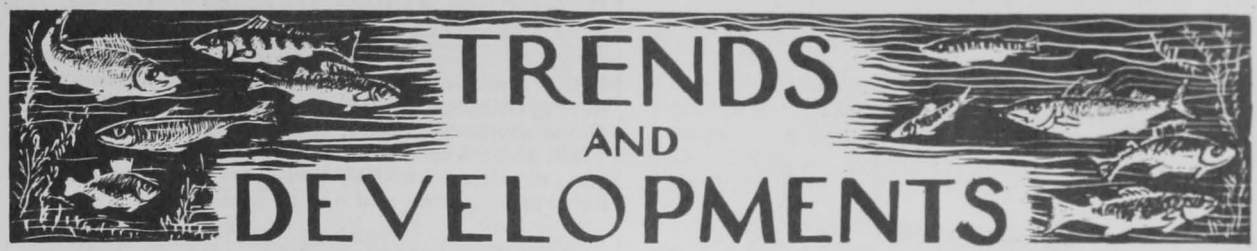


American Samoa

TUNA LANDINGS, JANUARY-APRIL 1960:

Tuna landings by Japanese and South Korean fishing vessels for the United States-owned tuna cannery in American Samoa amounted to 1,475,000 pounds in March and 2,094,000 pounds in April 1960. The January-April 1960 total of 9,150,000 pounds was up about 10.7 percent from the 8,267,000 pounds landed in the same period of 1959.

American Samoa Tuna Landings, March-April 1960 with Comparisons

Species	March		April		Jan.-Apr.	
	1960	1959	1960	1959	1960	1959
	(1,000 Lbs.)					
Albacore	1,176	1,357	1,722	1,793	7,702	6,277
Yellowfin	247	392	254	436	1,123	1,635
Big-eyed	52	97	112	142	315	355
Skipjack	1/	-	6	1/	10	1/
Total	1,475	1,846	2,094	2,371	9,150	8,267

1/ Less than 500 pounds.
Note: Majority of the tuna was landed by Japanese long-line vessels; some was landed by South Korean and Samoan long-line vessels.

California

ATTEMPT BEING MADE TO RESTORE SOUTHERN CALIFORNIA KELP BEDS:

In order to restore the Southern California coast's once valuable kelp beds, warm-water kelp is being planted. The kelp beds are near extinction because of damage caused by three years of subnormal water temperatures. The kelp that is being planted is brought from off the coast of Lower California, Mexico.

A University of California biologist states that a few plants are being planted in the hope that if the water continues warm, the spores will hold and grow. The spores normally float up from the south during warm water periods. Divers transplant the southern kelp by tying it to rocks with nylon cords, to hold it until it attaches itself.

* * * * *

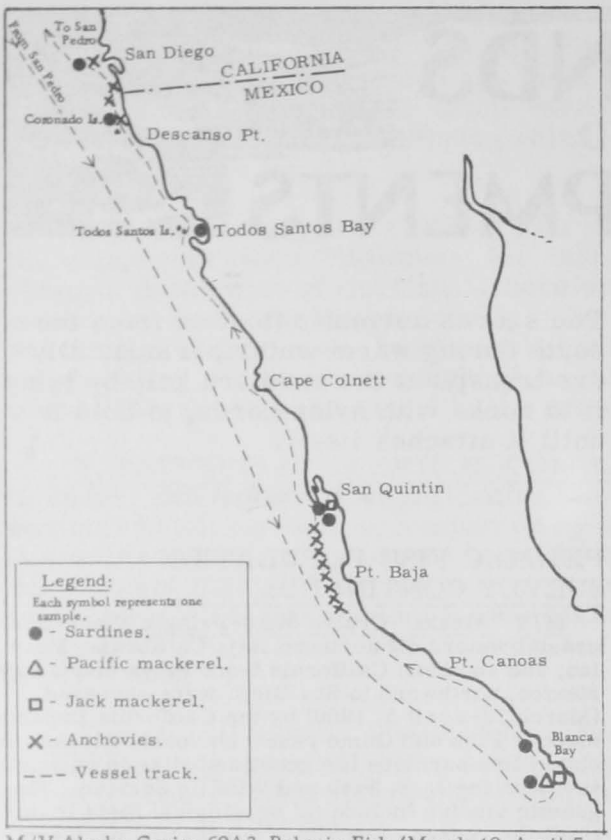
PELAGIC FISH POPULATION SURVEY CONTINUED:

M/V "Alaska" Cruise 60A3-Pelagic Fish: The coastal waters off northern Baja California, Mexico, and southern California from Playa Maria Bay, Mexico, northward to San Diego were surveyed (March 18-April 5, 1960) by the California Department of Fish and Game research vessel Alaska, to obtain live sardines for genetic studies in cooperation with the U. S. Fish and Wildlife Service. The genetic studies include (a) serological tests to delimit the ranges of sardines possessing northern and southern blood "types" (prior to the 1959 sardine fishing season the "northern type" was found off central California and the "southern type" off southern California. Since the 1959 season opened in September, all sardine samples collected off California have been of the northern type. Sardines collected in the area extending from Sebastian Vizcaino Bay southward to Magdalena Bay on the February 1960 Pelagic Fish Cruise 60A2 were of the southern type); and (b) detailed morphometric studies, on the above fish, to find morphological characters which may be related to genetic types. Other objectives were (1) to experiment with Japanese mercury vapor lights as a means of improving fish attraction to lights; (2) to make preliminary gear experiments to improve pelagic fish sampling; and (3) to sample sardines, Pacific mackerel, jack mackerel, and archovies to determine their distribution, relative number, and their ages.

Live sardines were collected in Sebastian Vizcaino Bay, San Quintin Bay, and Todos Santos Bay. An additional live sardine sample was obtained from a Mexican bait hauler at Ensenada. Although all blood tests have not been completed, the Ensenada sample was found to consist of northern-type fish.

From a total of 66 light stations, 6 sardine, 4 anchovy, 2 jack mackerel, and one Pacific mackerel samples were taken.

The vessel scouted 303 miles during which 358 anchovy, one sardine, and one Pacific mackerel schools were observed. Anchovies were seen in large quantities between Sacramento Reef and Cape San Quintin. In addition to the anchovy schools



M/V Alaska Cruise 60A3-Pelagic Fish (March 10-April 5, 1960.)

counted, there were nearly continuous bands of anchovies which were not separate enough to count. These fish were about 3 to 4 inches in length and were negatively phototropic. (Fish did not respond to light stations made in the area of school groups.)

On 14 light stations a 500-watt Japanese mercury vapor lamp was compared with a 1,500-watt incandescent light for relative fish attraction effectiveness. The lights were suspended over the water with a mercury vapor lamp placed amidships on one side of the vessel and an incandescent lamp placed in a corresponding location on the opposite side. The lights were turned on simultaneously and burned about one hour at each station. Although both types attracted sardines, anchovies, sauries, and pelagic red crabs, the animals did not show a preference for either. More extensive tests are planned.

A different method of catching fish under the light was tried by using a modified lampara net. Results provided ideas for further experimentation. An experimental set with a variable mesh gill net successfully captured 100 sardines and 4 barracuda of a deep school in a 15-minute set.

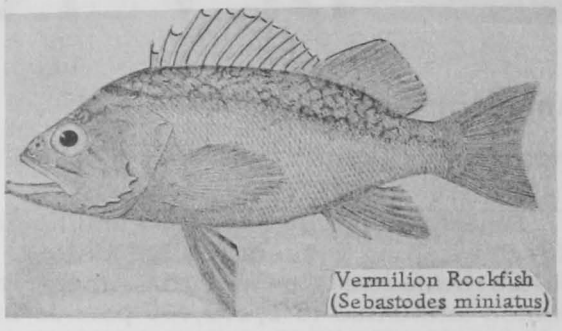
Sea-surface temperatures ranged from 54.1° F. at Cape Colnett to 62.5° F. at Point Descanso. A large number of readings ranged between 57° and 59° F.

Note: Also see Commercial Fisheries Review, June 1960, p. 22.

* * * * *

ROCKFISH STUDY OFF SOUTHERN CALIFORNIA COAST CONTINUED:

M/V "Nautilus" Cruise 60N1-Rockfish: The inshore waters around Santa Barbara Island were surveyed by the California Department of Fish and Game research vessel Nautilus on January 18-22, 1960, to obtain sub-adult and young adult sizes of the vermilion rockfish (Sebastodes miniatus) for determining size and age at maturity.



Vermilion Rockfish (Sebastodes miniatus)

Fifty vermilion rockfish, in the desired size range, were obtained by hook-and-line fishing. These were caught on the bottom at a depth of 30-35 fathoms off Santa Barbara Island. Scales and otoliths were taken from all specimens.

Information was obtained on other species of rockfish. Whitebelly rockfish (S. vexillaris) were the most abundant species found in association with vermilion rockfish.

Ocean whitefish (Caulolatilus princeps) were frequently caught just above the bottom; and numbers of Pacific mackerel (Pneumatophorus diego) were taken at midwater depth.

* * * * *

CALIFORNIA HALIBUT TAGGING STUDIES OFF SOUTHERN AND BAJA CALIFORNIA:

M/V "Nautilus" Cruise 60N2-Sportfish: The area off southern California from Ventura to Oceanside was surveyed by the California Department of Fish and Game's research vessel Nautilus on February 11-18, 1960, to secure California halibut (Paralichthys californicus) for (a) tagging; (b) morphometric studies; and (c) length-weight and age studies. Other objectives were (1) to collect samples of other species found in association with California halibut; and (2) to determine the relative abundance of California halibut inside and outside of the three-mile limit in certain areas.

A total of 81 hauls with a trawl net produced 888 California halibut for tagging. An additional 1,494 halibut were captured but were considered too small (smaller than $15\frac{3}{4}$") or were in too poor a condition for tagging. All of the large damaged fish and samples of the smaller fish were saved for morphometric and food and age studies.

The California halibut tagged averaged $19\frac{1}{2}$ inches in length and 20 percent were of commercial legal size (22 inches). This percentage was more than twice that encountered during 1959 trawling. Nine halibut were tagged off Oceanside, 561 in the

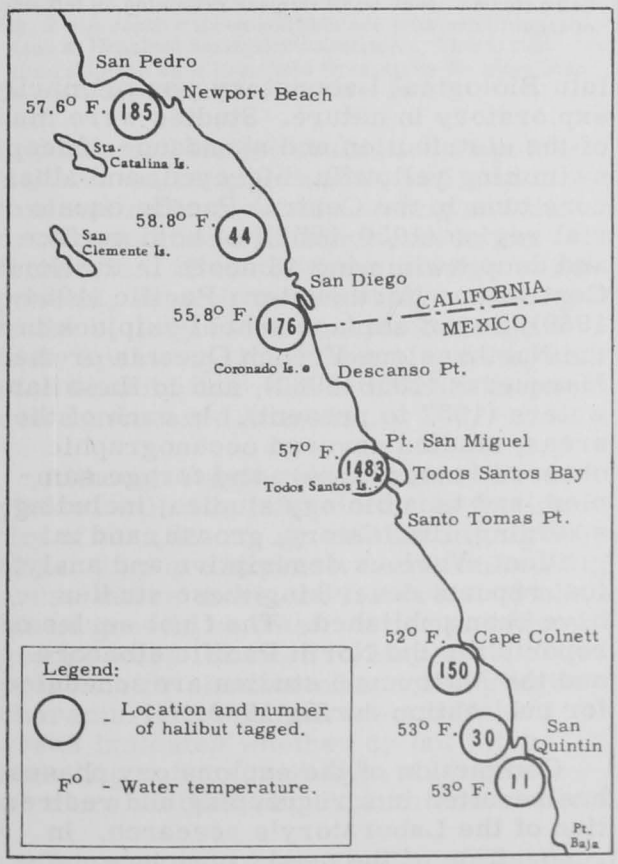
Newport-Long Beach area, 124 off Zuma Beach and 194 off Hueneme.

Fishing operations were hampered in the Zuma Beach area by vast quantities of broken kelp fronds and holdfasts that were picked up from the bottom by the trawl net. Dragging in the same area and depth later produced large quantities of kelp but the pieces were noticeably smaller.

In most cases, all bony fish other than California halibut were saved and processed at the California State Fisheries Laboratory. Lengths, weights, sex, and state of maturity were obtained for most of the 1,926 specimens saved.

M/V "N. B. Scofield" and "Nautilus" Cruises 60S1 and 60N3-Sportfish: The inshore waters from Huntington Beach, Calif., to San Quintin Bay, Baja Calif., were surveyed (March 2-20, 1960) by the Department's research vessels N. B. Scofield and Nautilus (1) to obtain California halibut (Paralichthys californicus,) for tagging, length-weight-age-maturity data, morphometric studies, and study of food habits; and (2) to collect samples of ocean life found in association with halibut.

The N. B. Scofield and the Nautilus were able to complete 168 drags with trawl nets. Of 3,189 California halibut taken, 2,079 were tagged. Fish shorter than 15¾ inches total length were not tagged unless in unusually good condition. The greater portion of the California halibut tagged up to this year have been of the smaller sizes and additional small fish were not needed. A total of 400 of those tagged were 22 inches or longer (commercial size limit 22 inches).



M/V N. B. Scofield and Nautilus Cruises 60S1 and 60N3 March 2-20, 1960.)

Approximately 1,400 pounds of fish and shellfish caught along with the California halibut were retained for laboratory examination. One shovelnose guitarfish (Rhinobatus productus) was larger than any previously examined.

Diamond turbot (Hypsopsetta guttulata), hornyhead turbot (Pleuronichthys verticalis), and fantail sole (Xystreurys liolepis) were the most common bony fish found associated with California halibut. In some areas, usually where the warmest water prevailed, large catches of the various flatfish, shovelnose guitarfish, bat ray (Myliobatis californicus), and thornback (Platyrhinoidis trisenata) were taken. Frequently, one or two electric rays (Torpedo californica) and angel sharks (Squatina californica) were included. Angel sharks appear to be a serious predator on halibut, as a number of halibut had scars of angel shark bites in various stages of healing.

Sharks, skates, and rays were counted and jettisoned. Shovelnose guitarfish were most numerous followed by bat rays. Totals were: shovelnose 1,668, bat ray 860, thornback 584, butterfly ray (Gymnura marmorata) 130, angel shark 98, diamond stingray (Dasyatis dipterura) 35, and electric ray 12.

Two large female angel sharks gave birth to a number of live young when boated. One yielded 11 young, the highest count. All were active and able to swim immediately.

Round stingrays (Urolophus haller), very common in California waters, were seldom caught in Mexico. Round stingrays cause considerable sting damage to all species of fish when confined together in the trawl net. Bat rays on the other hand do little sting damage, but their bulk and weight may harm fish that need to be in good shape for tagging.

Cans--Shipments for Fishery Products

BY AREA IN 1959:

In 1959, out of total shipments of 115,479 tons of steel for use in the manufacture of cans for fishery products, the Pacific Area (including Hawaii)--where the tuna, California, and salmon canneries are concentrated--utilized 81,809 tons or 70.8 percent. The Pacific Area was followed by the Eastern Area (New Eng-

land, Middle Atlantic, South Atlantic, and Puerto Rico) with 29,299 tons or 25.4 percent. The Maine sardine canneries are concentrated in New England and a tuna cannery operates in Puerto Rico. The Central Area (includes Gulf States)--where the bulk of the shrimp-canning industry is concentrated--used only 4,371 tons or 3.8 percent. The over-all total of 115,479 tons was down 6.6 percent from the preceding year due primarily to a sharp drop of 8.4 percent in the amount of steel used for fish cans in the Pacific Area where the packs of California sardines and salmon were down.

Shipments of steel for the manufacture of cans for fishery products on a quarterly basis were heaviest during the third quarter for the Eastern and Pacific Areas, but for the Central Area the heaviest shipments were made in the second quarter. In the east, 37.5 percent or 10,990 tons out of a total of 29,299 tons were consumed in the third quarter. The Pacific Area used 26,775 tons (32.7 percent of the 81,809-ton total) during the third quarter. The Central Area used 1,740 tons (39.8 percent) in the second quarter and 1,485 tons (34.0 percent) in the third quarter.

Note: Also see Commercial Fisheries Review June 1959 p. 33.

* * * * *

JANUARY-MARCH 1960:

Total shipments of metal cans during January-March 1960 amounted to 22,023 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 19,457 tons in the same period a year ago. Canning of fishery products in January-March this year was confined largely to tuna, Gulf oysters, and Pacific jack mackerel. Increased shipments of metal cans during January-March this year as compared with the same months in 1959 were probably due to the sharp increase in the California pack of canned jack mackerel.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor 23.0 base boxes of steel equal one short ton of steel.

Central Pacific Fisheries Investigations

FUTURE RESEARCH ON PACIFIC TUNAS POINTED TOWARDS SOLUTION OF PRACTICAL PROBLEMS:

During the first ten years (1950-1959), the oceanographic, marine biological, and fishery research conducted by the U. S. Bureau of Commercial Fisheries Honolulu Biological Laboratory was primarily exploratory in nature. Studies were made of the distribution and abundance of deep-swimming yellowfin, big-eyed, and albacore tuna in the Central Pacific equatorial region (1950-1956), of both surface and deep-swimming albacore in the North Central and Northeastern Pacific (1954-1960), and of surface school skipjack in the Northeastern French Oceania or the Marquesas (1956-1960), and in Hawaiian waters (1952 to present). In each of the areas, studies covered oceanographic observations, plankton and forage samples, and tuna biology studies, including spawning, life history, growth, and migration. Various descriptive and analytical reports describing these studies have been published. The final series of reports for the North Pacific albacore and the Marquesan studies are scheduled for publication during 1960.

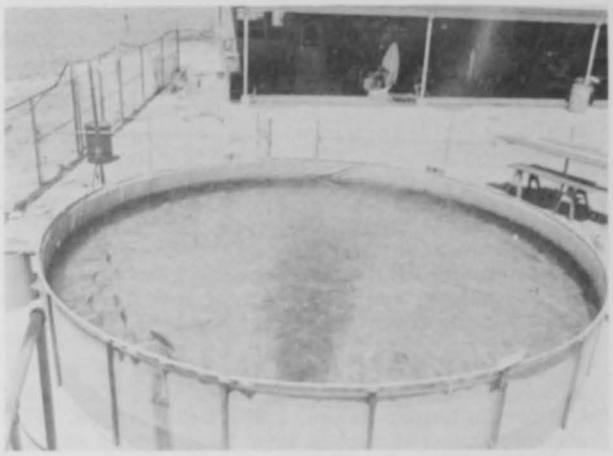


Fig. 1 - Tank at Bureau of Commercial Fisheries Honolulu Biological Laboratory where behavior of skipjack tuna is being studied. Note small skipjack swimming on left side of tank.

Completion of the exploratory phases has resulted in a regrouping and redirection of the Laboratory's research. In recognition of the need to produce more fundamental knowledge for the solution of

immediate practical problems, as well as those of the future, effort will be directed towards increasing efficiency of capture and increasing knowledge of the biology of the tunas, identity of the stocks, and distribution and abundance of the Pacific-wide tuna resources.

Research leading to increased efficiency of capture will involve behavior studies at sea and of captive tuna held

Fig. 2 - A captive six-pound skipjack tuna swimming in tank at Honolulu Biological Laboratory. This is first time skipjack have been held in captivity for more than a few hours or have been induced to feed.

in ponds and tanks; evaluation of potential live-bait supplements, and evaluation and refinement of existing and the development of additional prediction techniques. Each of these studies is dependent, in part, on knowledge relating to the biology of the tuna; knowledge of their spawning, life history, growth, and size distribution--all of which will receive increased attention.

Although tagging experiments have yielded valuable information to the identity of tuna stocks as well as on migrations, they are expensive and limited to areas where there are fisheries. Studies of genetic characteristics and blood groups were initiated in May 1960. The presence or absence of specific genetic characteristics in fish from different areas indicates whether or not interbreeding occurs, and thus whether one or more distinct populations are involved.

In order to pursue studies of the Pacific-wide distribution and abundance of the tunas and of the variations in the distribution and abundance as related to the environment, all available tuna catch and oceanographic station data are being assembled. These data, as received and as necessary, will be transferred to punch cards. In some cases, duplicate decks of punch cards are available from other institutions. As the files become complete for particular areas, average yield figures per unit area, per unit time, and per unit of effort will be prepared. In addition, the average values for units of area and time for selected oceanographic features will be similarly prepared. Examination of both sets of data may be expected to reveal problems and to suggest relationships which will require more intensive study.

In addition various exploratory-theoretical studies are under way or planned. Through attempts to generalize and synthesize existing knowledge, it is hoped to push understanding beyond present levels, perhaps identifying critical observations or experiments to be made in the laboratory or at sea.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-APRIL 1960:

Fresh and Frozen Fishery Products:

For the use of the Armed Forces under the Department of Defense, 1.6 million pounds (value $958,000) of fresh and frozen fishery products were purchased in April 1960 by the Military Subsistence Supply Agency. This was lower than the quantity purchased in March by 14.9 percent, and 24.8 percent under the amount purchased in April 1959. The value of the purchases in April 1960 was lower by 11.4 percent as compared with March and 2.4 percent less than for April 1959.

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Supply Agency, April 1960 with Comparisons

Quantity				Value			
April		Jan.-Apr.		April		Jan.-Apr.	
1960	1959	1960	1959	1960	1959	1960	1959
.....(1,000 Lbs.).....				.....($1,000).....			
1,646	2,188	6,894	7,137	958	982	3,688	3,782

During the first four months of 1960 purchases totaled 6.9 million pounds (val-

ed at $3.7 million)--a decrease of 3.4 percent in quantity and 2.5 percent in value as compared with the similar period in 1959.

Prices paid for fresh and frozen fishery products by the Department of Defense in April 1960 averaged 58.2 cents a pound, about 2.3 cents higher than the 55.9 cents paid in March and 13.3 cents more than the 44.9 cents paid during April 1959.

Canned Fishery Products: Purchases of canned fishery products were very light during April this year. In the first four months of 1960, purchases of canned tuna were lower by 9.1 percent and canned sardines were down about 78.2 percent as compared with the same period in 1959. No canned salmon was purchased during January-April 1959 and 1960.

Table 2 - Canned Fishery Products Purchased by Military Subsistence Supply Agency, April 1960 with Comparisons

Product	Quantity				Value			
	April		Jan.-Apr.		April		Jan.-Apr.	
	1960	1959	1960	1959	1960	1959	1960	1959
	(1,000 Lbs.)				($1,000)			
Tuna	13	539	1,282	1,408	8	271	581	658
Salmon	-	-	-	-	-	-	-	-
Sardine	15	15	61	280	6	6	26	46

Note: Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than indicated because local purchases are not obtainable.

Frozen Processed Fish and Shellfish Consumption

IN INSTITUTIONS AND PUBLIC EATING PLACES IN LOS ANGELES:

Information from restaurants and institutions concerning the consumption of frozen processed fish and shellfish was the objective of a survey in 10 major cities recently completed by Crossley S-D Surveys, Inc. for the Bureau of Commercial Fisheries. Los Angeles stands sixth among the ten cities surveyed in terms of percentage of all establishments buying frozen processed fishery products, and first in the variety of species purchased. Twenty-one species were included in Los Angeles purchases. Almost

three-fourths of all Los Angeles restaurants and institutions buy fish and shellfish, many of which buy them frozen. A breakdown of the types of frozen fishery products purchased during the survey month of November 1958 by the establishments that do serve those products showed that 36 percent was frozen processed fillets and steaks, 35 percent was frozen processed shellfish, and 20 percent was frozen portions, with the remainder unspecified varieties.

The incidence of use of frozen processed products was greater among institutions than among public eating places.

Among purchasers of frozen processed fish, more than a third bought halibut steak. This compares with 21 percent that purchased cod fillets; 20 percent halibut fillets; and 11 percent salmon steaks. Even though halibut fillets ranked third in choice, this item led the other four in poundage. In the shellfish category, one-third of the establishments using them bought frozen raw shrimp while almost the same number bought breaded shrimp. Raw scallops were another popular purchase.

Portions were a popular purchase with one-fifth of all the establishments in the city. This group preferred the fish uncooked whether breaded or plain, and Los Angeles ranked fourth among the ten cities in the percentage of establishments buying portions. Almost two-thirds of the purchasers of portions said they were currently buying about the same amount as a year before. Nineteen percent said

they purchased more than the previous year, while fewer than 8 percent said they bought less.

According to the survey, almost all establishments serving frozen processed fish, shellfish, and portions were satisfied with the preparation, quality, and condition of the products. With reference to portions only, one-fifth of the users felt that the quality of portions was better than that of other frozen processed fish; three-fourths rated the quality as about the same; 1 percent considered the quality poorer.

Major advantages cited for portions were:

	Percentage of Users Citing
"Time-saving"	49
"Convenience, ease of preparation"	36
"Economy, no waste"	30
"Uniform size"	22

Portions came under greater scrutiny than any other product. About one-third of users noted some disadvantage to using portions, yet 40 percent said their customers liked portions better than the processed fish. This is compared to 41 percent who claimed their customers liked portions about the same as processed fish and the 3 percent who said they liked portions less than other types.

Frying was the preferred method of preparing and serving fish among Los Angeles establishments. The average establishment served 53 percent of its fish fried, 24 percent broiled, and 18 percent baked.

In the shellfish category, the typical establishment served two-thirds of its shellfish fried, about 63 percent of its portions fried, while only 21 percent of portions was served baked. Four-fifths of the establishments using portions cooked them while frozen.

Portions received extra attention in this survey because of their growing acceptance in the restaurant and institutional trade. Of the establishments using portions, 15 percent said they were more expensive than other forms of frozen processed fish. A large majority of users considered them less expensive, or rated them about the same.

Five-sixths of the Los Angeles purchasers said they specified the kind of fish when ordering portions. Only 3 percent suggested new varieties of portions that were not then available. Establishments that did not use portions gave a number of reasons:

"They sold comparatively little fish"
"They served other types of fish"
"Portions were too expensive"

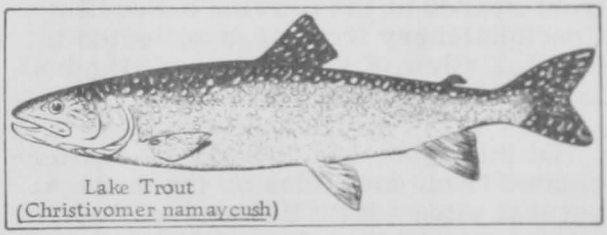
Establishments in Los Angeles tended to buy frozen processed fishery products from both frozen-food distributors and fishery wholesalers. Fifty-two percent of the suppliers were within 10 miles of the establishment, while another 45 percent were between 10 and 50 miles away. In almost half the cases, deliveries were made once a week, while one-fourth got delivery between 2 and 4 times a week, and most all were satisfied with the services of the suppliers.

Five-eights of the profit-making establishments which expressed an opinion considered frozen processed fish and shellfish more profitable than other protein foods.

Note: See Commercial Fisheries Review, January 1960 p. 32.

Great Lakes

LAKE TROUT RESTOCKING PROGRAM: Approximately 92,000 yearling lake trout were released in Lake Michigan



Lake Trout
(Christivomer namaycush)

early in April by the Michigan Conservation Department and the U. S. Bureau of Sport Fisheries and Wildlife to kick off Michigan's first plantings for 1960 under the projected 10-year program to revitalize trout populations in the upper Great Lakes.

About 580,000 of the 1,260,000 yearling and fingerling lake trout slated for planting in Lakes Michigan and Superior during 1960 will come from Federal hatcheries in Michigan. Ontario will release another 470,600 lake trout while Wisconsin will stock the remaining 210,000.

In 1959, the State and Federal agencies pooled their resources, planting some 880,000 lake trout, to launch the rehabilitation program. The Great Lakes Fishery Commission has set an annual planting goal of 7 million yearling trout in Lakes Michigan, Huron, and Superior to restore populations which have been virtually wiped out by the sea lamprey.

This year's planting stock, consisting mainly of one-year-olds ranging from 5-6 inches, will be immune to the lamprey for several years after their release. By this time, it is expected that the predator will be under control.

The April plantings were made in the area of Fox, Trout, and South Fox islands in Lake Michigan with stock purchased by Illinois and reared at the U. S. Fish and Wildlife Service's Charlevoix Hatchery. An additional 37,000 fingerling lake trout from the hatchery will be liberated in Lake Michigan this fall as an experimental planting. Exact site of this release has not yet been determined.

Early in June, another 451,000 yearling lake trout will be set free in Lake Superior. This stock includes 292,000 trout reared at the Service's Pendills Creek hatchery from eggs collected in Crystal, Glen, Elk, Torch, and Higgins Lakes during the fall of 1958.

Of this total, 146,000 will be scatter-planted from docksides or the shore at several sites within Keweenaw Bay; the other half will be released in the Bay between Baraga and Pequaming Point. The other 159,000 yearlings, reared from brood stock at the Michigan Conservation Department's Marquette Hatchery, will be planted off Laughing Fish Point in Shelter Bay.

All stock will be marked with fin clips by personnel from the U. S. Bureau of Commercial Fisheries for identification purposes.

Great Lakes Fisheries Exploration and Gear Research

SURVEYS OF COMMERCIAL FISH STOCKS IN LAKE ERIE TO BE OBTAINED IN 1960:

Explorations to determine the commercial potential of fish stocks in the United States waters of Lake Erie are to be continued in 1960. The U. S. Bureau of Commercial Fisheries chartered fishing vessel Active was scheduled to start exploratory fishing about May 16. Cruise 9, the first of the 1960 season, was to cover Lake Erie waters between Sandusky and Avon Point, Ohio. The vessel was scheduled to visit the ports of Huron, Vermilion, and Lorain to demonstrate gear techniques to commercial fishermen.

Great Lakes Fishery Investigations

LAKE ERIE FISH POPULATION RESEARCH INDICATES SHORTAGE OF ADULT YELLOW PIKE:

M/V "George L.," April 1960: Field work in 1960 did not start until the ice went out in early April, according to a U. S. Bureau of Commercial Fisheries report on the Lake Erie Fishery Investigations. Unusually warm weather followed shortly thereafter and surface water temperatures rose from about 37° F. on April 13 to about 55° F. on April 28. Trawl catches indicated that most fish were in deeper waters.

Low commercial catches of large yellow pike in April strongly suggest a shortage of brood stock for spawning. This was expected, since only 37,000 pounds of yellow pike were taken in the Ohio commercial catches in the fall of 1959. The catch of yellow pike in the spring of 1960 is nearly certain to be a record low.

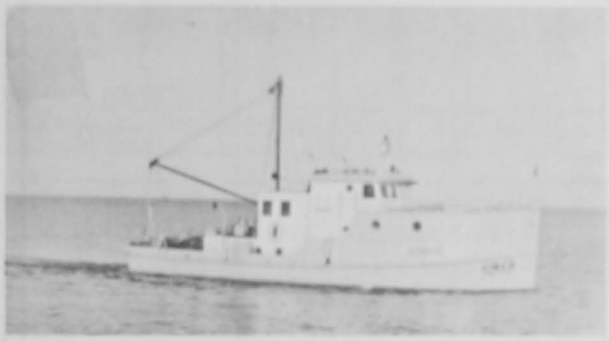
Many 9½- to 12-inch yellow pike were taken in trap nets in the Western Basin

in April. Approximately 4,000 of the fish were tagged in Ohio waters to determine the extent of movement to Canadian and other waters.

* * * * *

PROGRAM OF THE RESEARCH VESSEL "CISCO" FOR 1960:

The possibility of an extensive trawl fishery for chubs in Lake Michigan in the very near future makes it imperative that an accurate estimate of the present chub population in the Lake be obtained, since it will be highly desirable to know what changes, if any, the prospective trawl fishery will bring about.



Cisco, research vessel of the Service's Great Lakes Fisheries Investigations.

The chief aim of the U. S. Bureau of Commercial Fisheries research vessel Cisco during 1960 and 1961, accordingly, will be to establish a basis for future comparisons of Lake Michigan chub populations. The study will be conducted in the southern part of the lake in 1960 and the northern part in 1961.

An attempt will be made to determine the present populations by use of both gill nets and trawls. The intent is to standardize gear and techniques so that current and future data will yield reliable estimates of population changes. Gangs of nylon gill nets, which contain 9 mesh sizes from 1 to 4 inches, stretched measure, were hung by the Cisco's crew in the interest of standardization. The standard trawl will be a commercial type now used by Lake Michigan chub fishermen.

In 1960 the nylon gill nets will be set periodically at 25 and 50 fathoms off Grand Haven and St. Joseph, Mich., and Racine, Wis., and at 80 fathoms in mid-lake between Grand Haven and Racine. The trawls will be towed at various depths off these same ports and off Milwaukee, Wis., at regular time intervals. Emphasis will, of course, be on chubs, but data for other species will also be collected.

A second objective will be to compare present chub populations with those of 1954-55. The identical linen gill nets (several mesh sizes, $2\frac{1}{2}$-3 inches) which were set by the Cisco in 1954 off Grand Haven, Mich., will be set in the same manner in 1960 off Grand Haven.

Another objective during 1960 will be to study the relationship of gill-net catches with the length of time set, as applied to chubs. This problem is, of course, complicated, probably related to abundance, species, and other variables, but any information at all would aid in analyzing gill-net catches.

Lack of time will limit limnological investigations to routine collections and observations, and perhaps a few brief special studies. The 11 cruises planned for the Cisco in 1960 will start on April 26, and end about December 6.

* * * * *

RESEARCH VESSEL "SISCOWET" PROGRAM FOR 1960:

During 1960 the U. S. Bureau of Commercial Fisheries research vessel Siscowet will conduct its operations in western Lake Superior, with the exception of the Isle Royale survey. Attention will be devoted primarily to the study of the bathymetric distribution of fish stocks by fishing standard gangs of experimental gill nets (mesh sizes 1" to 5" by $\frac{1}{2}$" intervals) at depths ranging from 10 to 70 fathoms.

Long-term observations of environmental conditions and fish populations will be continued. Measurements will be made at index stations established in 1958.

Surveys will also be devoted to (1) the study of chubs (Leucichthys sp.) and lake trout in the Isle Royale region and along the Canadian north shore; (2) the spawning grounds of the lake trout and whitefish in the Apostle Island area; and (3) the collection of chub eggs and new

methods of trawling to sample stocks of spawning lake herring.

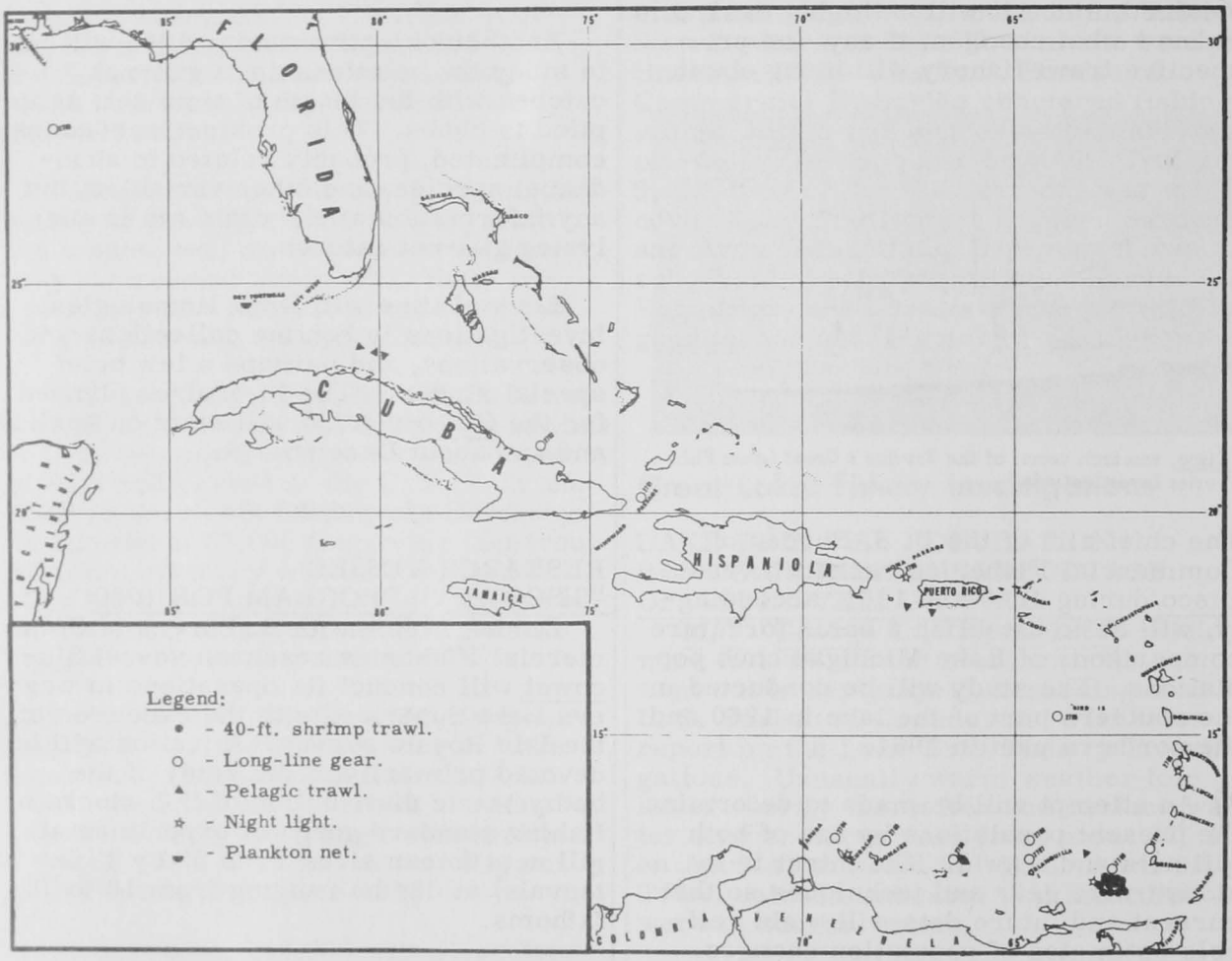
Gulf Exploratory Fishery Program

TUNA DISTRIBUTION IN SOUTH-EASTERN CARIBBEAN SEA AND OCCURRENCE OF ROYAL-RED SHRIMP OFF TRINIDAD EXPLORED:

M/V "Oregon" Cruise 66 (March 30-May 4, 1960): The objectives of the cruise were to determine species, distribution, and availability to long-line gear of pelagic tunas and other large pelagic fish in the southeastern Caribbean Sea and eastern Gulf of Mexico. Besides the U. S. Bureau of Commercial Fisheries exploratory personnel, biologists from the Woods Hole Oceanographic Institute and the American Museum of Natural History also participated in the 36-day cruise to tag tuna and marlin and to obtain biological data on the tunas and other large pelagic fishes. Another objective was to further the Bureau's studies on the distribution of the deep-water royal-red shrimp between 61° and 66° west longitude.

Table 1 - Tuna Catch by Station (M/V Oregon Cruise 66)

Sta. No.	Yellowfin	Bluefin	Albacore	Blackfin	Skipjack
2764	-	-	2	-	-
2765	3	-	2	-	-
2766	7	-	4	-	-
2767	-	-	-	-	-
2768	8	-	-	-	2
2769	3	-	1	-	-
2783	10	-	-	-	-
2785	11	-	1	-	-
2786	3	-	-	-	-
2790	2	-	-	-	-
2791	1	5	2	2	3
2792	-	-	-	-	-
2796	3	9	-	-	-
Total	51	14	12	2	5



M/V Oregon Cruise 66 (March 30-May 4, 1960).

During the cruise 13 long-line sets, averaging 50 baskets per set, were made (see cruise chart and tables 1 and 2). Twelve

Table 2 - Long-line Catch by Species (M/V Oregon Cruise 66)

Species	Total No.	No. Tagged	Weight (Lbs.)
Bluefin (Caribbean)	5	0	2,185
Bluefin (Gulf)	9	0	4,000
Total	14	0	6,185
Yellowfin (Caribbean)	48	12	5,745
Yellowfin (Gulf)	3	0	450
Total	51	12	6,195
Albacore (Caribbean)	12	1	563
Blackfin "	2	0	28
Skipjack "	5	0	105
Blue marlin "	6	1	1,250
White marlin "	8	0	680
Sailfish "	2	0	125
Spearfish "	2	0	121
Dolphin "	8	0	165
Rainbow runner "	1	0	8
Lancetfish "	2	0	13
Barracuda "	3	0	39
Sharks "	46	0	6,925
Sharks (Gulf)	10	0	1,550
Total	107	2	11,572
Grand Total	172	14	23,952

yellowfin tuna, one albacore, and one blue marlin were dart-tagged and released. Stomach content analysis, sex determination, and spawning condition and morphometric data were obtained from the remainder of the catch. Plankton tows and pelagic fish trawl tows were made in widely scattered areas.

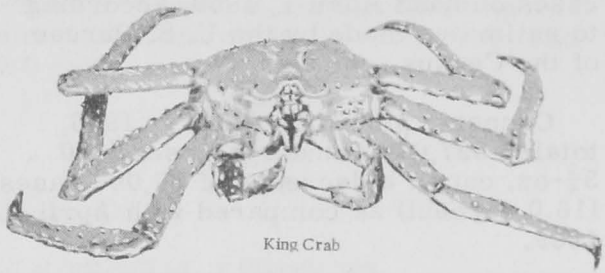
Thirteen exploratory drags were made northwest of Trinidad in 160-290 fathoms, using a 40-foot two-seam shrimp trawl. Generally poor trawling bottom was encountered in the area, which prohibited long drags. Penaeopsu megalops and royal-red shrimp, Hymenopenaeus robustus, were encountered in small numbers throughout the depths covered. The largest catch contained 40 pounds of megalops and 10 pounds of robustus from a 50-minute drag.

King Crab

EASTERN BERING SEA OPERATIONS:

In April 1960, the eastern Bering Sea king crab stocks were being exploited by fishermen from three countries. United States fishermen with 7 fishing vessels were taking crabs by otter trawling. Also, the Japanese fleet was fishing with the mothership Tokei Maru, 3 exploratory tangle-net vessels, and 8 "Kawasaki"-type fishing vessels. The Russian fleet was fishing tangle nets and was made up of the mothership Vsevolod Sibirzev No. 24, at least 2 exploratory tangle-net vessels, and 10 to 12 "Kawasaki"-type boats.

In view of the magnitude of fishing effort and the difference in fishing methods, gear conflicts occasionally occur. This is particularly true in the early spring due to the constricting influence on the fishing area by ice. Secondly, king crabs



King Crab

are not uniformly distributed, but occur in relatively few areas of concentration.

Since 1954, Japanese and United States fishermen have marked their fishing areas by buoys and daily they inform each other by radio contact of their area of operations. This procedure has worked out very well and no conflicts have occurred over fishing grounds. By agreement, no buoys are placed within five miles of the fishing grounds being occupied. The Japanese and United States fishermen hope to make such an agreement with Soviet fishermen operating in that area.

TAGS RETURNED BY U. S. S. R.:

The U. S. Bureau of Commercial Fisheries king crab investigations received 34 tags with recovery information from the Soviet Union. The recoveries were made by the Russian king crab fishing vessels between July 17 and September 12, 1959, and included tags released by the Bureau biologists in 1957, 1958, and 1959.

The positions from which these recoveries were made are of particular interest. They indicate that the Russian king crab fishery was centered approximately 120 miles due north of Unimak Pass. It is an area in which the Bureau's surveys have annually shown an abun-

dance of new-shell crabs. It has not been fished by the Japanese commercial fishery and in past years was a major fishing area for United States fishermen during the autumn months.

Maine Sardines

CANNED STOCKS, APRIL 1, 1960:

Distributors' stocks of Maine sardines totaled 252,000 actual cases on April 1, 1960--2,000 cases less than the 254,000 cases on hand April 1, 1959, according to estimates made by the U. S. Bureau of the Census.

Canners' stocks on April 1, 1960, totaled 397,000 standards cases (100 $3\frac{3}{4}$-oz. cans), a decrease of 77,000 cases (16.0 percent) as compared with April 1, 1959.

Table 1 - Canned Maine Sardines--Wholesale Distributors' and Canners' Stocks, April 1, 1960, With Comparisons[1/]

Type	Unit	1959/60 Season			1958/59 Season				
		4/1/60	1/1/60	11/1/59	7/1/59	6/1/59	4/1/59	1/1/59	11/1/58
Distributors	1,000 actual cases	252	235	296	176	197	254	268	312
Canners	1,000 std. cases[2/]	397	843	1,001	422	272	474	891	1,037

1/ Table represents marketing season from November 1-October 31.
2/ 100 $3\frac{3}{4}$-oz. cans equal one standard case.
Note: See Commercial Fisheries Review, March 1960 p. 22. Correction in Table 1 the season heading "1957/58 Season" should read "1958/59 Season."

The 1959 pack (from the season which opened on April 15,1959, and ended on December 1, 1959) was 1,753,000 standard cases, compared with 2,100,000 cases packed in the 1958 season. The 1960 fishery was legally open on April 15, but the canneries remained closed due to lack of fish.

The total supply (pack plus carryover on April 15, 1959) available during the 1959/60 season at the canners' level totaled 2,171,000 standard cases as compared to 2,434,000 cases the previous season. This was due to the decline in the amount packed in 1959/60. Canners' shipments from April 15, 1959, to April 1, 1960, amounted to 1,774,000 cases as compared to 1,960,000 cases for the same period a year earlier.

Michigan

COMMERCIAL FISHERMEN PROPOSE CHANGES IN FISHING REGULATIONS:

The commercial fishermen of Michigan appeared before the State's Conservation Commission in April 1960 and made an urgent appeal for quick adoption of their proposed liberal changes in regulations.

They told the Commission, which was given power to regulate Michigan's commercial fishing industry March 19, 1960, that the changes were necessary to save their businesses and put them on better competing terms with operators from other Great Lakes states.

Keynoting their appeal was a request for permission to use the otter trawl, a type of fishing gear new to Michigan's commercial fisheries.

The Great Lakes area Regional Director of the U. S. Bureau of Commercial Fisheries said it is very difficult for gill-net operators to make a living in Lake Michigan. He qualified this by saying present equipment is outmoded because it was primarily designed for catching fish that have virtually disappeared.

The Bureau's Regional Director pointed out that there still is good potential in the lakes for commercial fishermen and although trawling is an expensive operation, it is the only answer to saving the industry. He assured that trawling would not deplete game species because it allows for selective fishing.

The head of the Bureau's sea lamprey control program warned that the lamprey is now wasting the portion of chub populations which should be harvested by commercial operators. He remarked there is no biological reason for protecting these populations in deep waters, adding that the otter trawl provides a more efficient means of harvesting these stocks.

Trawl operators in other Great Lakes states are reportedly finding a ready market for small chubs and other non-commercial fish from companies producing pet food and fertilizer.

The President of the Michigan Fish Producers Association and spokesman for one group of fishermen, requested 10 changes in regulations. He proposed that the mesh size of chub nets be reduced by one-sixteenth of an inch and recommended lowering the size limit for yellow perch in a triangular area of Green Bay to match Wisconsin's 8-inch minimum.

Some of his other recommendations called for revising the season on yellow pickerel in Saginaw Bay to conform with the one in Lake Huron; switching the closed season on whitefish to November 1-December 10; extending the area where trap nets may be used for taking whitefish in Lake Huron; removing the closed season on calico bass; and matching sport and commercial perch fishing seasons in Lake Michigan.

Michigan's Department of Conservation officials told the fishermen that legal steps required by the Administrative Procedures Act in enacting legislative changes generally take about 90 days. Before action was taken on the above proposals, Department officials scheduled 10 meetings between May 3 and May 23 with commercial fishermen throughout the state to discuss problems.

* * * * *

COMMERCIAL FISHERMEN'S PROBLEMS DISCUSSED AT MEETINGS:

Michigan's commercial fishermen had an opportunity to present their problems and offer possible solutions to Conservation Department officials during a series of 10 meetings held throughout the State from May 3 through May 26, 1960.

From the meetings Department officials hoped to get the consensus of operators, which will lay the groundwork to managing the State's commercial fishing industry on a closer and more profitable basis than in recent years.

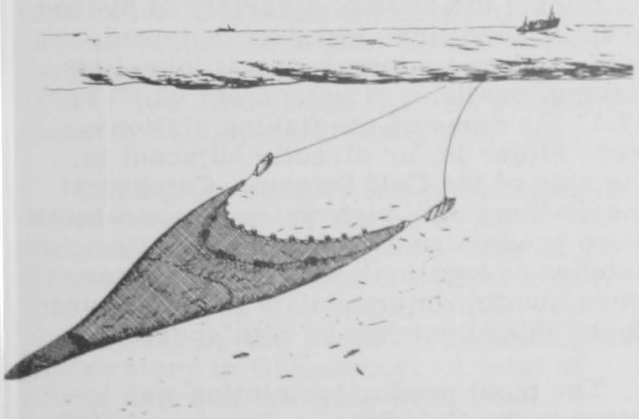
Regulation of this industry, involving about 1,000 licensed operators and some 39,000 square miles of Great Lakes waters, became the Conservation Commission's responsibility on March 19, 1960. Administrative duties have been assumed by the Department.

Under its new authority, the Commission is empowered to adjust regulations, pending legislative approval, with the exception of license fees and penalties. Regulations in effect before the transfer of authority have remained unchanged.

* * * * *

USE OF TRAWLS IN GREAT LAKES PROPOSED:

A proposed change in commercial fishing regulations to permit the use of



Atlantic otter trawler.

trawls in Michigan waters of the Great Lakes was discussed before the Conservation Commission during a special public hearing held on May 12, 1960, at the Higgins Lake Conservation School.

As proposed, the regulatory change would authorize the Conservation Department to issue permits for the use of trawls by commercial fishermen in taking chubs, herring, alewife, smelt, and other fish species it might designate. The Department would also regulate the kind and size of trawls, their mesh sizes, and the areas, time, and manner in which this new type, for the Great Lakes, of fishing gear could be used.

Permittees would be required to keep and submit records and reports of their trawling operations as required by the Department. Department authorities would be allowed to inspect these operations and check equipment, records, and fish catch.

Missouri

COMMERCIAL FISHERIES LANDINGS, 1959:

In 1959, Missouri's commercial fishermen landed fish valued at $85,000, lower by about $10,000 than in 1958, a Missouri Conservation Commission fisheries biologist stated.

Fishermen on the Mississippi River landed 178,974 pounds of fish, those on the Missouri River landed 154,359 pounds and those on the St. Francis River landed 25,413 pounds.

Out of 1,076 persons who bought commercial fishing permits in 1959, only a few made it a full-time occupation. The high cost of equipment has caused the number of commercial fishermen to decline the past 15 years, while others were squeezed out of business when people refused to buy fish that tasted "oily" from pollution near the big cities.

"Actually there's a big demand for fresh river fish," the biologist said, "and the 358,746 pounds taken last year by commercial fishermen was only a small part of what was sold. Fish dealers import millions of pounds of marine and fresh-water fish yearly from outside Missouri to fill the demand."

Carp accounted for 41 percent of the catch, followed by buffalofish, flathead

catfish, drums, blue catfish, paddlefish, channel catfish, gar, sturgeon, suckers, bowfin, eels, and bullheads, in that order.

National Fisheries Institute

RESOLUTIONS ADOPTED AT 15TH ANNUAL CONVENTION:

At the National Fisheries Institute 15th Annual Convention in Miami Beach, April 29-May 4, nine resolutions were submitted and adopted by the Board of Directors on May 4, 1960.

1. Voluntary Frozen Food Handling Practices. That the Association of Food and Drug Officials of the United States be commended for its interest in the improvement in the handling of frozen foods; but that the Institute vigorously insists that improvement in frozen food handling methods can be accomplished better by cooperative industry action than by State, Federal, or Municipal Government statutory or regulatory actions; and that the Institute join with other segments of the frozen food industry in developing and adopting a uniform industry program of frozen food handling practices; and that the Institute through its membership urge state legislators and agency officials to refrain from establishing arbitrary and unrealistic laws or regulations in the realm of quality improvement of frozen seafoods.

2. N. F. I. to Participate in Joint Frozen Food Committee. Whereas, it is desirable for the Institute to join with other segments of the frozen food industry in properly developing such a program; and whereas, members of the Institute and the staff have already constructively participated in preliminary joint industry meetings; it was resolved that the President be directed to appoint a committee of three members to direct and guide this program; and that said committee and the staff be given authority to represent the Institute in any joint industry committee and to participate in the development of the program; and that the Executive Committee be empowered to solicit voluntary contributions of such funds as may be required to carry out this resolution.

3. Fresh-Fish Handling Research. The Institute requests the U. S. Bureau of Commercial Fisheries to continue its technological investigations of fresh-fish handling methods and to initiate a comprehensive research on the relations of time and temperature to the losses of quality in each step in the handling of fish from the water to the consumer; and that the Institute's Technology Division staff be asked to carry out an active program of informing the fresh fish industry of quality-improving equipment and methods, through personal contacts and demonstrations, and through a monthly technical newsletter devoted specifically to fresh-fish handling matters, within budget limitations.

4. Revise Frozen Fried Fish Sticks Standards. The Institute requests the U. S. Bureau of Commercial Fisheries to study the advisability of revising the Standards for Grades of Frozen Fried Fish Sticks, and if the studies so indicate, to endeavor through research and frequent consultation with industry to develop an acceptable practical set of proposed revised Standards.

5. Authorizes Institute's Technology Division to accept specially contributed funds and regularly budgeted money, and to expend these in accordance with the contributing groups' instructions and within the Institute's regular operating limitations.

6. Authorizes Institute's Technology Staff members to participate in Atlantic and Pacific Fisheries Technological Conferences.

7. Recommend Standards of Identity for Breaded Shrimp. Whereas, the breaded shrimp industry has for two years considered the desirability of establishing Standards of Identity for Breaded Shrimp in order to prevent the possibilities of unfair competition from excessively breaded products; and whereas, the breaded shrimp industry has developed a set of possible standards which it plans to submit to the Food and Drug Administration for the latter's approval and official establishment; the Institute commends the breaded shrimp industry for this action and urges the Food and Drug Administration to adopt the industry's proposed standard of identity for breaded shrimp.

8. Retention of Fisheries Exemption for Truck Transportation. The Institute reaffirms its support of the exemption from I.C.C. regulation of motor vehicles transporting fresh and frozen fishery products in interstate and foreign commerce.

9. Regulated Motor Carriers to Publish Reasonable Rates and be Liable for Damages. Whereas, Senate bill S. 3389 has been introduced in the 86th Congress of the U. S. requiring motor carriers to publish just and reasonable rates and making them liable for the payment of damages and reparation for failure to do so; and whereas, the fishery industry is in favor of the provisions of this legislation; the Institute supports the passage of S. 3389 or similar legislation which may be introduced in the future.

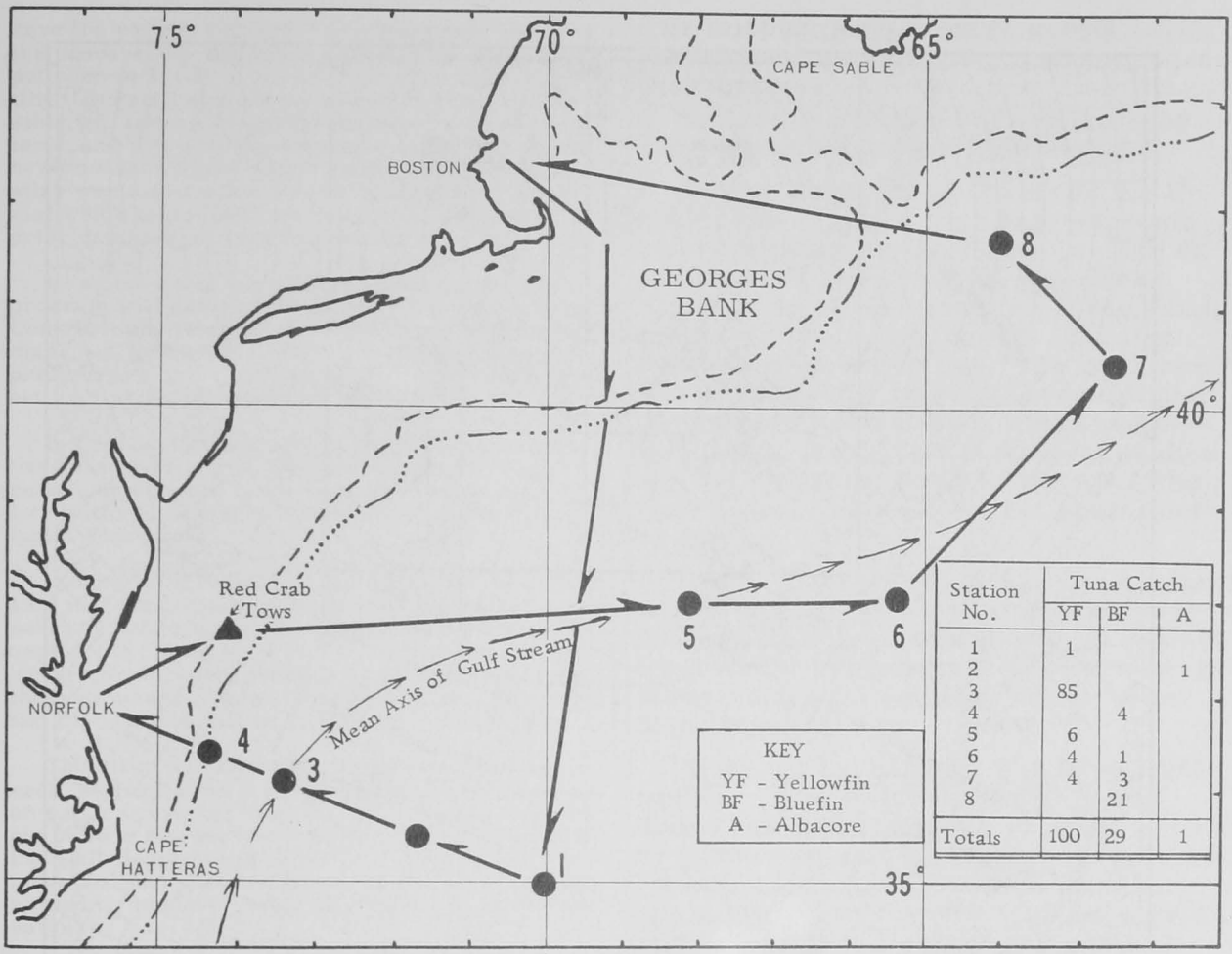
North Atlantic Fisheries Exploration and Gear Research

AREA BETWEEN GEORGES BANK AND CAPE HATTERAS EXPLORED FOR TUNA STOCKS:

M/V "Delaware" Cruise 60-6: Tuna were landed at each of eight long-line stations completed by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware during an April 18-May 7 cruise. Three species--bluefin (Thunnus thynnus), yellowfin (Thunnus albacares), and albacore (Thunnus alalunga)-- were present in the catch taken from the waters between Cape Hatteras and Georges Bank.

During the cruise, a variety of hydrographic conditions were encountered, with surface temperatures at long-line fishing locations ranging from 43.6° to 77.1° F. Some of the fishing stations were either in, or directly adjacent to, the axis of the Gulf Stream. Catches at the stations with high water temperatures were predominantly yellowfin, while catches at locations with colder water were bluefin; intermediate locations produced mixed catches of both species.

The most productive station was located in the Gulf Stream Track at 73°25' W. longitude and 36°07' N. latitude, and yielded 85 yellowfin on a 60-basket set (600 hooks). The estimated weight of the fish caught at that station ranged from 70 to 90 pounds each. Water temperature at the surface was 77.1° F.



Station No.	Tuna Catch		
	YF	BF	A
1	1		
2			1
3	85		
4		4	
5	6		
6	4	1	
7	4	3	
8		21	
Totals	100	29	1

M/V Delaware Cruise 60-6 (April 18-May 6, 1960).

In addition to the information gathered on the distribution of certain of the tunas in the Western North Atlantic, biological and other data were collected by representatives of the Woods Hole Oceanographic Institution and Boston University. Forty-two tunas were marked and released, using plastic "spaghetti" tags.

During the cruise, two trawl stations were completed, in depths of 215 to 325 fathoms off Ocean City, Md. The objective of these tows was to collect a sample of the deep-sea red crab (Geryon sp.) for testing by the Bureau's Technological Laboratory in Gloucester. A total of three hours of trawling with a No. 36 trawl produced about 500 pounds of red crabs; these were cooked and frozen aboard the Delaware. In addition to the red crab catch, one of the tows yielded 21 American lobsters (Homarus americanus) which averaged six pounds each. Fish in these tows included several species of hakes, some of which were preserved for study.

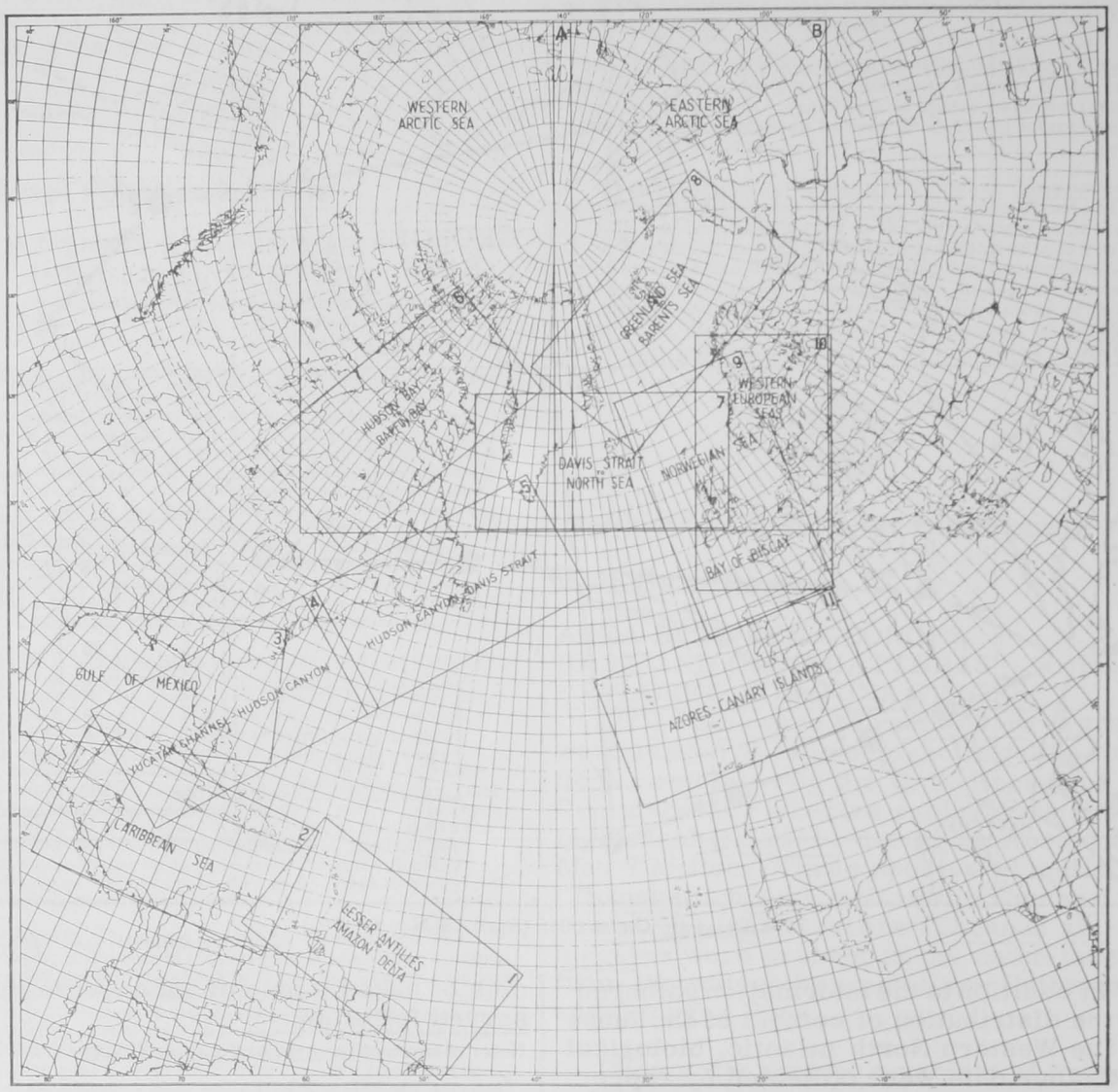
Note: Also see Commercial Fisheries Review, July 1959 p. 40.

Oceanography

ATLANTIC OCEAN ATLAS BEGUN:

To chart the possibility of farming and mining the oceans for new sources of food, fuel, and minerals, the American Geographical Society has begun work on a comprehensive atlas of the North Atlantic Ocean. It is expected to provide scientists with a new research tool for making comparative studies of the interrelationships of marine organisms and their environments.

The project is aimed at integrating vast amounts of data, published and unpublished, now accumulating at a rapid rate. Physical oceanographers, marine biologists, geologists, physicists, and other specialists will be invited to contribute to the new atlas. They will be asked to plot their own original data on base maps specially prepared by the Society as work sheets. Where necessary, explanatory texts will supplement the maps, which



will be published individually in a continuing series as soon as they are completed.

The maps will be printed in two versions: one on paper, for general distribution: the other, a limited edition on transparent material, to facilitate comparative studies in research laboratories.

The biogeographical atlas will show as many of the variables of the ocean as possible. Embracing the North Atlantic from top to bottom and from the equator to the pole, it will show the distribution and productivity of plants and animals, bathymetry, bottom sediments, properties of water masses, courses of currents, seasonal changes in temperature, movement of water, direction and force of winds, air temperature, and solar radiation. The project is long-term in character and scientists expect substantial results by 1970.

Cooperating research organizations include the Atlantic Fishery Oceanographic Research Laboratory (U. S. Bureau of Commercial Fisheries), Woods Hole Oceanographic Institution, and the Royal Society of Canada. Other scientific bodies and individual scientists on both sides of the Atlantic are being invited to cooperate in the atlas program. The American Geographical Society is serving as general coordinator and publisher.

The first maps to be published will be those of the continental shelf of eastern North America showing fishing activities and the distribution and biological productivity of plants and animals. Two sheets covering the eastern seaboard from the Labrador Sea to the Straits of Florida already have been completed.

The project is under the general auspices of the Committee on Oceanography of the National Academy of Sciences - National Research Council.

The Committee last year set up a Panel on North Atlantic Biogeography to investigate the feasibility of the present project. In a statement to the scientific press, one panel member said: "It happens often in marine research, as elsewhere, that correlations are found which seem significant, only to

have the pattern fall apart in a few years owing to the unsuspected existence of variables which had not been included in the original investigation. Plotting the distribution of as many variables as possible will offer a broader approach to these problems, and will uncover sensitive areas into which new research effort may be put." He said the new atlas would also offer means of publishing material which might not appear in print because of prior demands on research facilities.

It is hoped that most of the financing for the program will come from industry and foundations. Contributions totaling $17,000 already have been made. A total of $42,000 is being sought for the preliminary phase of operations. Cost of the project as a whole is estimated at $500,000.

In Canada, the program is being sponsored by the Canadian National Research Council. European countries are being approached through the International Commission for the Northwest Atlantic Fisheries.

In describing the plan of operation, Dr. Hitchcock said that the completed work sheets returned to the panel by scientists would be evaluated. Once accepted, the materials would be sent to the Society, whose cartographers and technicians would study the best means of graphic presentation. Printing and distribution will be in charge of the Society.

The maps will necessarily vary in scale and in area covered, from a small section of the coast to an entire ocean, but they will all be based on a single oblique stereographic projection so computed that half-degree intersections of parallels of latitudes and meridians of longitude can be accurately plotted on whatever scale is chosen for an individual map.

Thus complete cartographic continuity for the whole area will be provided, and this continuity, valuable in itself, will solve the problem of joining adjacent sheets. It will also facilitate the reduction of large-scale compilations to smaller scales for such purposes as integrating and summarizing important results and conclusions.

The stereographic projection has the property of conformality (directions around points are shown correctly), which is important in plotting movement, as for example, flow lines of currents and migrations of fishes. Though precise measures of distances and areas cannot be recovered directly from a conformal map, simple procedures are available for obtaining these measures with sufficient approximation. In case such measurements are required, we plan to issue short instructions with the base charts.

While excellent marine atlases exist--principally in Russia, the Netherlands, Great Britain, France, and Japan--these do not serve the research needs envisioned. They are generally based on outdated published information, are too limited in scope, too generalized, and of too small a scale to be useful "for the purposes of integrating advanced research relating to marine environments and the problems of biogeography."

* * * * *

EXPEDITIONS BY THE SCRIPPS INSTITUTE OF OCEANOGRAPHY FOR 1960:

Scripps Institution of Oceanography expeditions planned in 1960 include:

Tethys Expedition: To cross the Equator and travel to five degrees south before making port in Honolulu. The expedition has two principal objectives. The first is to take samples of the small creatures of the oceans that live at a depth of about two miles. The distribution of these will be compared with that of near-surface animals, which are better known. In addition, geological studies will be conducted south of Hawaii. The expedition left its California home port in May.

Limbo Expedition. Takes the research vessel Horizon to a point about halfway between California and Hawaii to remain for several weeks measuring currents in waters three miles deep. This vessel also sailed in May.

Monsoon Expedition: Will use a 1,900-ton Navy ARS which is being reconditioned for oceanographic exploration. The ship will sail in August to cross the Pacific and Indian Oceans to Mauritius. After Mauritius she will visit Indonesia and Australia before returning to San Diego. The chief purposes of the trip are sediment studies in tropical waters and geological-geophysical investigations in the Indian Ocean. The Indian Ocean work is part of an International oceanographic investigation of the area.

For three months, starting September 15, the R/V Horizon will engage in studies of the Peru Current, traveling as far south as northern Chile.

* * * * *

LINK ADDED TO UNDERWATER MOUNTAIN CHAIN IN GULF OF ALASKA:

A Coast and Geodetic Survey ship detected an unusual hump on the ocean floor in the Gulf of Alaska this year. The unusual hump turned out to be an 8,700-foot seamount or underwater mountain.

The discovery, announced on May 20, 1960, by the Director of the Coast and Geodetic Survey, U. S. Department of

Commerce, was first reported by the Captain of the Survey Ship Pathfinder after deliberately sailing her through an uncharted spot in a chain of charted underwater mountains marking an ancient fissure on the ocean floor.

When the sweep of the echo-sounder revealed the telltale rise in the ocean floor, the Pathfinder reversed her course and criss-crossed the area in question. After further processing of the soundings, hydrographers had an almost complete picture of the seamount which is a flat-topped cone that measures 12 miles in diameter at the base, $1\frac{1}{4}$ miles across the top, and 8,700 feet high. The almost perfect flat top, which is 3,984 feet under water, is marred by a slight peak in the center.

Although other seamounts of more than two miles high have been found in this region, the new discovery, located 56 degrees north latitude and 143.2 degrees west longitude, forms a significant link in a chain stretching southeastward across the Gulf of Alaska from Kodiak Island toward Vancouver Island. This is the 20th one to be located in the 600-mile chain, which begins on the floor of the Aleutian Trench 100 miles east of Kodiak Island, and it lies about one-third of the distance from Kodiak to Vancouver.

The new seamount is approximately the 160th discovered in this extensive Northeast Pacific region by the Coast and Geodetic Survey ships on their spring and fall trips to and from coastal survey areas in western and northern Alaska, the Aleutians, and in Bering Sea waters.

In addition to the seamount information, the deep-sea sounding lines provide a continuous track of soundings which are the basis of the Gulf of Alaska Nautical Chart No. 8500, originally published in 1952. The current issue of the chart includes numerous seamounts discovered and surveyed in detail to date.

Of interest are two falsely reported seamounts in the area of this chart, one of which was said to have been the cause of a serious shipwreck. When the Washington Mail broke in half in rough seas on March 3, 1956, 300 miles southeast of Kodiak Island, it was claimed that a seamount caused the wreck. Pursuant to this claim the Coast and Geodetic Survey ship Pathfinder sounded a 1,000-square mile area at the reported position, but found no depths less than two miles deep.

Another pseudo seamount was reported to rise $1\frac{1}{2}$ miles to a depth of 70 feet, 75 miles off Vancouver Island, but repeated sounding over a large area indicates that the original reporting may have been caused by acoustic sounding-echoes from the back of a whale.

Although considerable exploration has been accomplished in this vast region of one million square miles, a great amount of surveying and oceanographic exploration is required to fully disclose the nature of this ocean floor so closely related to the continental United States.

Salmon

NEW SALMON FISH HATCHERY UNDER CONSTRUCTION IN STATE OF WASHINGTON:

Construction of a new salmon hatchery on Grays River, Pacific County, Wash., was announced by the Governor on May 5, 1960. The hatchery, with an annual fry capacity of around 7 million salmon and a rearing capacity of 5 million, will be the 22nd in the state's system of salmon hatcheries and the 5th built by Federal funds under the Lower Columbia River Development Program, the Governor said. Cost of construction will be over $500,000.

Plans and specifications for the new hatchery, which were due to be completed on May 6 by the engineering section of the Washington State Department of Fisheries, were sent to Portland, Ore., for approval by the U. S. Fish and Wildlife Service, and finally to the Service's head office in Washington, D. C.

The job will include construction of a hatchery building, 100 by 40 feet, 10 outdoor concrete ponds, a large earthen pond, and two holding ponds for ripening salmon. A fish ladder, racks, and trap will be included for the holding ponds. In addition, a new timber bridge for access to the hatchery site will be constructed to

replace the present bridge. Water for the hatchery will be taken from the river with a gravity water supply system.

The hatchery will be used for the rearing of chinook, silver, and chum salmon, with special emphasis on the short-term rearing of chinook and chum.

* * * * *

WASHINGTON AND OREGON COOPERATE IN SALMON TAGGING PROGRAM:

Salmon were tagged in the Possession Point area in Puget Sound in April by the Washington State Department of Fisheries, marking the third salmon research project carried out by the Department in March and April.

The Possession Point project includes a testing of the effects of single and treble hooks on young salmon. Salmon are caught on sports fishing gear and tagged under the dorsal fin with orange spaghetti-type tags. Recoveries will indicate which type of hook causes the most damage to the fish in addition to adding knowledge of migration patterns.

An offshore troll salmon tagging project was conducted off the coast south of Westport, Wash., from March 15 through April 9. Chinook salmon were tagged in an effort to establish migration patterns and the origin of chinook in the ocean area from North Head north to Grays Harbor. A total of 149 chinook was captured and tagged. Approximately 10 fish were taken each day of fishing. A similar project in 1959 averaged 8 fish per day. During March, best fishing was in the North Head-Willapa Bay area; in early April, fishing picked up slightly in the Westport area. Less than 25 percent of the chinook caught in the 1960 test were under the minimum legal size of 26 inches.

The Oregon Fish Commission also conducted an offshore troll tagging project in conjunction with the Washington Department of Fisheries. The Oregon project resulted in the tagging of 194 chinook. Both investigations included the use of barbed and barbless hooks and preliminary results indicated very little difference in catchability between the two.

The third project conducted by the Washington fisheries agency was a test-fishing investigation on chinook salmon in the Corbett drift area of the Columbia River, in an effort to determine timing of the spring chinook salmon run in the Columbia. This project closed on April 29, just prior to the opening of the spring Columbia River commercial chinook salmon fishing season.

The Columbia River test fishing project was also in conjunction with one conducted by the Oregon Fish Commission in Woody Island area where the fish caught in good condition were tagged and released. The biologists found that it takes approximately 12 days for a chinook salmon to move upstream to the Corbett area from the Woody Island area, a distance of approximately 65 miles.

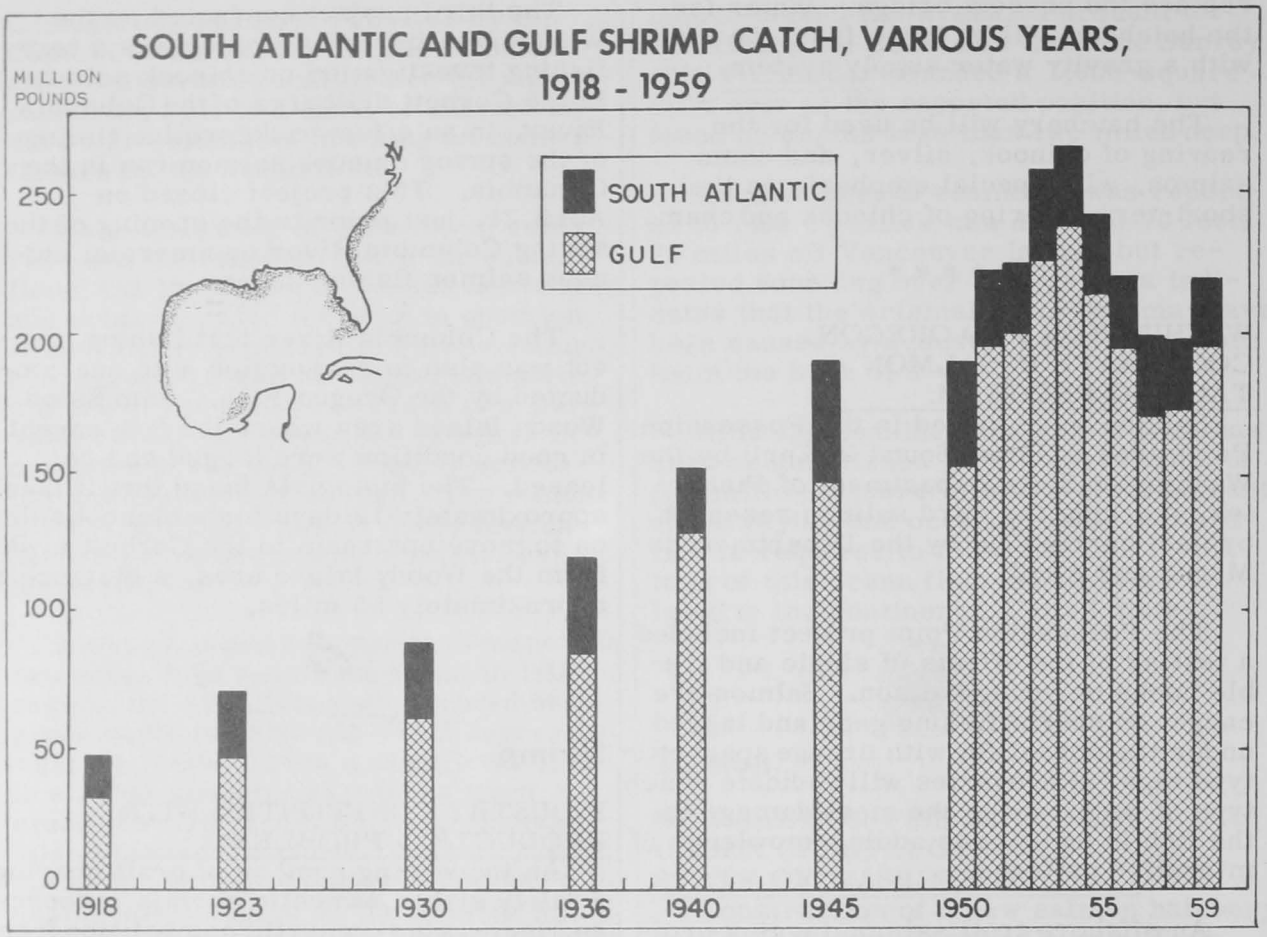
Shrimp

INDUSTRY CONFRONTED WITH PRODUCTION PROBLEMS:

An increasing number of craft sharing a fairly stable domestic shrimp resource and increasing domestic competition from shrimp fisheries developing in many parts of the world are among the problems facing the United States shrimp industry, according to a report issued by the U. S. Bureau of Commercial Fisheries.

The report was prepared in accordance with a provision of the Fish and Wildlife Act of 1956. This provision authorizes the Secretary of the Interior to make a report--when requested--with respect to any fishery product imported into the United States; to determine whether there have been any downward trends in prices, production, or employment; and to determine whether there has been an increase in imports of that product. The request was made by the National Shrimp Congress, Inc., an Organization whose members produce more than 70 percent of United States-caught shrimp.

In releasing the report, Under Secretary Elmer F. Bennett said that it is not purported to be a complete economic



study of the shrimp fishery. "It would have been desirable to have made a more thorough economic study of the industry, but neither time nor resources would permit such detailed effort," he said.

"Accurately projecting the course of world production and expansion of exports of shrimp by foreign nations will require more information than is available in this report," Bennett said. "For these reasons any policy decisions of this Department, particularly with respect to tariff policy, should be based upon additional data and more complete analysis."

The report shows that in recent years there has been an increase in the number of shrimp boats, but no change in production other than the normal annual fluctuations in the resource; there has been a decrease in the gross earnings per boat; the discovery of new shrimp areas has resulted in the construction of more seaworthy larger vessels; increased construction costs are noted; employment has increased at a greater rate than the increase in the number of vessels, mainly because the larger vessels require larger crews; and there has been a substantial increase in the amount of shrimp imported into the country.

One of the significant things noted in the report is that until the price to the shrimp fisherman dropped in 1959 there had been sufficient increase in prices to more or less balance off the decreasing catch per boat. Also, price decreases, boatside, before 1959 had been followed quickly by price increases which tended to stabilize the fishery. The 1959 slump presents a different picture and, the report says, "the effectiveness of the United States shrimp industry in coping with the present situation appears to be reduced."

In 1959 the average gross return for shrimp landings in the Gulf of Mexico and in the South Atlantic areas was $7,500

per shrimp trawler, lower than any year since 1950 when it was $6,400. The average annual catch for 1959 was 17,300 pounds (heads-off weight) per vessel. This was considered low, although it was 1,300 pounds more than the 1958 average. In 1953 the catch per trawler averaged 23,600 pounds.

During the past 10 years the shrimp otter-trawl fleet has increased by about 1,000 craft to a fleet of 7,610 in 1959. The increase was entirely in vessels of five tons net or over; the number of smaller craft of less than five net tons declined. More than 80 percent of the catch was taken by vessels of five net tons and over.

Employment in 1959 was estimated to have been slightly higher than in 1958 when it was 17,153, about 2,000 higher than in 1957. Comparable data for other years are not available.

In 1959 imports were at a record high of 106,555,000 pounds, an increase of 25 percent over the 1958 imports. The 1958 imports were 23 percent higher than those of 1957. In 1939 shrimp imports were four million pounds; in 1950 imports exceeded 40 million pounds and in 1955 shrimp imports approximated 54 million pounds.

Since 1948 the world production of shrimp, exclusive of mainland China, has increased nearly 80 percent, to reach an estimated 632 million pounds, heads-off weight. In 1950, 18 countries exported 40 million pounds of shrimp to the United States. Mexico supplied 99 percent of that. In 1959 there were 51 nations sending more than 106 million pounds of shrimp to the United States. Mexico led with 69 million pounds which represented 64 percent of the total.

South Atlantic Exploratory Fishery Program

LARGE BEDS OF CALICO SCALLOPS FOUND OFF FLORIDA EAST COAST:

M/V "Silver Bay" Cruise 23 (April 13 to May 6, 1960): A large stock of calico scallops (Pecten gibbus), occupying an extensive area, was discovered and tentatively delineated along the east coast of Florida near Cape Canaveral by the U. S. Bureau of Commercial Fisheries' chartered fishing vessel Silver Bay during an April 13 to May 6, 1960, exploratory cruise. Commercial concentrations were found over a 1,200-square-mile area with indications that the bed may be even more extensive.

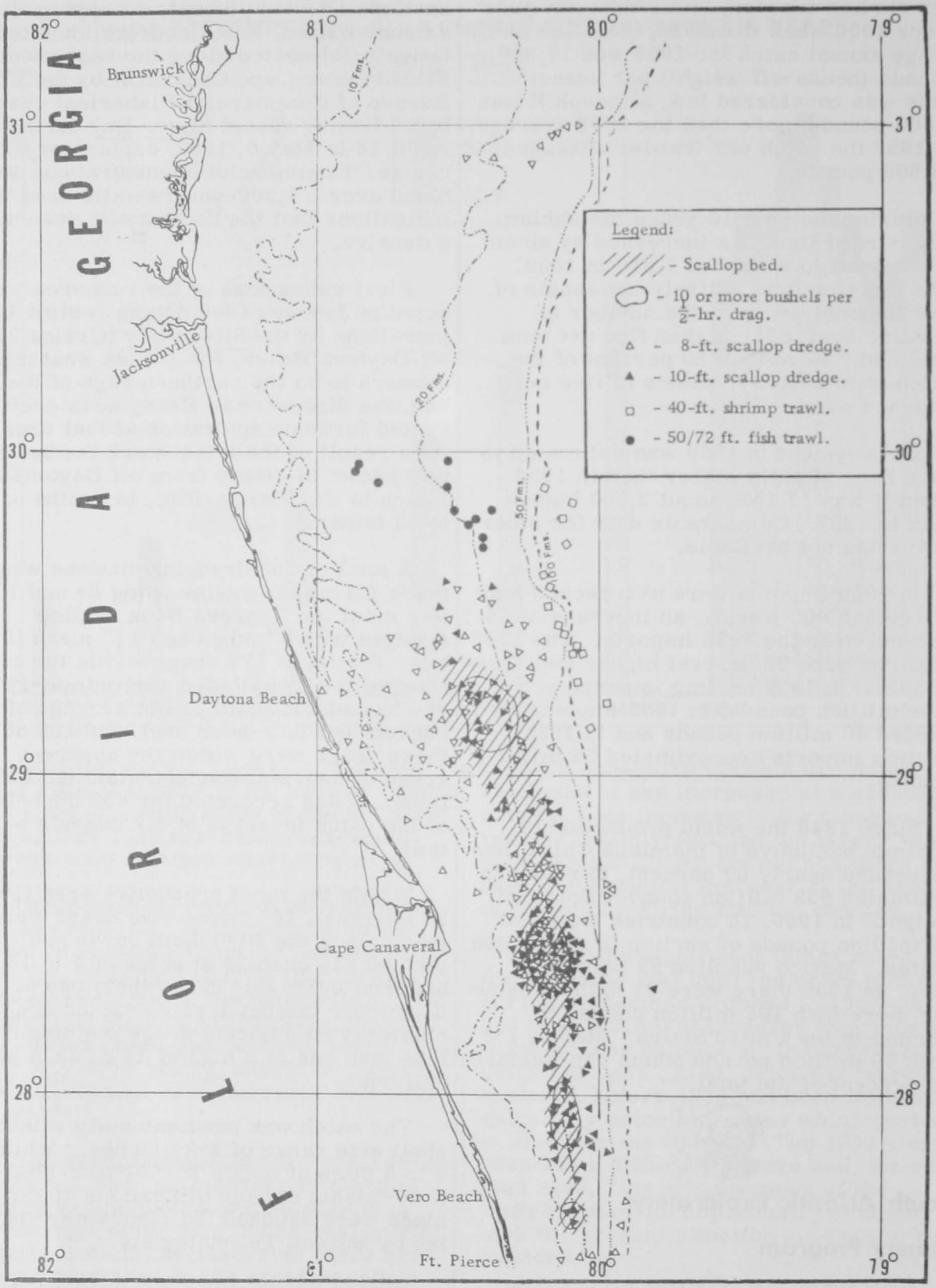
First indications of the resource were noted in January 1960 during routine explorations by the Silver Bay (Cruise 21) off Daytona Beach, Fla., when what now appears to be the northern edge of the bed was discovered. Heavy seas prevented further exploration at that time. As a result of the latest work the bed is now known to extend from off Daytona Beach to Ft. Pierce, Fla., in depths of 10 to 32 fathoms.

A total of 252 dredging stations was made during the cruise using 8- and 10-foot modified Georges Bank scallop dredges with 2" rings and $1\frac{1}{2}$" mesh liners. A total of 177 drags within the confines of the bed yielded approximately 664 bushels of scallops (an average of $3\frac{3}{4}$ bushels per half-hour tow), and 126 of these drags were within the apparent areas of heaviest concentration (15 to 25 fathoms) and accounted for 659 bushels of the catch (average of 5.2 bushels per tow).

Within the most productive area (15-25 fathoms), 16 consecutive drags were made along the 20-fathom curve and yielded 135 bushels at rates of 1 to 13 bushels, averaging 8.5 bushels per day. Elsewhere the catch rates varied considerably on adjacent drags yielding from less than one to a high of 24 bushels per half hour.

The catch was predominantly within a shell size range of $2-2\frac{1}{2}$ inches, yielding 4 to 5 pints of meats per 80-pound bushel. A 40-bushel sample of scallops of varying sizes were shucked for laboratory studies by Bureau Technologists.

Fifteen drags with a 41' head/47' foot rope, $1\frac{1}{2}$" mesh, 2-seam shrimp trawl were made as a seasonal check on the royal-red shrimp potential off St. Augustine and



M/V Silver Bay Cruise 23 (April 12-May 6, 1960).

Daytona Beach. Catches up to 170 pounds (heads-on) per three hour drag were made in 180 to 230 fathoms between 29°53' and 29°09' north latitude.

Limited exploration on known snapper lumps off St. Augustine with a roller-rigged, 2-seam, 4½" mesh nylon fish trawl produced catches of mixed fish up to 1,500 pounds per 90-minute tow. Individual catches as high as 1,000 pounds of vermillion snappers (Rhomboplites aurorubens) and 345 pounds of porgies (Pagrus and Stenotomus) were made. No red snappers were taken.

Note: Also see Commercial Fisheries Review, March 1960 p. 26.

* * * * *

USE OF COMMERCIAL SCALLOP DREDGES DEMONSTRATED TO FISHERMEN:

During the week of May 30 to June 5 the Silver Bay conducted daily trips to the Cape Canaveral scallop bed off the Florida Atlantic Coast to demonstrate use of commercial scallop dredges to interested fishermen.

The M/V Silver Bay (Cruise 24) was scheduled to return to the Cape Canaveral, Fla., area during May 25-June 17 to conduct follow-up explorations and gear trials in the calico scallop bed discovered during cruise 23.

Tuna

UNITED STATES AND JAPANESE BIOLOGISTS COORDINATE RESEARCH ON ALBACORE SPAWNING AREAS:

The Director of the Hawaii Area and the Chief, Albacore Ecology Investigations, Honolulu Biological Laboratory, U. S. Bureau of Commercial Fisheries, returned to Honolulu May 15, 1960, after spending a month conferring with various fishery officials and scientists throughout Japan.

Their trip was made primarily to plan an expedition to discover albacore spawning grounds, to be carried out this summer by the Bureau's research vessel Charles H. Gilbert and the Japanese Fishery Agency's vessel Shunyo Maru, attached to the Nankai Regional Fisheries Research Laboratory at Kochi, Japan. Biologists of the Honolulu Biological Laboratory and the Nankai Laboratory are both interested in learning the origin of this commercially-important Pacific-wide species of tuna. As a result of this trip, future research by Japanese and American tuna biologists will be more closely coordinated.

United States Consumption of Fishery Products, 1959

Fish is not keeping pace with the increased consumption trend for meats and poultry. There has been a sizable per capita consumption increase for meats and poultry, while fish and shellfish consumption is either barely holding its own, or declining.

Per capita meat consumption has increased steadily since 1935-39, with the exception of a decline in 1958 and a predicted minor decline in 1960.

Per capita poultry consumption has also shown a sharp increase since 1935-39, with a tendency toward stabilization since 1957. The greatest surge in consumption was during the 10-year period following 1947 when high volume production and a low selling price became the keynote of that industry.

Conversely, per capita fish and shellfish consumption reached its peak during 1935-39. But it dropped steadily from 1939 until 1958. In 1958 consumption recovered a little and the trend toward stability set in. Less canned and somewhat less cured fish were consumed in 1959 than during 1935-39, and fresh and frozen fish consumption increased only three-tenths of a pound (edible weight) per capita in the same period. The decrease in the consumption of canned fish was caused by a drop in the pack of canned salmon; also a shift in consumer preference from canned to frozen fillets and frozen packaged specialties like fish sticks and portions. Because cured fish is a more selective item and

Apparent Civilian Per Capita Consumption of Fish and Shellfish, Calendar Years, 1935-39 and 1947-49 Averages, 1957-59, and Preliminary for 1960, with Percentage Comparisons

Commodity	Average				Preliminary 1/		1960 as a Percentage of		
	1935-39	1947-49	1957	1958	1959	1960	1935-39	1947-49	1959
	(Pounds)						(Percent)		
Fish (edible weight) - Total	11.0	10.5	10.1	10.7	10.7	10.6	96	101	99
Fresh and frozen	5.4	6.0	5.6	5.9	5.9	NA	-	-	-
Canned 2/	4.9	3.9	3.9	4.2	4.2	NA	-	-	-
Cured	0.7	0.6	0.6	0.6	0.6	NA	-	-	-

1/ Excludes Hawaii and Alaska.
2/ Excludes canned food products containing small quantities of fishery products, such as clam chowder, etc.
NA: not available.

more stable, there has been no significant change in per capita consumption since 1947.

On the whole, however, the picture is not bright for edible fishery products as the major competitive products appear to be getting an ever-increasing share of per capita consumption, and likewise the consumer dollar.

U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, MARCH 1960:

Imports of edible fresh, frozen, and processed fish and shellfish into the United States during March 1960 increased by 27.7 percent in quantity and 17.6 percent in value as compared with February 1960. The increase was due primarily to higher imports of groundfish and other fillets (up 1.5 million pounds), frozen albacore and other tuna (up 7.1 million pounds), and to a lesser degree, an increase in the imports of canned tuna in brine. The increase was partly offset by a 1.4-million-pound decrease in the imports of canned salmon.

Compared with March 1959, the imports in March this year were lower by 4.6 percent in quantity and 0.8 percent in value due to decreases in the imports of frozen tuna other than albacore (down 9.2 million pounds), and canned salmon (down 5.8 million pounds). Compensating, in part, for the decrease was an increase of about 6.3 million pounds in the import of frozen albacore tuna and groundfish and other fillets (up 1.6 million pounds).

U. S. Imports and Exports of Edible Fishery Products, March 1960 With Comparisons

Item	Quantity			Value		
	March		Year	March		Year
	1960	1959	1959	1960	1959	1959
	(Millions of Lbs.)			(Millions of $)		
Imports:						
Fish & shellfish:						
Fresh, frozen & processed[1/]	80.2	84.1	1,070.5	24.1	24.3	309.6
Exports:						
Fish & shellfish:						
Processed only[1/] (excluding fresh & frozen)	3.5	7.7	68.0	0.9	2.1	25.2

1/ Includes pastes, sauces, clam chowder and juice, and other specialties.

United States exports of processed fish and shellfish in March 1960 were lower by 34.5 percent in quantity and 30.8 percent in value as compared with February 1960. Compared with the same month in 1959, the exports this March were lower by 55.1 percent in quantity and 57.1 percent in value. The lower exports in March this year as compared with the same month in 1959 were due to the short supply of California sardines available for export to foreign countries.

* * * * *

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1960 at the 12½-percent rate of duty is 53,448,330 pounds. Any imports in excess of the quota will be dutiable at 25 percent ad valorem.

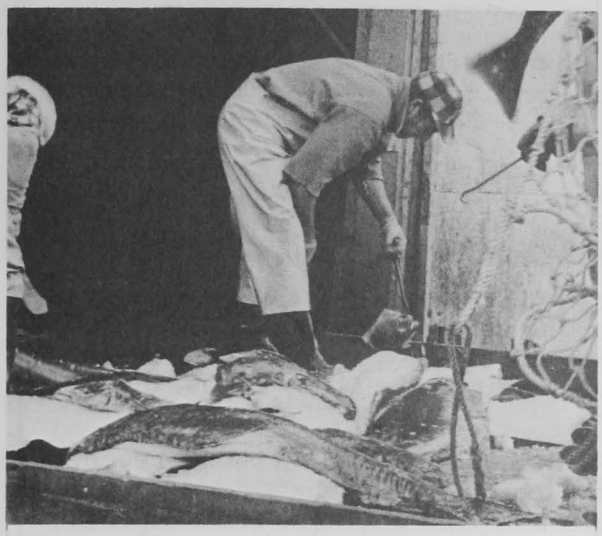
Imports from January 1-April 30, 1960, amounted to 13,516,144 pounds, according to data compiled by the Bureau of Customs. From January 1-May 2, 1959, a total of 14,958,862 pounds had been imported.

Wholesale Prices, May 1960

The over-all wholesale price index for edible fishery products (fresh frozen and canned) for May 1960 was 126.6 percent of the 1947-49 average, up 2.7 percent from the preceding month. This increase from April to May was due primarily to higher fresh haddock and fresh and frozen shrimp prices. From May a year ago to this May the index increased 4.0 percent due mainly to higher prices for shucked oysters, frozen shrimp, and canned fish. The May 1960 index was the highest since March 1959 when it reached 128.2 percent.

With haddock landings at New England ports falling off seasonally from the peak catches of March and April, the ex-vessel price at Boston went up 50 percent from April to May. This sharp price increase plus a further increase in the frozen king salmon price resulted in a 4.0-percent rise in the drawn, dressed, and whole finfish subgroup index. From April to May wholesale prices for fresh-water fish (with the exception of whitefish) leveled off from the high levels that prevailed during the April Jewish holidays. The subgroup price index this May as compared with May 1959 was up about 3.2 percent due to higher prices for frozen dressed salmon and fresh-water whitefish and yellow pike at New York City. These increases more than compensated for lower prices for fresh drawn haddock (down 3.0 percent), fresh and frozen dressed halibut (down 12.6 percent), and Chicago drawn whitefish (down 4.5 percent).

The fresh processed fish and shellfish subgroup price index in May 1960 increased 6.3 percent from the preceding month due to a 9.7-percent increase in fresh shrimp prices at New York City and a 3.7-percent increase in shucked oyster prices. These increases more than compensated for a drop of about 1 cent a pound in the wholesale price for small haddock fillets at Boston. From May a year ago to this May this subgroup index rose 6.9 percent. Although the fresh haddock fillet prices were down sharply (21.7 percent) and fresh shrimp prices were lower by 1.2 percent, the increase of 22.2 percent in shucked oyster prices more than offset the decreases.



Heading and sorting halibut for size after unloading at the dock of a fishery firm in Seattle, Wash.

In mid-May 1960 the wholesale price index for processed frozen fish and shellfish increased by 1.3 percent from the preceding month. The wholesale prices for frozen 26-30 count shrimp at Chicago rose 4.7 percent or about 3 cents a pound. This jump in frozen shrimp prices was sufficient to overcome decreases of about 1/2 to 1 cent a pound in the wholesale prices for the frozen fillet items. In May this year the frozen processed fish and shellfish price index was down 1.8 percent from the same month of 1959. Although frozen shrimp prices were higher by 5.0 percent this May as compared with May last year, frozen haddock fillet prices were down 22.7 percent and flounder fillet prices were down 2.7 percent. Wholesale prices for frozen 26-30 count shrimp this May at 123.5 percent of the 1947-49 average were the highest since April 1959 when the index for this item was 128.1 percent. This price increase between April 1959 and May this year represents an increase of about 18 cents a pound from the low of 62 cents a pound reached in October 1959.

The primary wholesale canned fish price index was unchanged from April to May 1960. As compared with May 1959, the index this May was up 6.3 percent. All wholesale canned fish prices were higher this May than they were in May a year ago. Among the canned fish products included in this subgroup, the only product in good supply in May this year was canned tuna. Seasonal canning of Maine sardines and Pacific salmon began in May, but packs were extremely light.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, May 1960 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1947-49=100)			
			May 1960	Apr. 1960	May 1960	Apr. 1960	Mar. 1960	May 1959
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					126.6	123.3	123.4	121.7
Fresh & Frozen Fishery Products:					142.2	136.7	137.6	138.1
Drawn, Dressed, or Whole Finfish:					150.1	144.3	148.5	145.5
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.09	.06	94.1	60.8	116.9	97.0
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.30	.30	93.5	92.8	90.3	107.0
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.82	.80	184.8	179.2	174.7	174.1
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.74	.98	183.4	241.7	195.8	192.1
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	1.05	1.05	212.5	212.5	144.7	192.1
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.73	1.00	170.0	234.5	181.8	140.7
Processed, Fresh (Fish & Shellfish):					145.8	137.1	142.2	136.4
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.27	.28	91.9	93.6	117.4	117.4
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.86	.78	135.1	123.2	127.2	136.7
Oysters, shucked, standards	Norfolk	gal.	6.88	6.63	170.1	164.0	167.0	139.2
Processed, Frozen (Fish & Shellfish):					117.7	116.2	109.1	119.8
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.38	.38	98.1	99.5	98.1	100.8
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.26	.27	80.1	84.8	89.5	103.6
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.28	.29	112.8	116.8	114.8	112.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.80	.77	123.5	118.0	104.5	117.6
Canned Fishery Products:					104.8	104.8	103.8	98.6
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	24.50	24.50	127.8	127.8	127.8	117.4
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.10	11.10	80.0	80.0	77.9	77.9
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	8.00	8.00	93.9	93.9	93.9	83.9
Sardines, Maine, keyless oil, No. 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	8.75	8.75	93.1	93.1	93.1	88.8

1/ Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

"GHOST" NETS THAT FISH YEARS AFTER THEY ARE LOST

"Ghost" nets that go on fishing years after they have been lost at sea are presenting a novel problem in many parts of the world, especially in the heavily fished waters around Iceland.

Some of the problems created by "ghost" nets--which may be fancifully compared with the fabled Flying Dutchman--were discussed this week at the headquarters of the Food and Agriculture Organization (FAO), Rome, Italy, by the Chief of the Fishing Gear Section of FAO's Fisheries Division.

"The gear concerned in Icelandic waters is the bottom-set cod gill-net made of non-rotting synthetic fibres, mainly nylon," he said. "Such nets are fitted with metal or plastic floats which, like the nets themselves, do not rot, and when the nets are lost by the fishermen, for instance due to broken buoy ropes, they are maintained in a fishing position by the floats.

RETRIEVED NETS FULL OF DEAD AND LIVING FISH: "It is only recently that fishermen have generally realized that the lost bottom-set nets do go on fishing on their own," he continued. "This has been proved when nets are accidentally retrieved some months or even years after they were lost and are found to contain great quantities of rotten fish and fish bones as well as live fish.

"It is not suggested that this is at present a problem which threatens any fishery but it is quite clear that steps must be taken to prevent lost nets remaining in a fishing position," he stated. "But the extent of the potential threat is indicated by the fact that in Iceland each boat engaged in gill-netting operates 75 to 90 such nets, and that these nets, in total, stretch over a length of about 4 kilometres. In the heavily fished areas in Icelandic waters, where sea conditions are often very rough, many kilometres of nets are lost each year."

The Chief of the Fishing Gear Section pointed out that the threat arising from "ghost" nets is likely to grow more serious in those waters where gill-net fishing is practiced on a large scale but should also be given attention in the developing fisheries in Africa and Asia.

COTTON FLOAT LASHINGS MAY PROVIDE ANSWER: "Suggestions have already been made for solving the problem," he said. "For example, one proposal is that the floats of such nets should be attached by untreated cotton which would quickly rot away if the nets are lost. Released from the floats, the nets would sink to the bottom and cease to catch fish. However, float lashings of this type would have to be renewed periodically and would be the cause of a lot of extra work by the fishermen.

"We have brought this problem to the attention of the International Council for the Exploration of the Sea and the International Commission for the Northwest Atlantic Fisheries, both of which are studying the problem in the hope of finding a practical solution," he added.

With the extensive and still rapidly expanding use of many varieties of synthetic fibre nets, there is need to take effective, practical action.

SYNTHETIC FIBRE NETS VASTLY INCREASE CATCHES: "Nets made of nylon and other synthetic fibres, including new types which have been developed recently, have already proved a boon to fishermen," he stated. "A simple but often very effective gear, gill-nets can be operated even from primitive unpowered craft. They have been particularly valuable in the drive to increase fish production in underdeveloped countries. For example, FAO has helped to introduce synthetic fibre nets in India and many of the countries of Asia and the Far East, with the result that fishermen are catching as much as five times more fish than they were able to catch with their traditional nets made from local fibres.

"But," he concluded, "as experience shows, there are unexpected draw-backs to be found in any innovation although I am quite sure that we shall soon solve this problem of 'ghost' net fishing."