Coast Guard Base. On March 3, at 2 a.m. Alaska time, the SRTM-8413 began to steam towards Sand Point, escorted by the Storis. In about 2 hours, however, the Soviet mothership "Vasilii Putintsev," which was servicing the shrimp-fishing trawlers and is flagship of the Commander of the Soviet Pacific Shrimp Expedition, Vasilii Guzenko, intercepted the convoy. The Soviet Commander requested and was granted 2 conferences with Comdr. George Hardy Jr., Commanding Officer of the Storis, to review the situation and to delay departure of SRTM-8413 until the Far Eastern Administration at Vladivostok would permit Guzenko to accompany the captain into Sand Point. It took 14 hours to obtain permission and board the trawler guarded by the Coast Guard prize crew.

Early on March 5, the two Soviets were flown by Coast Guard to Kodiak, where the Soviet captain was arraigned before a U. S. Commissioner and charged with violating U. S. fishery and territorial laws. Awaiting the party there was an official of the Soviet Embassy in Washington and a court-appointed attorney.

The SRTM-8413 and its crew were released the same day, and the vessel proceeded out beyond the U. S. 12-mile zone. On March 6, the trial took place at Anchorage and the Soviet Captain was fined US$5,000. He pleaded nolo contendere (not admitting guilt but not contesting the evidence, thus subjecting himself to conviction as though admitting guilt). The maximum sentence that could be imposed (once vessel was released) was a fine of $10,000 and a one-year prison sentence. This was the first time the U. S. had seized a Soviet fishing vessel and prosecuted its captain for violation of territorial waters.

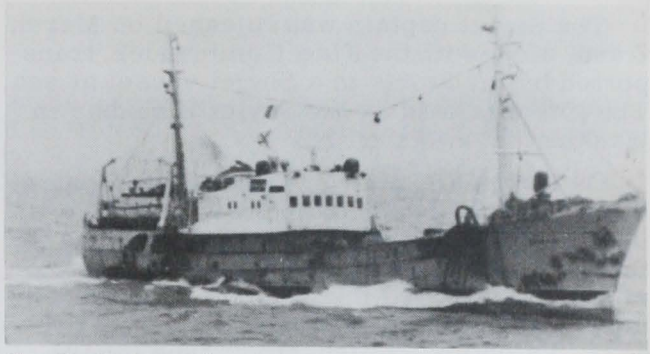


Fig. 2 - Soviet medium freezer trawler SRTM-8413 apprehended by U. S. Coast Guard fishing inside U. S. territorial waters. Answering signals of the U. S. Coast Guard cutter Storis. (Photos: U. S. Coast Guard)

Fig. 3 - A crewman of Soviet trawler SRTM-8413 uncovers a catch of Pacific shrimp caught off U. S. coast.

Fig. 4 - Spoiled shrimp aboard Soviet trawler are washed back into the sea.

The Soviet captain was released on March 7 and, along with the Fleet Commander, transported by the Storis to a Soviet vessel at sea. The fine was paid by the Soviet Embassy in Washington on March 20.

On March 10, a U. S. Coast Guard patrol observed 3 Soviet medium freezer trawlers inside the 9-mile contiguous fishery zone off the Shumagin Islands (Alaska). One was 3.5 miles offshore. Of the 3, only 1 trawler fishing for shrimp was identified as the SRTM-8421 "Valentina Tereshkova." The others were also probably catching shrimp.

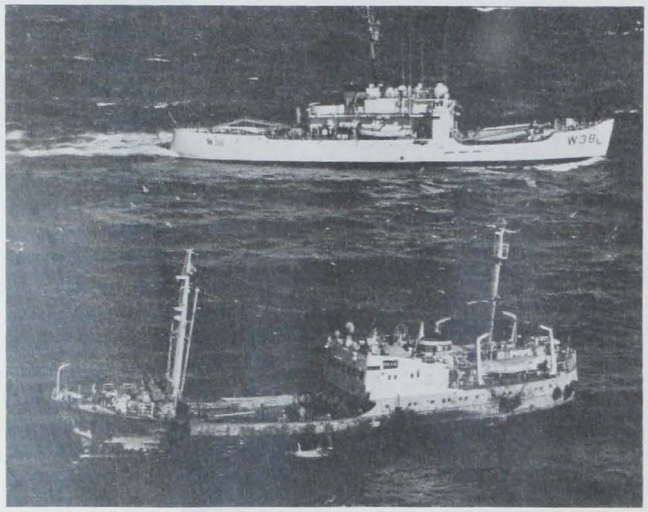


Fig. 5 - Twice in less than 3 weeks, crew of U. S. Coast Guard cutter Storis (W 38) stopped and boarded a Soviet shrimp trawler violating U. S. fishery laws off Alaska. Storis is shown preparing to lower boat with boarding party. The medium freezer trawler SRTM-8457 (foreground), is watched by a Coast Guard aircraft, from which photo was taken.

On March 22, a Coast Guard aircraft sighted a Soviet fishing vessel 5.5 miles east of Seal Cape (Alaska) and identified it as "SRTM-8457." The vessel had nets in the water and thus was fishing well within the 9-mile contiguous fishery zone. The aircraft signaled the vessel by radio, flashing lights, and message block to stop, but the vessel hauled in her nets and departed. The aircraft maintained "hot pursuit" and contacted the nearby cutter Storis. Her personnel boarded the vessel 15 miles from the U. S. coast. The Soviet captain admitted fishing when first sighted but believed he was out more than 12 miles. A prize crew was placed aboard the vessel, but the captain (supported by the Fleet Commander) protested the seizure and stated the vessel would not proceed to a U. S. port under her own power. The 700-gross-ton medium freezer trawler had to be towed by the Storis for 48 hours before arriving at St. Paul Harbor, Kodiak.

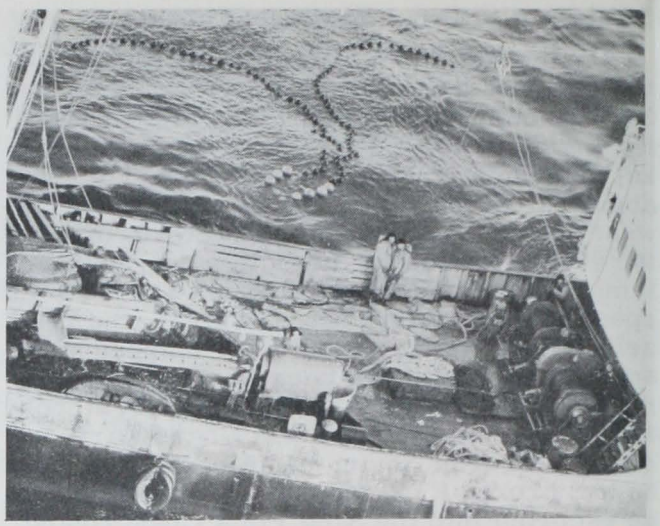


Fig. 6 - A small U. S. Coast Guard plane hovers over Soviet medium freezer trawler SRTM-8457 as it takes aboard a load of shrimp only 6 miles off U. S. Alaskan coast. The trawl bag containing shrimp (middle left) was pulled aboard, but wings of the trawl and headline floats (upper middle) are still alongside vessel.

Fig. 7 - Some of fresh shrimp found aboard SRTM-8457 after seizure by Coast Guard.

The Soviet captain was tried in the Anchorage District Court and given a $10,000 fine to be paid immediately. Unable to pay, he was held overnight, until Iruii Chemokhud of the USSR Embassy in Washington paid the fine. The captain was released and transported to his vessel. The Soviet diplomat stated that the Soviet Government respects its international obligations and that the captain would lose his master's license for one year and would have to repay the fine to the Soviet Government.

STATES

Alaska

HIGHLIGHTS OF 1966

BCF Juneau reports:

• Alaska remains the number 1 fishery state with landings valued at $74 million and products worth about $200 million--25 percent greater than California's, the number 2 state.

• Kodiak (population 3,500) is the Nation's third most important fishery port with landings worth $13 million--$3 million more than Boston.

• Fish eggs cured in Claska during 1966 were worth $4 million, or about 25 percent of the wholesale value of products from the U. S. Pacific halibut fishery. Salmon roe amounted to $3 million; herring roe $350,000; cured kelp with herring eggs (harvested during a 45-minute season) $600,000.

• The value of the herring roe and kelp products matched the wholesale value of meal and oil produced in Washington State (from hake and other species). It was nearly twice the value of meal and oil produced in either Oregon or in the Lake Michigan alewife fishery.

• Alaska salmon egg and herring egg products are exported to Japan and represent about 6 percent of U. S. fishery exports.

• The salmon catch was 352 million pounds, the best since 1949.

• King crab continued as Alaska's second most important fishery--landings hit a record 159 million pounds. Products of this fishery were worth $38 million, three times the value for products of the U. S. Pacific halibut fishery.

Arkansas

BCF AIDS IN HARVESTING CATFISH

During the first 3 months of 1967, BCF gear specialists harvested 108,000 pounds of catfish from Arkansas farm ponds for demonstration purposes. The ponds ranged from 5 to 40 acres, individual seine hauls caught from 600 to 42,000 pounds. BCF designed live-cars were used to hold the captured fish in good condition for 1 or 2 days.

In the 40-acre pond, 87 percent (63,000 pounds) were caught in 2 hauls. In a 10-acre pond, 89 percent (18,300 pounds) were taken in 2 hauls. The results were poor only in ponds containing snags, such as roots or stumps, or in ponds with undesirable design features.

Commercial pond-fish production is expected to grow this year.

California

DIVIDED 1966 ALBACORE LANDINGS WITH OREGON

The March report of the Resources Agency of California states that preliminary albacore landing figures show Oregon and California divided the 1966 commercial landings almost equally--California 18.2 million pounds, Oregon 18.0 million. It was the best season since 1944 for Oregon, the worst since 1947 for California. Washington landings totaled 1.1 million pounds.

The report discloses that Northern California crab fishermen are enjoying a very good year. Over 8 million pounds of high quality crabs have been landed. Good catches are predicted for another month or two. In the San Francisco area, however, the season's catch will be low, a little over 300,000 pounds. These are the grounds that historically produced 3 to 4 million pounds per season.

* * *

TROUT FLOWN TO MOUNTAIN LAKES

Over seven million of California's trout and kokanee salmon fingerlings took to the air in 1966, reports the California Department of Fish and Game (DFG). They were planted in high mountain lakes by DFG's warden-pilots flying twin-engined Beechcraft airplane.

DFG has been air planting more than 800 lakes annually since 1946 with 6 to 7 million fingerlings. They are planted in hard to reach places, where natural reproduction is inadequate to sustain angling pressure. This modern method of planting is a fraction of the old horseback method's expense and stocks scores of lakes never before planted.

Air Dropped Safely

Fingerling trout, less than an ounce per fish, have been air dropped safely from as high as 800 feet, but the average free fall drop is about 250 feet.

DFG pilots logged 155 hours on 104 flights to plant 819 lakes in 1966. Planting is done in the summer, as soon as the ice melts. Some fingerlings reach catchable size in a year; some take 2 years.

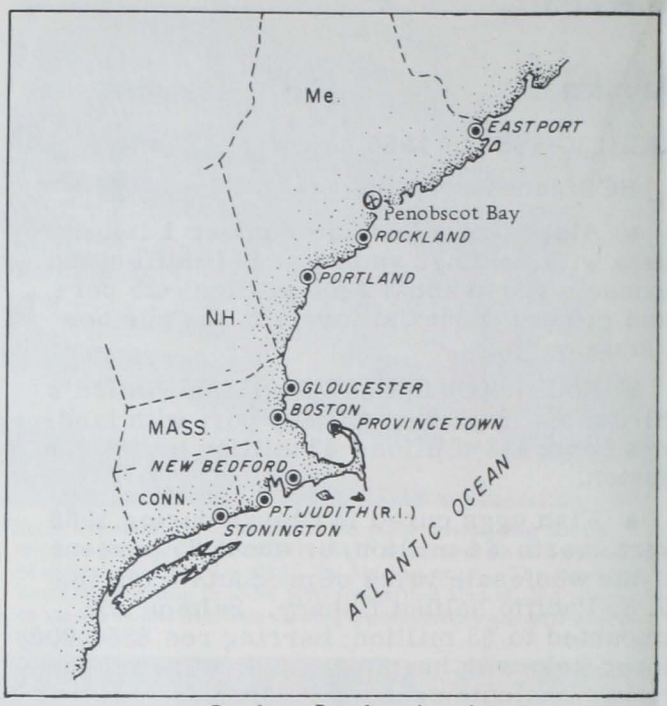
The 1966 plants were: 1,754,145 rainbow trout, 614,132 eastern brook, 4,152,842 kokanee, 75,305 browns, 249,340 Lahonton cutthroat, and 304,400 golden trout.

Maine

U. S. AGENCY ASKS PENOBSCOT BAY AREA TO CUT POLLUTION

The Federal Water Pollution Control Administration (FWPCA) told the Penobscot Bay area of Maine on April 20 in Belfast, Me., to reduce the pollution of shellfish beds by 1970 or face Government penalties. Last year, Senator Edmund S. Muskie of Maine introduced amendments to the Federal Water Pollution Control Act that empower Interior Department to initiate action when substantial economic injury is involved in navigable waters.

Secretary of the Interior Stewart L. Udall called the Conference of Maine and FWPCA officials in Belfast because he found that the discharge of wastes from industries and communities into the bay area have damaged clams and prevented their sale in interstate commerce. FWPCA is Interior's enforcement agency, backed by the Department of Justice.



Penobscot Bay shore (cross).

Maine Closes Valuable Shellfish Beds

A FWPCA report states that pollution impelled the State of Maine to close shellfish beds near Northport, Belfast, Searsport, Stockton Spring, Penobscot, and Castine. These waters have an estimated 96,000 bushels of soft shell clams worth $2-$5 million. Because of water pollution, the last shellfish beds in upper Penobscot Bay were closed last June by Ronald W. Green, State Commissioner of Sea and Shore Fisheries. The bay once was a major source of lobsters and clams.

FWPCA listed Bangor and Brewer as the leading offenders and pinpointed municipal sewage as responsible for 65 percent of the pollution. Its report said bacterial pollution is caused primarily by the sewage. FWPCA listed 2 poultry plants in Belfast as contributing 11 percent of pollution, and industries and municipalities 24 percent. Wastes from pulp and paper companies kill fish, cause offensive odors and discolor waters.

Penobscot Bay stretches seaward 35 miles from the mouth of Penobscot River, one of Maine's 3 major industrial streams; Kennebec and Androscoggin are the others.

Michigan

RELEASES 3 MILLION SALMON
IN GREAT LAKES

About 850,000 young chinook or king salmon and 2.2 million coho (silver) salmon were released by Michigan's Department of Conservation during April and May into several Michigan tributaries of Lake Michigan and one site on Lake Superior.

The chinook plantings were the first for the Great Lakes. Hopes are high that they will be as successful as the coho planting of last spring. The rivers selected for the chinook were: Muskegon and Little Manistee on Lake Michigan, and Big Huron, near Keweenaw Bay, on Lake Superior. When released, the chinook were 3-4 inches long. If they thrive as well as the cohos, they should grow to the 15-40 pound class within their 3-5 year life cycle. About a million chinook eggs were donated by Washington State.

The Department of Conservation planned to release over 2.2 million yearling coho salmon (4-6 inches) in five streams in late April. The outlook for their development is very bright based on the results of last year's initial plantings of 850,000 fish in three streams. An estimated 2,000 cohos were caught last fall. They averaged about three pounds, but one two-foot fish weighed over seven pounds. During the first run last fall, enough egg-bearing females were caught so that state hatcheries now have 22,000 "Great Lakes" coho salmon in the sac-fry stage. The adult coho is smaller than the chinook; those on the West Coast generally are 6 to 12 pounds.

A natural food for both species is the alewife, also normally an ocean fish. The alewife adapted readily to fresh water. Its population currently is exploding in the Great Lakes. Preliminary 1966 alewife catch figures indicated a Lake Michigan total of about 29 million pounds. If the coho and chinook become established in Lake Michigan, the alewife numbers should be reduced substantially. Perhaps then the balance that existed before the lake trout (also an alewife feeder) was virtually eliminated in Lake Michigan by the parasitic sea lamprey would be approached.

North Carolina

BCF'S "OREGON"
AGAIN LOCATES SCALLOP BEDS

In recent months, 10 to 12 boats were landing 5,000 to 6,000 bushels daily from the very productive calico scallop fishery conducted off Morehead City, North Carolina. But in recent weeks the catch dropped to where it was becoming unprofitable to fish. The industry asked BCF to help. The Bureau's exploratory vessel Oregon was sent to work with industry boats in surveying areas at the edges of the beds previously fished.

The survey results were good, and again several commercial vessels are each landing daily 500 to 600 bushels.

The calico scallop resources, which extend from Morhead City to southern Florida, were first outlined through BCF explorations.

Washington

SHIPYARDS ARE BUSY

Shipyards in Tacoma, Seattle, and Blaine, Washington, are filled with the characteristic sounds of shipbuilding. There is enough construction planned to keep their workers busy through 1967. At Tacoma, 6 large tuna seiners are being built. Several smaller ships are being constructed for use in the king crab and purse seine fisheries. Seattle's Pacific Fisherman Shipyard is finishing off the 91-foot Alaska king crabber. Blaine's Berg Shipyard is working on 3 vessels.

The construction under way will add 18 large new vessels to the West Coast fisheries by the end of 1967.

* * *

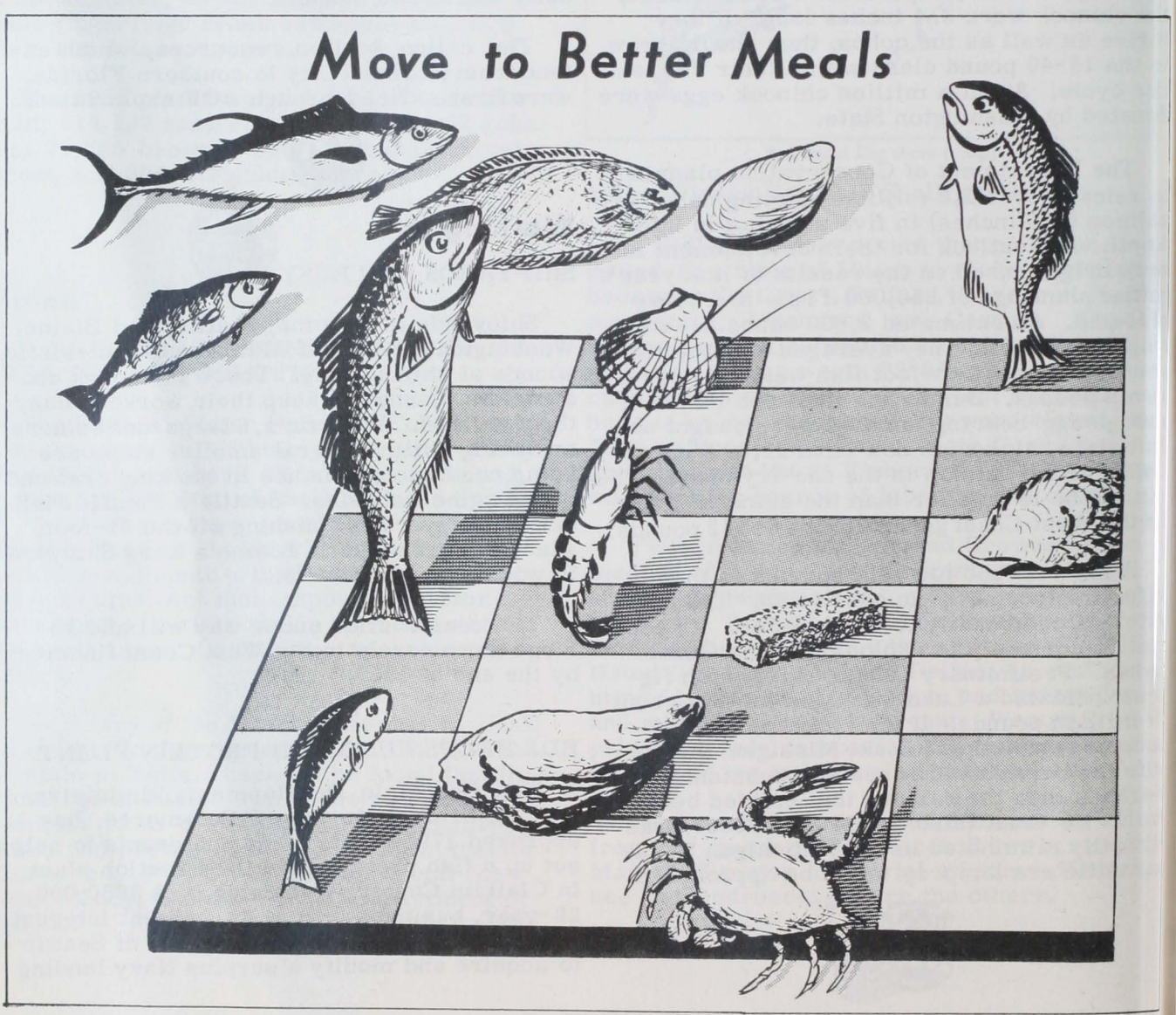
EDA HELPS FUND FISH PROTEIN PLANT

The Economic Development Administration, U. S. Department of Commerce, has approved $791,000 in loans and grants to help set up a fish protein and oil extraction plant in Clallam County, Washington. A $650,000, 20-year, business loan at $4\frac{5}{8}$ percent interest was made to the Cape Flattery Co. of Seattle to acquire and modify a surplus Navy landing

ship, buy machinery and equipment, and erect building and storage facilities.

A $70,500 EDA public works grant and a $70,500 public works loan (20 years at 4 1/8 percent interest) also were made to the Makah Indian Tribe to repair and enlarge a pier at Neah Bay. The pier and adjacent land belong to the Tribe. The pier will serve the Tribe's fishing fleet, other fishermen, charter boats, and the Cape Flattery Co.'s "floating plant."

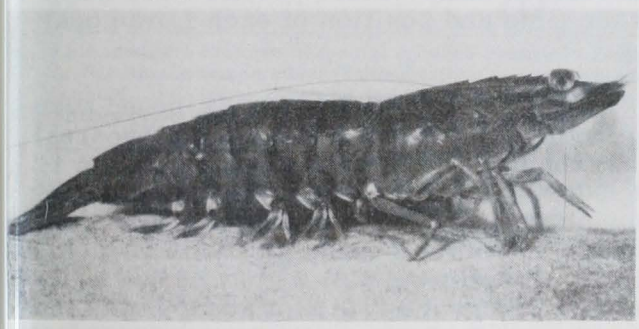
The project also will include an access road and water line to the new plant for fire protection. Total plant cost will be $1 million: $650,000 EDA loan, $50,000 Tribe investment, $100,000 equity capital by Cape Flattery Co., and $200,000 private capital. The plant will convert scrap fish into protein meal and oil. Twenty-four people will be employed and 8 to 10 fishing vessels will be required to supply the raw material when the plant is fully operational. Job priority will be given to Makah tribesmen. EDA also is guaranteeing 90 percent of a $150,000 working capital loan for the Cape Flattery Co.



BUREAU OF COMMERCIAL FISHERIES PROGRAMS

Photograph Pink Shrimp Reaction to Electricity

The "R/V George M. Bowers" returned to Pascagoula, Mississippi, on April 4 from a 21-day cruise (#76) to the Eleuthera Island area, Great Bahama Bank, to study shrimp behavior. The objective was to record with color motion picture film the escape reactions of pink shrimp stimulated by electrodes of the BCF-developed electro-shrimp trawl. Previous attempts to film their behavior patterns in front of the electric trawl on commercial shrimp grounds were unsuccessful because of poor visibility due to high turbidity. The offshore waters off Eleuthera were selected because of water clarity and the similarity between its bottom type and that of commercial shrimp grounds off south Florida.



Adult pink shrimp (Penaeus duorarum).

Live shrimp were transported in circulating seawater tanks on board the vessel to the work area. The shrimp were then placed in bottomless cages, which allowed the animals to burrow into the coralline-sand substrata. After the shrimp burrowed, the cages were removed and the electro-trawl was towed over the area. SCUBA divers riding a sled positioned above the electric trawl and towed by the Bowers recorded the escape reactions of the electrically stimulated shrimp with a 16 mm. movie camera. They obtained 2,000 feet of film sequences.

Burrowed Shrimp Can Be Caught

Shrimp escape reactions appeared to be similar to previous behavior observations collected on Bowers Cruises 59, 60, and 61. The shrimp escaped from the bottom between the first and second electrode of the five-electrode trawl. They jumped several inches above the bottom and exhibited lateral escape reactions. It appeared that such escape behavior would cause burrowed shrimp to be caught as long as the footrope tended bottom.

It also was observed that the electrodes of the electro-shrimp trawl forced large numbers of Portunid crabs out of the substrata and into the trawl.

"Delaware" Locates Yellowfin Tuna

BCF's research vessel M/V Delaware located and fished concentrations of prime-size yellowfin tuna in the Gulf Stream area of the Northwestern Atlantic during 3 weeks of long-line fishing explorations (Cruise 67-2, March 10-April 5, 1967). The U. S. Naval Oceanographic Office lent technical and tactical support to determine optimum thermal environment conditions for experimental fishing (see Fig. 3). Previous investigations in this area noted good yellowfin tuna catches after mid-April; results of cruise 67-2 extend the seasonal abundance potential of the species by one month.

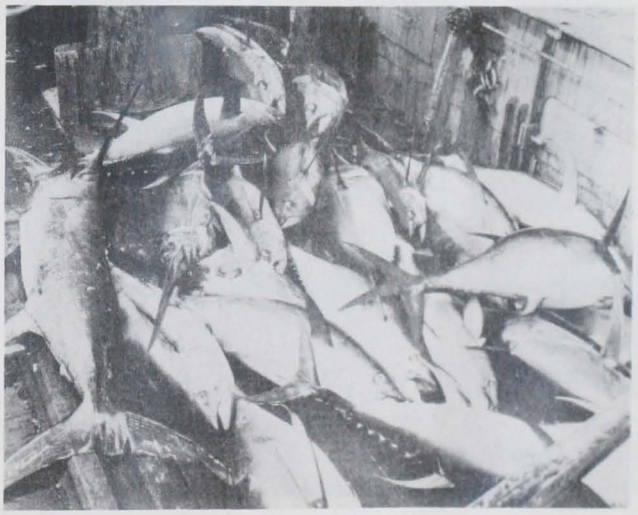


Fig. 1 - Yellowfin, bluefin tuna and swordfish on deck of M/V Delaware were part of a 2-ton exploratory longline catch, March 15, 1967.

Major objectives of the cruise: (1) locate tuna and swordfish concentrations based on analysis of the thermal environment structure, (2) survey seasonal distribution and abundance of tunas and swordfish in Northwestern Atlantic, (3) demonstrate availability of bluefin tuna concentrations to commercial-type longline operations, (4) evaluate applica-

tion of an expendable bathythermograph (XBT) system to obtain layer depth data for fisheries and environmental research, and (5) field test an experimental longline branchline detaching system.

Gear Used: Fishing gear consisted of 165-fathom units of longline with 10 branchlines attached at 15-fathom intervals. Each 10-hook unit was buoyed from the surface with a 5-fathom line. Squid and herring baits were alternately used on every other unit.

Experimental "auto-clips" replaced spring-type clips used to attach branchlines to the mainline. They were automatically released by a prototype detaching device at the rail (see Fig. 2). Adjunct equipment included a marine radiofacsimile recorder, an XBT system, and 2 surface-temperature recording systems.

Fig. 2 - Experimental "auto-clips" connecting branchlines to the mainline were released by a prototype detaching device. When unattended, the detached clips were caught by the semicircular steel rake shown below the detaching mechanism.

Methods of Operation: The approximate geographic position of each fishing station was selected from analyses of synoptic sea-surface temperature and sonic-layer depth charts received daily from Fleet Weather Facility, Norfolk, Virginia, via radiofacsimile. Additional synoptic sea-surface temperature data were received from special radiofacsimile charts of ASWEPS (Antisubmarine Warfare Environmental Prediction Systems) aircraft overflights in the operations area (see Fig. 3). The aircraft used infrared radiation measurement equipment to obtain surface temperature readings for determining positions of strong horizontal gradients. The validity of these data was checked--and the exact position of each station was determined--by analyses of actual sea-surface temperature observations (recording thermographs) and subsurface temperature profiles (XBTs) taken as the vessel moved through the selected area. With the exception of one station (day set at Station 3), longline gear was set after midnight and hauled after sunrise to permit fishing during dark and light hours of the day. The effect of current on the gear (drift) was measured by plots of Loran bearings on the ends of the longline set at time of setout and haulback. XBT recordings of the subsurface temperature profile were taken at the time and position of each Loran bearing.

Results: An abundance of 82-pound average size yellowfin tuna (Thunnus albacares) was found at all but one station. (Station 1: 36°36' N. Lat., 72°07' W. Long.) Catch rates ranged from 1.5 to 5.5 fish per 100 hooks. Best catches were associated with surface temperatures from 69°-73° F. over a well-defined thermocline starting at depths of 15 to 30 fathoms. In these cases, Stations 2 (36°56' N. Lat., 70°44' W. Long.) and 5 (37°44' N. Lat., 69°11' W. Long.), the gear was positioned on the warm side of the north wall of the Gulf Stream in very swift current (set No. 2 drifted northeast at 4.1 knots, and set No. 3 drifted east at 4.2 knots). Similar size yellowfin have been found in this area in abundance as early as mid-April. A year ago, mid-March 1966, a few 35-pound average fish were taken in this area under similar environmental conditions. Catches from this recent cruise, however, mark the earliest known availability of yellowfin tuna abundance in the Northwestern Atlantic.

No concentrations of bluefin tuna (Thunnus thynnus) were located, nor was a thermal environment encountered similar to that which yielded heavy catches a year ago. The scattered catch of 8 bluefin consisted of 327-pound average fish, 50 pounds heavier than the average size in this area a year ago. It is further indication that this group of fish has frequented the region in the late winter and early spring season for 4 consecutive years.

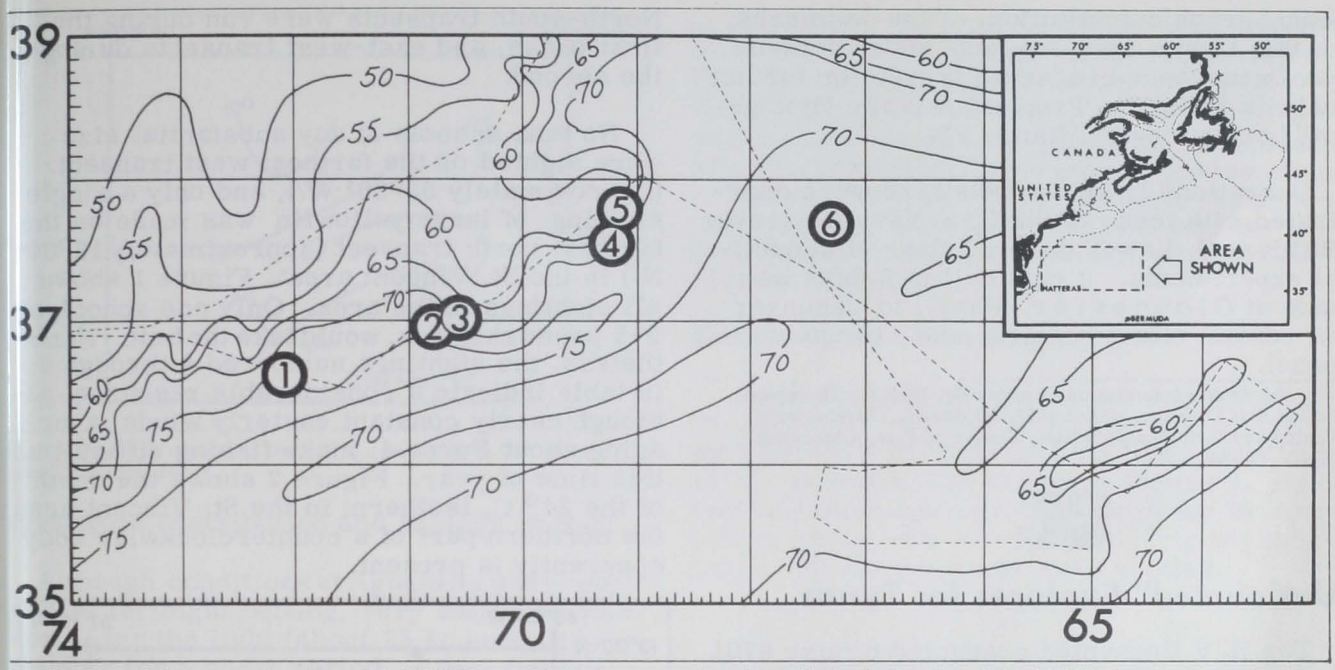


Fig. 3 - A modified example of special ASWEPS overflight charts received by radiofacsimile aboard the M/V Delaware during Cruise 67-2. Sea surface temperatures (Fahrenheit) on this chart are primarily interpreted from infrared radiation readings during the flight of March 28, 1967 (track shown by dashed line). Starting position of the Delaware's six longline stations are numbered. Observed temperatures from the vessel on March 28 and 29 (Stations 3 and 4) agree closely with the aircraft data.

Bigeye tuna (Thunnus obesus) were found at 3 stations and were associated with the same environmental structures as yellowfin tuna. Average weight of bigeye taken at Stations 2 and 5 (see positions on preceding page) was 109 pounds. A single, small, bigeye weighing 20 pounds was taken at Station 3 (37°40' N. Lat., 67°20' W. Long.). The only albacore (Thunnus alalunga) caught during the cruise was found at Station 4 (37°34' N. Lat., 69°13' W. Long.) and weighed 52 pounds.

Catches of swordfish (Xiphias gladius) were minimal in the environment fished. The 2 stations of capture also had the highest catches of yellowfin tuna. With the exception of one 210-pound male at Station 2, all swordfish were under 100 pounds.

Heavy shark catches were encountered at 4 stations. Shark mutilation to tunas and swordfish was not significant, although 100 hooks and considerable time were lost due to frequent snarls and parting of gear.

New Expendable XBT Tested

A newly installed expendable bathythermograph system (XBT) was tested to obtain rapid and accurate profiles of vertical thermal structure. Disregarding 3 human errors, 98.8 percent of 85 XBT operations were successful. Immediate availability of vertical temperature data from this system, combined with surface temperature data from radiofacsimile charts and recording thermographs, facilitated maneuvers of the vessel into desired thermal environments for successful fishing. Sixty-two XBTs were coded into BATHY messages and transmitted to ASWEPS on shore.

Full-scale field trials were conducted using experimental branchline "auto-clips" and a prototype rail detaching device. With very few exceptions, the only problems encountered were from branchlines snarled on the mainline. Manual operation of the clips in these cases cleared the gear as quickly as had been accomplished in previous operations. The chief advantage of the system, noted from these trials, was the continuous hauling speed attained, and the consequent easing of ship handling in high winds and moderate to rough seas.

In cooperation with other agencies, 43 tunas and 149 sharks were marked and released using dart tags. Studies on metabolic rates and heat conservation systems in live yellowfin and bigeye tunas were carried out by cooperating scientists from the Woods Hole

Oceanographic Institution. Tuna stomachs, gonads, tissue samples, and several whole specimens were preserved frozen for further analysis at BCF's Tropical Atlantic Biological Laboratory in Miami, Fla.

Operations from the Delaware were coordinated with those of the U. S. Navy Destroyer "William C. Lawe" during 5 days of acoustical experiments. A port call of 5 days was made at Gloucester, Mass., to rebunker the vessel, effect repairs, and change personnel.

Note: For further information, contact Dr. John R. Thompson, Acting Base Director, or Ernest D. McRae Jr., Exploratory Fishing and Gear Research Base, State Fish Pier, Gloucester, Mass., 01930.

"Undaunted" Explores for Tunas

The R/V Undaunted conducted Cruise 6701 through the Southern Lesser Antilles (St. Vincent area), north coast of Venezuela, southern Bahamas, Feb. 2-Mar. 7.

Its primary missions were to investigate distribution and biology of surface tunas and other pelagic predators and measure physical and biological environment--and to investigate distribution and biology of fishes suitable for use as live bait for tuna fishing. A secondary mission was to investigate physical oceanography of the area on the Atlantic side of the Antillean Arc from Martinique to Grenada.

The scientists conducted a fishery-oceanography survey with scouting for tunas during daylight hours in the St. Vincent Island area February 12-28. It was interrupted by a stop to make bait February 18-19, and a physical oceanography survey outside the Antilles Arc February 19-February 23. North-south transects were run during the first phase, and east-west transects during the second.

No tuna schools of any substantial size were sighted on the farthest west transect (approximately 63°30' W.), and only a single sighting of large yellowfin was made on the farthest north transect (approximately 13°00' N.) in the St. Vincent area. Figure 1 shows all sightings in the area. Only one school, of 2-3 pound skipjack, would take the bait. Nonetheless, the sightings numbered 4 through 9 in table indicate a considerable resource, although nearly constant easterly winds, averaging about Force 4, make fishing difficult at this time of year. Figure 2 shows the depth of the 24° C. isotherm in the St. Vincent area; the northern part of a counterclockwise eddy apparently is present.

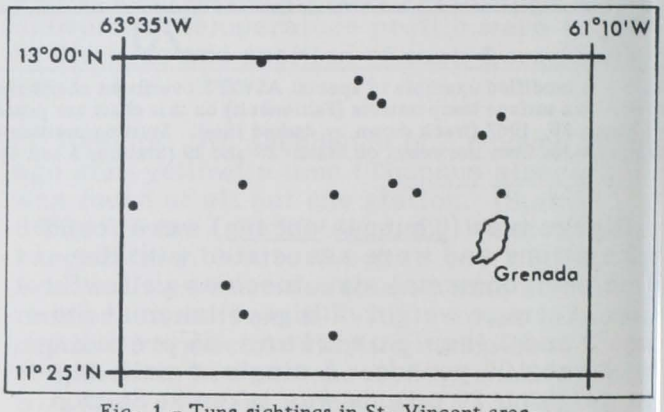


Fig. 1 - Tuna sightings in St. Vincent area.

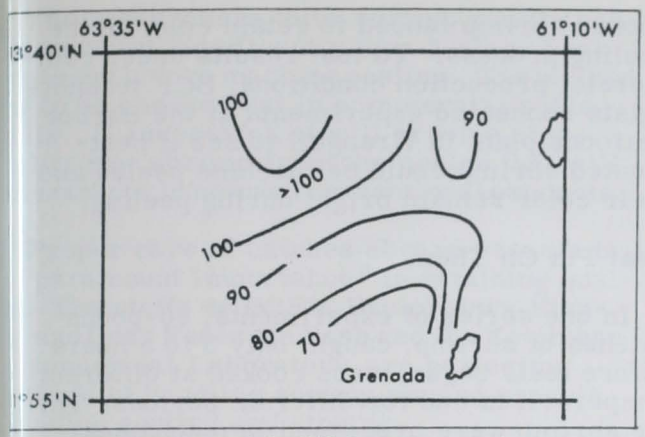
Several sightings of tuna schools in the southern Bahama Islands and northwest of Mona Passage (Table, Nos. 1-3 and 10) suggest a resource at this season. These sightings were made while steaming and were not part of an organized survey. On the basis of sightings Nos. 2 and 3, a short fishery-oceanography survey was run between Caicos Bank and Great Inagua Island (March 3-5) but no sightings were made.

Sightings of Substantial Schools (Estimated at 5 Tons or More) of Tuna, UN 6701.

No.	Position (N. Lat.)	Position (W. Long.)	Date	Time (GMT)	Species	Estimated No. Tons	Remarks
1.	24-17	75-11	Feb. 4	2100	Yellowfin+blackfin	10-15	2 blackfin on jig1/
2.	21-21	72-33	Feb. 5	1845	Yellowfin+skipjack	4-5	1 yellowfin, 1 skipjack on jig1/
3.	21-05	72-13	Feb. 5	2020	Skipjack+blackfin	5	4 skipjack, 16 blackfin on jig1/
4.	12-24	63-00	Feb. 15	1402	Yellowfin	50	None caught1/
5.	11-58	63-07	Feb. 15	1905	Skipjack	100	None caught1/
6.	12-23	62-27	Feb. 24	1430	Yellowfin	100+	15-50 lb. fish; would not take bait.
7.	12-24	62-13	Feb. 24	1550	Skipjack	60-70	1 on jig; would not take bait.
8.	12-21	62-05	Feb. 24	1818	Yellowfin+skipjack	20+	Would not take bait.
9.	12-44	61-40	Feb. 27	2005	Yellowfin	30-40	80-lb. fish; would not take bait.
10.	18-57	68-07	Mar. 2	1550	Skipjack	20	Caught 155 with bait; 1 on jig.

1/No bait aboard.

Note: The only catch not included in this table was at 12-53, 62-25, on February 25 at 1830 GMT, when 56 small skipjack were caught on bait from an estimated 1-ton school.

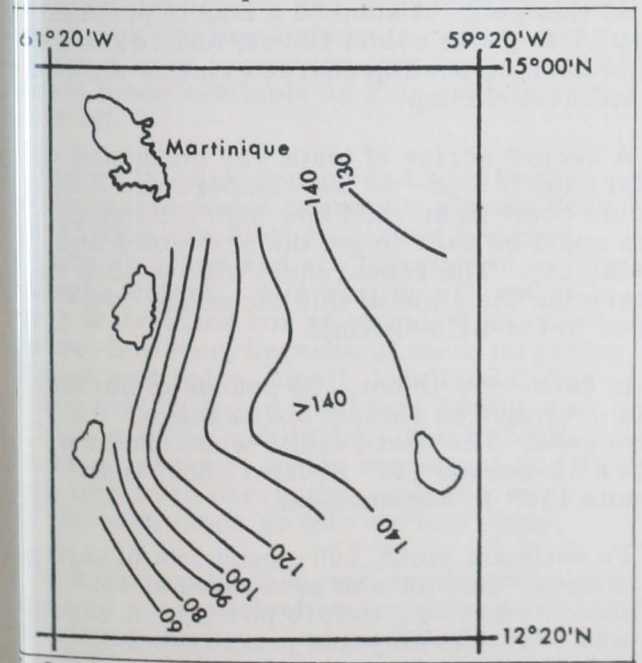


g. 2 - Depth in meters of the 24° C. isotherm in St. Vincent rea, February 24-27.

vestigate Distribution and Biology of Bait

Although conditions at Aguadilla were near- ideal for night baiting, very little bait was en under the light (about 25 scoops), and is only for a short period. Local fisher- en at Isla Lobos and Punta Arenas (Vene- ela), where bait was purchased on previous uises, said they had seen none in the area r several days.

Bait was finally made at the U. S. Naval ation, Trinidad. A daylight attempt was successful, but night baiting while tied to dock was carried out without difficulty. o hundred scoops were taken in two sets;



. 3 - Depth in meters of the 24° C. isotherm between Barba- s and the Antilles.

at least 1,000 more scoops were still under the light when operations were terminated. This fish was an anchovy (close to Anchoviella eurystole) which may be a previously undescribed species of Engraulis. Tropical Atlantic Biological Laboratory's Systematics of Fishes Program will investigate the problem further. Survival of the bait was very good; about 70 scoops were still alive on arrival in Miami.

Survey Physical Oceanography

A physical oceanography survey between the Antillean Arc and Barbados was carried out February 19-February 23. Depths of the 24° C. isotherm are shown in Figure 3. Operations were continuous through the 24 hours; tuna scouting was carried on during daylight hours. No tuna schools were spotted.

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The Undaunted sailed on its present cruise with special equipment: 25 bicycles and 8,000 used schoolbooks for the children of Cartagena, Colombia. The Colombian city was adopted as its "sister city" by Coral Gables, Florida, which is active in the "People-to-People" organization. The bikes and books were donated by the people of Miami.

Juneau Reports on Alaskan Shrimp

BCF's Juneau, Alaska, office has issued a newsletter devoted to the shrimp industry and designed to help Alaska fishermen and processors. It reviews the history of the fishery, growth of foreign activity off Alaska, and discusses "our shrimp programs in processing, locating stocks, gear development, and biological research."

The Juneau staff believes that the shrimp industry seems "ripe for an abrupt expansion." The apparent leveling off of the king crab fishing near Kodiak has stimulated interest in shrimp. It is likely that at least 20 shrimp vessels will be operating in the Kodiak area alone before the end of 1967; only 3 trawlers fished shrimp in 1965. Some estimates of shrimp potential are as high as 400 million pounds annually--over twice that for king crab. In 1966, about 25 million pounds of shrimp were landed; Kodiak was the leading port. The newsletter says: "Though we can only specu-

late, the total catches by Alaska fishermen during this current year could exceed 40 million pounds."

STRIVE TO IMPROVE QUALITY OF PROCESSED SHRIMP

Despite large resources available and high prices per pound, the shrimp industry has remained relatively underdeveloped. Why? BCF research and consultation with processors indicate that a big problem is the inferior quality of machine-peeled shrimp.

The larger pandalid species caught in the Gulf of Alaska: left, coon-stripe shrimp; right, spot shrimp; bottom, side-stripe shrimp.

The processors know that the best way to produce a top-quality product is to start with fresh, high-quality, raw shrimp. But they find that too-fresh shrimp cannot be peeled economically by machine. The shrimp break on the machine, and more labor is needed to inspect and discard partially peeled shrimp. Peeling efficiency can be improved and costs cut by holding shrimp in ice for at least 2 days before peeling. But this also creates problems because holding shrimp reduces their quality substantially. Lost are the important contributors to the original high quality: nonprotein nitrogen, sugars, free amino acids, and nucleotides. As a result, the color, flavor, odor, and texture of the finished product suffer. And pale-colored shrimp meet buyer resistance.

The first challenge to technology is: Find a technique to condition fresh shrimp for machine peeling as a substitute for holding them in ice. Experiments at BCF's Technological Laboratory at Ketchikan, Alaska, showed that cooked shrimp tended to retain color in the peeling process. To test results under commercial production conditions, BCF technologists conducted experiments at the Harbor Seafoods plant in Wrangell to see if heat-treated shrimp could be machine peeled and their color remain bright during peeling.

Heat Put On Them

In one series of experiments, 60-pound batches of shrimp, caught only 3 to 5 hours before tests began, were cooked at different temperatures and for different periods. Then, the shrimp were processed in mechanical peelers. Higher temperatures improved color but resulted in poorer peeling; lower temperatures improved peeling but little color was retained. Two-cook sequences then were tested: 2 minutes at 110° F. to improve peeling, followed by 15 seconds at 150° F. to improve color. This double cook worked well: both color and peeling were good. The shrimp meats were canned for later color tests.

From a practical approach, the best the researchers could hope for would be to process shrimp about 24 hours after they are caught. So they allowed some shrimp to set overnight without ice at about 35° F. Then one lot was cooked 3 minutes at 110° F. and resulted in fair color and excellent peeling.

At this point, it seemed a double precook would improve color, flavor, and texture while keeping peeling characteristics similar to ice-held shrimp.

A second series of tests was conducted to determine if high- or low-temperature cook should come first--and how high a temperature could be used to get the best color and peelability. The researchers also needed to determine the yield of this technique compared to ice-held shrimp.

In each experiment, 100 pounds of shrimp held overnight in shrimp boxes without ice were used. The best results were obtained with a 15-second 165° F. first cook, and a 3-minute 110° F. second cook.

To estimate yield, 500-pound lots of shrimp were used. One lot was precooked at 165° F., followed by 110° F., before peeling. A second lot was iced normally and processed 2 days later. The yields were nearly the same, although the yield picture was complicated by formation of a gel in cans of precooked shrimp.

The researchers think shrimp quality can be improved significantly by a 2-stage heat treatment before machine peeling. The method was to be checked out in commercial scale trials. If successful, it will provide high-quality raw shrimp from the peeler that will win markets in new and conventional products.

Proper care of catches aboard vessels is of "paramount importance" in retaining quality. The staffs of BCF's Exploratory Fishing and Gear Research Base and the Ketchikan Technological Laboratory are perfecting methods of handling shrimp aboard vessels, including sorting and storing.

LOCATING AND HARVESTING SHRIMP

BCF's Exploratory Fishing and Gear Research (EF&GR) Base is headquartered in Juneau. Its staff investigates the State's marine waters and offshore waters. It defines the seasonal abundance and distribution of various fishery resources, and develops improved or new devices or methods for harvesting. BCF's "John R. Manning" is used and various fishing craft are chartered when needed.

The EF&GR shrimp program has dual purpose: to help develop a spot-shrimp fishery suitable for smaller vessels in order to alleviate the current seasonal unemployment of salmon fishermen; and to promote expansion of pink-shrimp fishery in central and western Alaska to provide jobs for men and vessels made available as king crab fishery levels off.

Currently, pink shrimp and spot shrimp interest commercial operators a great deal. Pink shrimp are most important because they are abundant and are distributed widely in Alaska waters. Spot shrimp are not as widely distributed nor as abundant as other species; however, because of their large size and high unit value, small, localized fisheries are developing in Southeast Alaska and Kachemak Bay (Cook Inlet). The EF&GR Base staff seeks to locate resources and develop improved harvesting methods; over half the base funds go into shrimp study.

Pink shrimp studies now seek to develop improved gear. Selective trawls to sort trash from catches--and modified trawls to permit fishing for various size-groups and/or species--have been constructed and will be tested this spring.

The Juneau staff believes there is need to reassess soon the shrimp stocks of the Shumagin Islands. Extensive exploratory trawling there in 1964 revealed the greatest concentrations of pinks of any area during a 4-year study. This was attested by foreign fleets operating there continuously since spring 1965. "There is no doubt that this fishing has had some effect on the abundance of these shrimp stocks." The Alaska fishing industry--presently faced with reduced catches of king crab in the Kodiak area--is turning to the shrimp resource. The Shumagin reassessment would provide industry with current information. It is the logical area for U. S. fishery expansion.

Spot shrimp or "prawns" have been part of the personal-use fishery for many years in Southeast Alaska, but only occasionally have they been taken commercially. During fall 1965, BCF began to investigate the resource to develop an off-season fishery for idle small boats of gillnet, troll, seine, and halibut fisheries. Gear development and exploratory fishing were equally important during this first year's study. As investigations continue, major emphasis will be on exploratory fishing but modification and refinement of gear and fishing methods will continue to receive attention.

As a result of BCF's preliminary work, a small pot fishery has started in Southeast Alaska, and limited numbers of these large shrimp are being marketed in the "lower 48" (the U. S.). Thus far, the fishery has used pots only. However, EF&GR recently constructed several small (35 ft.), modified, beam trawls that will be tested in late spring in areas of known spot-shrimp abundance. These trawls are designed for small boats (30 to 35 ft.), can be handled by one man, and are relatively inexpensive to build. Their compact size is easily controllable and they may prove entirely suitable for the restricted Southeast Alaska grounds where short tows and abrupt turns would effectively prohibit the use of more cumbersome otter trawls.

Exploratory fishing operations are being resumed this spring and will continue next fall and winter. The goal of spot-shrimp surveys is to assess the potential of all waters inside Southeast Alaska, using both pots and trawls.

BIOLOGICAL RESEARCH

Biological research on commercial species of Alaskan shrimp is an important part of the BCF program. Because of imminent expansion of fishing effort, the staff now is studying life histories, behavior, and means of determining abundance of shrimp stocks. This information will assist industry and management--and guarantee the resource's future.

One primary goal is to learn the life histories of the 4 commercially important Alaska species: sidestripe, pink, spot, and coonstripe. For all 4 species, generally, the eggs hatch in the spring, the young shrimp begin life as larvae, which float and swim about in the plankton while molting and changing shape several times. In their first summer, they change into adults; for the remainder of their life they live on or near the ocean bottom. All shrimp begin life as males and breed as males for 1 or 2 years. Then, they change into females and reproduce at least one time. They spawn in the fall. The female carries the fertilized eggs on the underside of her abdomen until spring, when the eggs hatch.

BCF has research station for shellfish investigations at Kasitsna Bay to study shrimp and king crab in central Alaska. Most field work involves early life and adult stages. The 38-foot "R/V Sablefish" and most research sampling equipment and supplies are there.

Emphasis is placed on learning to identify the larval stages of the four species. This is done by rearing known species in the lab and using the larvae as examples to determine the species of larvae captured during sampling at Kasitsna Bay and Auke Bay. It is important to be able to identify larval forms of each species and understand their later life histories--because, when the commercial fishery begins to harvest the shrimp, BCF will be asked to predict population abundance 1 and 2 years in advance. If the researchers know the abundance of juvenile forms, and their rate of growth, such predictions may be possible.

The 4-year-old study of adult shrimp has had several objectives. A marking technique has been developed for staining Alaska shrimp. These techniques will be put into practice when a suitable method of identifying marked animals in commercial landings is developed. With the present method of fishing and processing, individual marked shrimp cannot be detected easily. A good idea of the percentage of marked animals captured is needed to calculate abundance of various stocks. The researchers also are studying changes in abundance of adult shrimp in several areas in Kachemak Bay. Results indicate seasonal migrations will affect the commercial harvest from month to month. When these migrations are understood, the scientists will be able to advise fishermen of times and areas where heavy concentrations are likely to be found.

The adult-shrimp study also involves research on environment, food habits, and activities of shrimp. In shallow waters, divers equipped with SCUBA have observed the activities of shrimp in their natural environment. By using surface-to-bottom strings of pots, the scientists have learned that shrimp move off the bottom during nighttime hours and stratify by size groups--smaller shrimp nearer the surface. Bottom trawling experiments have shown that fewer but larger shrimp could be captured by night fishing. Basic information on shrimp behavior provided by BCF biologists is used by EF&GR staff to perfect fishing techniques.

The Alaska Department of Fish and Game is studying the life history of shrimp of Southeastern Alaska. This work is supported by Federal funds. Headquartered at Wrangell, this project provides data on species composition, size, and sex composition of the commercial catch. The observations are supplemented by year-round sampling with small-mesh otter trawls to learn distribution, abundance, and growth rates of juveniles that escape commercial gear.

Stanford Lab Cuts Cost of Ocean Data

On March 13, 1967, the "SS Californian" of the Matson Navigation Co. began using radio teletype (RATT) to transmit automatically digitized temperature-depth data to shore. It was the most recent development in the pilot project of BCF's Biological Laboratory in Stanford, Calif., to demonstrate the feasibility of obtaining ocean monitoring data at low cost by using expendable bathythermograph (XBT) systems aboard merchant and fishing vessels.

The Stanford lab is analyzing the data for seasonal variation of temperature and flow in the California Current. Such studies are essential to BCF's efforts to develop fisheries forecasting capability. The project is an outstanding example of industry cooperation with Government--in this case, Matson with BCF and the Navy. The XBT system was placed aboard Matson bulk cargo and container vessel SS Californian. About twice a month since June 1966, the ship's personnel have made observations at approximately 100 nautical mile intervals along the great circle track from Honolulu to San Francisco. The subsurface temperature observations can be obtained without slowing the ship's speed, which is necessary unless the expendable instrumentation is used.

Rapid Transmission of Data to Shore

Prompt relay of observed data to shore plays an essential role in environmental monitoring to provide weather, oceanic, and fishing advisories by radio to fishing vessels. Radio station WWD, licensed to BCF Tuna Resources Laboratory and operated with cooperation of Scripps Institution of Oceanography, helps develop communication capabilities and receives RATT transmissions. WWD is a prototype station for a network to provide an ocean data service. It is rapidly improving its capabilities for scientific communication service to fishing vessels, research ships, and merchant ships that cooperate in providing scientific data.

The project is a prime example of Government-industry cooperation to save much money. The idea of using ships of opportunity was generated at the Stanford lab. But the project could not have got underway without the expendable instrumentation developed by Sippican Corporation, the platform and cooperative personnel to make observations provided by Matson, financial support from the Oceanometrics Program of the Navy Electronics Laboratory, and encouragement and technical assistance from the Fleet Numerical Weather Facility.

To illustrate the relative economy of using ships of opportunity, it is estimated that annual operating costs to obtain 4 sections per month, using the SS Californian, would be about $40,000. This excludes costs of communication but includes preliminary reduction of data. If it were necessary to charter a suitable, inexpensive, but slower, vessel to collect equivalent data, the annual operating cost would be about $500,000.

BCF Aquanauts Train for SeaLab III

BCF will participate in SeaLab III, a Navy experiment designed to enable man to learn to live and work on the ocean floor for extended periods. SeaLab III is scheduled for the winter of 1967 and will be the third in a series of experiments in undersea living of the Navy's Man-in-the-Sea Program. Five teams of Navy divers and civilian scientists will operate from a submerged laboratory at 430 feet off Southern California. They will perform engineering and scientific work over a 60-day period.

Three BCF scientists are participating: Richard A. Waller, Division of Biological Research, the BCF Project Chief; Richard A. Cooper, Boothbay Harbor Biological Laboratory; and James M. Scott, La Jolla Tuna Resources Laboratory.

Some biological studies to be carried out during the experiment are: animal transplants, animal tagging studies, observations on animal behavior, environmental monitoring, and time-series biological studies with elapsed-time cameras.

Will Use Artificial Breathing Gases

During SeaLab III, the undersea laboratory will be pressurized to the prevailing depth of about 430 feet so that personnel will have free access to the outside environment. At this high pressure, it will be necessary to breathe a synthetic gas mixture of oxygen and helium because compressed air cannot be used by divers below about 300 feet. The concept of divers using artificial breathing gases under extreme high pressures is a recent development; it is called "saturated diving". Before the technique was worked out, the depth and duration of dives were critically limited, and undersea living experiments were not feasible.

In one phase of the training requirements, Richard Waller completed an 8-day simulated dive in a pressure chamber at the Navy's Experimental Diving Unit in Washington, D. C. He was subjected to pressures up to 215 lbs. psi (equipment to water pressure at 450 feet)

and artificial breathing mixtures of helium and oxygen. Richard Cooper completed the 450-foot test in April. Michael Scott will undertake this phase of the training during the summer. The simulated saturation dives are required of all "aquanauts" to determine their tolerance of the high pressures and synthetic breathing gases to be used in SeaLab III.

Retail Clinics Help Industry

BCF marketing personnel are working to make the fishing industry more competitive with other industries by improving merchandising practices. They are conducting seafood retail merchandising clinics on a pilot basis for meat cutters and seafood countermen in selected areas.

The clinics are two 3-hour sessions that emphasize purchasing, handling and thawing techniques, cutting, display ideas, and the basic economics of retailing and pricing seafoods.

Associated Grocers reported to BCF that in its 8 stores in the area of Olympia, Washington, sales of fresh fish had averaged 300 pounds per week per store for 3 years. After the new merchandising program was started, sales soared to a 1,100-pound average.

To Sell Fishery Products Retail at Fairs

BCF is adding yet another approach to its promotion of foreign trade. When it introduces new fishery products into European markets, it will hire a professional U. S. food merchandiser to sell the products at retail prices at the fair sites. To help defray the cost of the operation, 25 percent of the receipts will be taken from the retail sale of each product; the remainder will be given to the participating U. S. firms.

The new approach will be tried at 3 fairs in fall 1967--Dublin, Ireland; Leeds, England; and Dijon, France. Only products new to these areas will be eligible.

Fur Seal Prices Mostly Lower

At the Fouke Fur Co.'s spring auction in Greenville, S. C., April 6-7, 20,700 Alaska fur sealskins were sold for the account of the U. S. Prices for blacks, Kitovis, and Lakodas declined from the record high sale of a year earlier and the fall sale of October 1966.

Blacks averaged about $90, down 20 percent; Kitovis averaged about $77, down 11.5 percent; and Mataras $93, unchanged. Natural Lakoda skins were virtually unchanged at average $67; dyed Lakodas averaged about $27, down 35 percent from last fall.

BCF Films in "Oscar" Test

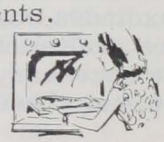
The U. S. Information Agency has selected 13 Government films, including BCF's "Flavor of Maine" and "Watermen of Chesapeake," to represent the U. S. in competition for the CINE (Council on International Nontheatrical Events) Golden Eagle Award. This is the first time Government-produced films have been permitted in the competition.

CINE is a voluntary, nonprofit organization set up to coordinate the selection of U. S. nontheatrical, short subject, and TV documentaries for competition in overseas film festivals.

New Book's Message: "Let's Cook Fish"

BCF has produced a 52-page color publication--"Let's Cook Fish"--to serve as a complete guide to basic fish cookery. It includes information on buying, handling, storing, and preparing fish. It seeks to arouse more interest in fish as an everyday food by emphasizing variety, economy, and nutritional value.

"Let's Cook Fish" can be bought from the Superintendent of Documents, Washington, D. C., for 60 cents.



Crowther and McHugh Named Director and Deputy Director

The Department of the Interior has named H. E. Crowther director and Dr. J. L. McHugh deputy director of BCF. They had been serving in acting capacities. Mr. Crowther was deputy director before becoming acting director Nov. 1, 1966. Dr. McHugh was assistant director for biological research until Nov. 3, 1966, when he was appointed acting deputy director.

"Both men have 30 years' experience in fishery research and administration and are eminently qualified to head the Bureau," Secretary of the Interior Stewart L. Udall said at the swearing-in ceremony May 2.

Harold E. Crowther

Born in Laurel, Maryland, Mr. Crowther received his BA in 1933 and his MS in 1935 from the University of Maryland. In 1936, he was employed by a private company to conduct research in fishery products. In 1943, he joined the Marine Corps and served as an officer in the South Pacific. From 1946 to 1949, and from 1953 to 1956, he was employed in the fishing industry in Massachusetts. At first, he was a research scientist, and later an executive. In 1949, he entered Government service. For 4 years he served as Chief, Exploratory Fishing Section, and Chief, Technology Section, Fish and Wildlife Service. He came back to the Fish and Wildlife Service in April 1956 as BCF's coordinator of the Saltonstall-Kennedy Program. In November 1957, he was promoted to Chief, Division of Industrial Research and Services; in June 1961, he became Assistant Director (now Deputy Director).

In 1961, President Eisenhower appointed him a U. S. Commissioner of the International Pacific Halibut Commission and he continues to serve in that capacity. He has served too in international fisheries conferences.

For 8 years before coming to BCF in 1959, Dr. McHugh was Director of the Virginia Fisheries Laboratory and Professor of Marine Biology at the College of William and Mary, Williamsburg, Va.

Dr. J. L. McHugh

He was born in Vancouver, B. C., and received his bachelor's and master's degrees from the University of British Columbia. He served the Biological Staff of Canada's Fisheries Research Board from 1938 until 1941. During World War II, he was an infantry officer with the Canadian Army in England and France.

After earning his doctor of philosophy degree at the University of California's Scripps Institution of Oceanography, Dr. McHugh moved to Virginia to head the State's marine fishery program at Gloucester Point. He became a United States citizen in 1958.

He is the author of 70 publications on fishery biology, ichthyology, and biological oceanography, a member of scientific societies, and a trustee of the International Oceanographic Foundation. He has been a member of many United States delegations to international fishery meetings in Europe, Latin America, and the Far East.

Develop Fish Food in Ice Cubes

Biologists of BCF's Ann Arbor (Michigan) laboratory have developed a unique method of feeding plankton to alewives, smelt, and coregonids (whitefish) in experimental aquaria. They freeze wild zooplankton in small ice cubes. When the cubes are placed in a tank, they float and gradually melt--releasing the animals. As the animals drift toward the bottom, they are taken readily by the fish.