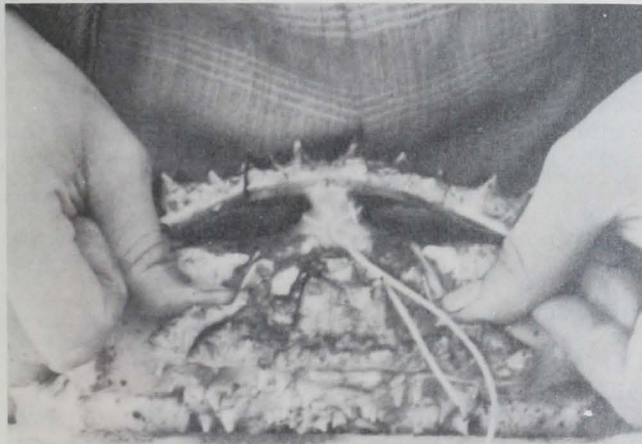


TRENDS AND DEVELOPMENTS

Alaska Fisheries Investigations

ALASKA STATE-FEDERAL COOPERATIVE KING CRAB RESEARCH:

The king crab biological research programs of the Alaska Department of Fish and Game at the Kodiak Research Center and the U. S. Bureau of Commercial Fisheries Biological Laboratory at Auke Bay have been coordinated. The Bureau Laboratory's research efforts are to be concentrated on the continental shelf west of Chirikof Island and the Alaska Center's efforts are to be concentrated on studying the Kodiak stocks of



Tagging king crab in Alaska.

king crab. One of the research groups also is to place a research biologist aboard the Bureau of Commercial Fisheries exploratory fishing vessel that will be working Portlock Bank (near Kodiak) this summer. Alaska Department biologists will continue to handle collection of all king crab tags.

LITTLE PORT WALTER SALMON STUDIES:

At Little Port Walter the peak migration of pink and chum fry occurred in Sashin Creek between April 25 and May 25. By May 25 the total fry escapement was 5.7 million pinks and 123,000 chum fry. The numbers of each species leaving Sashin Creek this

spring will be in close agreement with the abundance of pre-emergent fry estimated in late March. At that time about 6.3 million pink and 123,000 chum pre-emergent fry were estimated to be present in Sashin Creek spawning beds. The 1962



Fish eggs and "fry," or baby fish.

migration from Sashin Creek is the largest on record for both pink and chum fry since enumeration started on pink fry in 1941 and chum fry in 1943. The largest previous recorded migration of pink fry occurred in 1960 with 5.3 million and chum fry in 1945 with 38,000.

Twelve SCUBA-equipped biologists from the Auke Bay Laboratory participated in an intensive survey of the Sashin Creek estuary and obtained information on the ecology, distribution, movement, and school-size of pink salmon fry, both in the estuary and along the coast of Chatham Strait. An intense phytoplankton bloom was under way in the inner bay, limiting



SCUBA divers have learned many things about fish and fishing.

visibilities to 4 feet or less. Nearly all fry were situated in the upper 2 feet of the water column, and fry were infrequent at depths of 3 feet or greater. The larger schools of fry seemed to be farther from the shore and in deeper water than the smaller schools. Foraging individuals appeared to be giving most attention to the surface and the upper four feet. Potential predators noted in the upper four feet included juvenile coho salmon, kelp greenling, adult herring, and whiting. All, however, were in such small numbers that they would be incapable of taking large numbers of fry. Deeper dives in the outer harbor and along the coast disclosed a surprising dearth of fish at depths between 30 and 80

feet. Whether this scarcity is seasonal or permanent is not known at present.

* * * * *

AUKE BAY ESTUARY SALMON STUDIES:

Migrant salmon indexing experiments in Auke Creek and Bay were nearly complete in May 1962. Preliminary analyses indicate: (1) Over 65,000 pink salmon fry entered the bay from Auke Creek (75 percent between May 6-14). (2) Over 30,000 pink migrants were captured in 2 floating traps in Auke Bay (80 percent between May 12-18). It is believed that these fry were predominantly from Auke Creek. (3) A reliable method of counting fry migrants photoelectrically was developed. Auke Creek experiments for pinks resulted in 1 out of every 2, 3, and 9 fry being recorded by the counter on the aperture and photocell positions; for sockeye smolt in Auke Creek, 1 out of every 2 smolt were counted by the photocell. (4) Salt-water holding pen experiments for pink salmon entering Auke Bay will continue as long as possible. The first experimental group of Auke Creek migrants was placed in the pens April 1, and a weekly sample has been taken throughout the run. Weekly length frequencies are being obtained for each complete experiment, using a simple photographic technique developed for the purpose. Results indicate: (a) a highly favorable estuary environment (only one mortality attributable to a natural cause); (b) growth rates comparable to those obtained in similar experiments in Smeaton Bay near Ketchikan in 1956, 1957, and 1958. (5) Sockeye smolts leaving Auke Lake reached a peak on May 21, which is 2 weeks later than the peak in 1961. The run through May was estimated in excess of 40,000 sockeye smolts.

* * * * *

HERRING SPAWNING STUDIES:

Herring spawning took place in Auke Bay during late April and early May. The spawning in 1962 appears to be somewhat lighter than usual, although it was spread over a large area. The crop of rock weed (a preferred substrate for spawning) appeared to be considerably smaller than usual this year which may be reflected in the widespread nature of the spawning activity.

Herring eggs deposited in April and early May began hatching toward the end of May. Efforts to take herring larvae with a high-

speed plankton sampler have not yet been successful. Since the samplers used have shown considerable success in capturing other fish larvae and juveniles of considerably larger size than herring larvae, it would appear that the herring larvae were not accessible in Auke Bay. Either they are too close to the beach or at too great a depth to be successfully sampled with the present procedure, or they may have been carried out of the bay by tidal currents immediately after hatching.

* * * * *

KARLUK LAKE SOCKEYE SALMON STUDIES:

Sockeye salmon smolt catches out of the Karluk River were extremely light until May 18 when the out-migration increased in magnitude. The first few adult sockeye salmon appeared at the Karluk River weir site on May 16, which is almost 2 weeks earlier than in 1960 and 1961. Fry migrations into Karluk Lake from Meadow Creek and Grassy Point peaked in early May. Based upon a mark and recovery method using stained fry, Meadow Creek contributed about 275,000 fry and Grassy Point about 234,000. The Grassy Point fry run in 1962 is about one-half of that of 1961.



Alaska

DOUGLAS MARINE STATION BEING SET UP:

Plans were being completed in May 1962 for setting up the Douglas Marine Station of the Marine Science Institute, University of Alaska. It will be located in the former Mayflower School Building in Douglas, Alaska (near Juneau). The Station will be used as a research laboratory and graduate training school. Two oceanographers, both from Texas A. and M. are already there. Three additional researchers were expected.

The research program for the new Marine Station is expected to be well under way by fall. The Director of the Marine Science Institute stated that he hoped the Station would have a research vessel in the near future.



American Fisheries Advisory Committee

INTERIOR DEPARTMENT ADVISORY GROUP VIEWS STATUS OF FISHERIES:

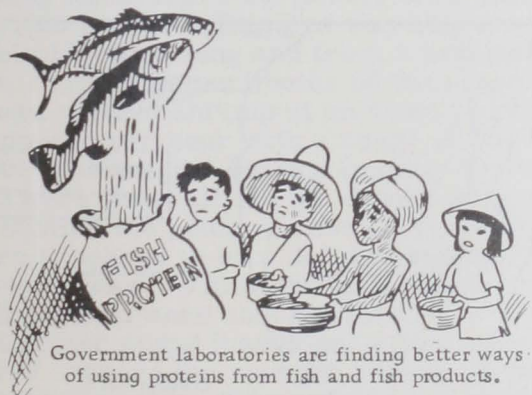
A searching look at the present status and future of the Nation's commercial fisheries was taken by the American Fisheries Advisory Committee at its 14th meeting, held May 24 and 25, 1962, in Washington, D. C. The meeting was opened by Frank P. Briggs, Assistant Secretary of the Interior for Fish and Wildlife, who called for serious deliberations by the Committee on problems facing the American fishing industry.

The Committee, an advisory group to Secretary of the Interior Stewart L. Udall, spent much of its session working as four study groups, composed of five members each. These groups assessed the Atlantic area, the Pacific area, the Gulf and Caribbean area, and the Inland areas, reporting to the full Committee and the Bureau of Commercial Fisheries on the current status of the fisheries in those areas and what the situation is likely to be in the immediate future and in 1975.

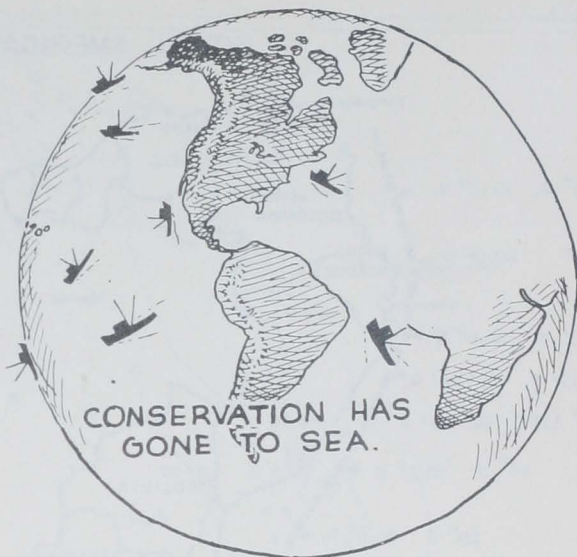
Significant among the findings were the growing effect of international activities upon the fisheries and the need for long-range planning. The increasing amounts of fishery products being imported into the United States, the competition with other nations for the resources of the sea, and the need for using presently untapped fish species also were stressed.

The groups also recommended to the Bureau of Commercial Fisheries an acceleration of its marketing program. The Committee felt that some United States markets lost to imports could be regained by an aggressive promotion of fishery products and that the per capita consumption of fish in the United States could be increased through such means as consumer education on the nutritional value of fish. The need for improved and consistent quality also received considerable attention.

Under Secretary of the Interior James K. Carr addressed the meeting and emphasized the potential of increased fish production as a means of utilizing all marine resources, of providing an opportunity for tremendous expansion of the fishing industry, and of the United States taking the lead in solving world-wide problems of hunger and malnutrition. Carr said the Department is solidly behind a proposal to manufacture fish protein concentrate from whole fish for human consumption and said he is optimistic about the manufacture and distribution of this protein supplement on a world-wide basis.



The Bureau of Commercial Fisheries described its work in the fish protein concentrate field. The Bureau is exploring various methods for manufacturing the concentrate, including chemical and other extraction processes that have shown promise. The Bureau's preliminary findings indicate that fish protein concentrate is a cheap, highly nutritional, easily stored, and transported product with a variety of uses.



America belongs to nine International Commissions dealing with the produce of the sea.

Among other Bureau programs reviewed for the Committee were the Bureau's participation in the Tropical Atlantic Oceanography Survey, its vessel construction differential subsidy program, its student fellowship program, and its long-range program planning.



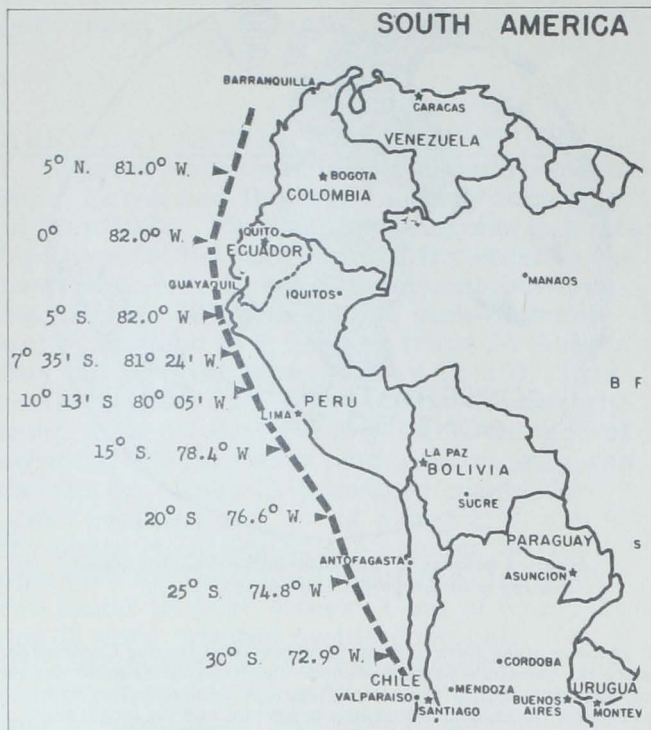
Antarctica

FISHERIES AND OCEANOGRAPHY INCLUDED IN RESEARCH VESSEL "ELTANIN" STUDIES:

On the first leg of her voyage to Antarctica to begin scientific operations in polar waters, USNS Eltanin left New York on May 23, 1962, for Valparaiso, Chile. In addition to regular scientific studies that can be made during the voyage, the ship will make nine special stops between Panama and Valparaiso for oceanographic studies related to Antarctic research. The vessel was expected to arrive in Valparaiso in late June.

USNS Eltanin is a floating research laboratory maintained by the National Science Foundation. Scientific projects carried out aboard the ship are funded and coordinated by the Foundation, and operation of the ship is by the Military Sea Transportation Service

On her cruise southward, the Eltanin will make two major stops in the Peru-Chile trench, where bottom trawls will be made by the University of Southern California marine biology group aboard and piston cores



Oceanographic Stations USNS *Eitanin* (May-June 1962).

will be obtained by Florida State University personnel. The Florida State group will obtain piston cores at three additional locations, and at all nine stops hydrographic stations will be made for Texas Agricultural and Mechanical College scientists.

Because of the interest expressed in these studies, the voyage has been designated Cruise 3 of the *Eltanin* to indicate that scientific observations are an important mission of the voyage.

Cruise 2, the major shakedown cruise of the ship following her conversion for research purposes, was made between March 15 and April 16, 1962, between New York and an area in the Labrador basin near Greenland. The area was chosen to duplicate as closely as possible Antarctic conditions, and at the same time to obtain useful scientific data.

Only limited oceanographic studies had previously been made in the area at that time of year.

Marine biology work was carried out by the University of Southern California, with a major biological station made. Nine complete hydrographic stations were obtained by Lamont Geological Observatory in a network from the southern tip of Greenland to Labrador, from which a delineation of water masses

and ocean currents was accomplished. Lamont microbiologists made continuous studies of primary productivity of plankton of the near surface waters en route.

Cruise 1 of the *Eltanin* took place briefly in late February and early March 1962 to test scientific equipment.

Note: See *Commercial Fisheries Review*, October 1961 p. 9, August 1961 p. 16, June 1961 p. 15.



California

EXPLORATORY FISHING FOR PINK SHRIMP OFF NORTHERN AREA:

M/V "Alaska" Cruise 62-A-2 (April 17-May 29, 1962): Exploratory fishing to locate concentrations of pink shrimp (*Pandalus jordani*) in the coastal waters off central and northern California from Avila to Crescent City was the principal objective of the cruise by the California Department of Fish and Game research vessel *Alaska*. Other objectives were to determine size, sex, and weight of shrimp from different areas; to count and weigh incidental fish by species; and to obtain bottom temperatures in shrimp-fishing areas.

A total of 188 tows were made with a 20 x 6 foot beam trawl with 1¼-inch mesh netting. The tows lasted 20 minutes. Sixty-one tows were in Area A from the California-Oregon border to Mad River; 51 tows in Area B-1 from Big Flat to Laguna Point; 43 tows in Area B-2 from Salt Point to Bodega Head; and 31 in Area C from Pt. San Luis to Pt. Sal.

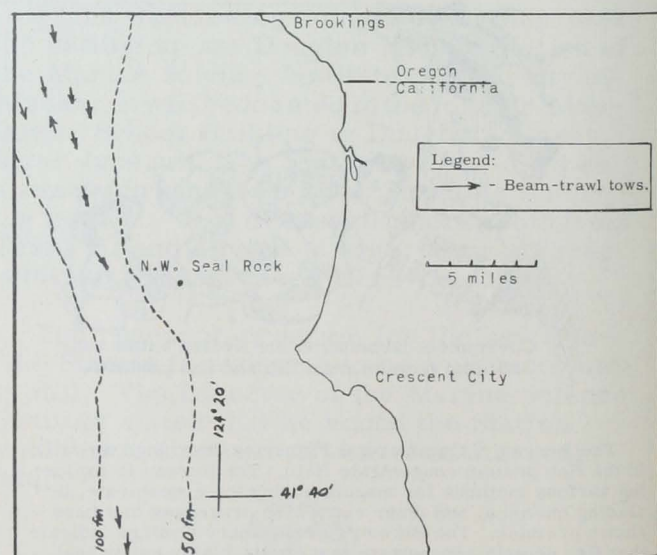


Fig. 1 - Area A.

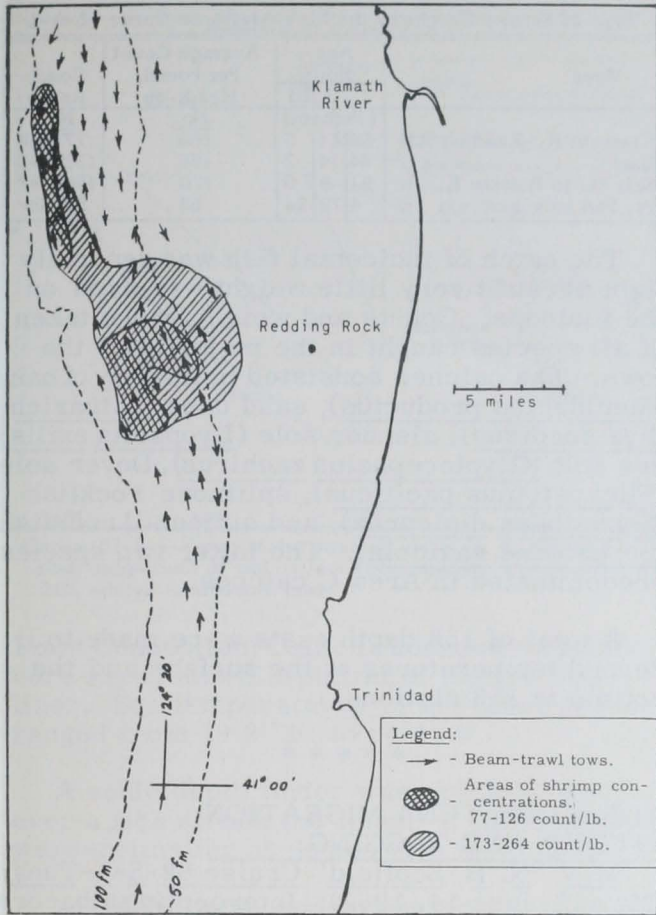


Fig. 2 - Area A.

The best shrimp catches in Area A were off the Klamath River and Redding Rock in 45 to 82 fathoms. The heaviest concentrations of shrimp were west and southwest of Redding Rock where 20-minute tows yielded up to 600 pounds. This bed was approximately 17 miles long and from 1 to 6 miles wide. Within the perimeter of the schools, 19 tows yielded shrimp at an average rate of 819 pounds per hour with a range of 105 to 1,800. The largest shrimp (mostly 2-year-olds) were generally in the deeper waters and outside the younger ones (1-year-olds). There appeared to be a definite separation by year-class. Within the area where the older shrimp were concentrated, they averaged 99 per pound (heads on) with a range of 77-126. Where the younger shrimp were concentrated they averaged 225 per pound with a range of 173 to 264. No shrimp concentrations were found between Pt. St. George and the Calif.-Oregon border. One tow off Brookings yielded 125 pounds of shrimp in 20 minutes.

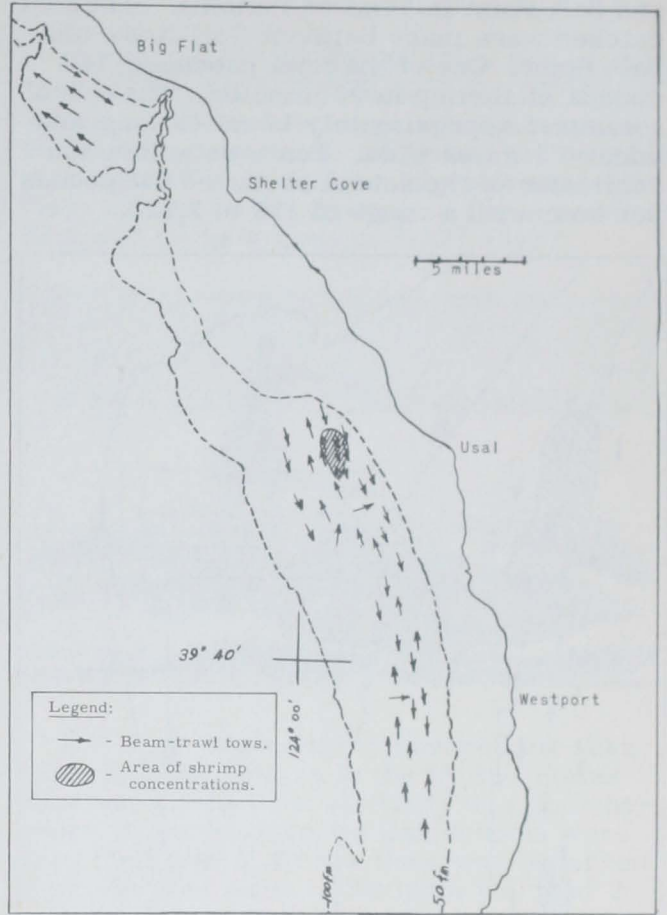


Fig. 3 - Area B-1.

Shrimp were difficult to find in Area B-1, and only one small concentration was located off Usal in 62 to 70 fathoms. The bed measured approximately $1 \times 2\frac{1}{4}$ miles. The catch rate there ranged from 525 to 1,800 pounds per hour with an average of 925. No shrimp were caught in 8 tows off Big Flat and 12 off Westport.

In Area B-2, a narrow concentration of shrimp was found between the Russian River

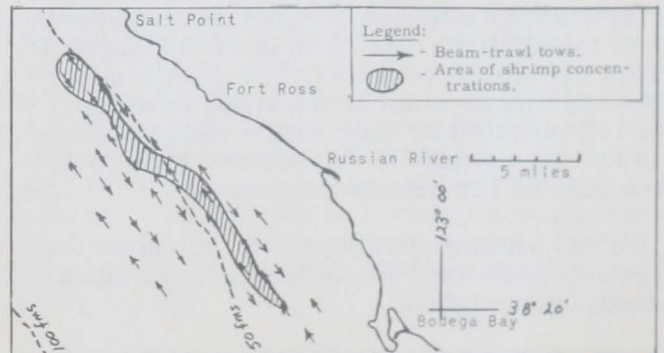


Fig. 4 - Area B-2 (Figs. 1-4 are all beam-trawling station locations of M/V Alaska Cruise 62-A-2).

and Salt Point in 44 to 56 fathoms. The best catches were made between Fort Ross and Salt Point. One of the tows produced 740 pounds of shrimp in 20 minutes. The school measured approximately 17 miles long and about 0.7 miles wide. Ten tows within the perimeter of the school produced 548 pounds per hour with a range of 138 to 2,220.

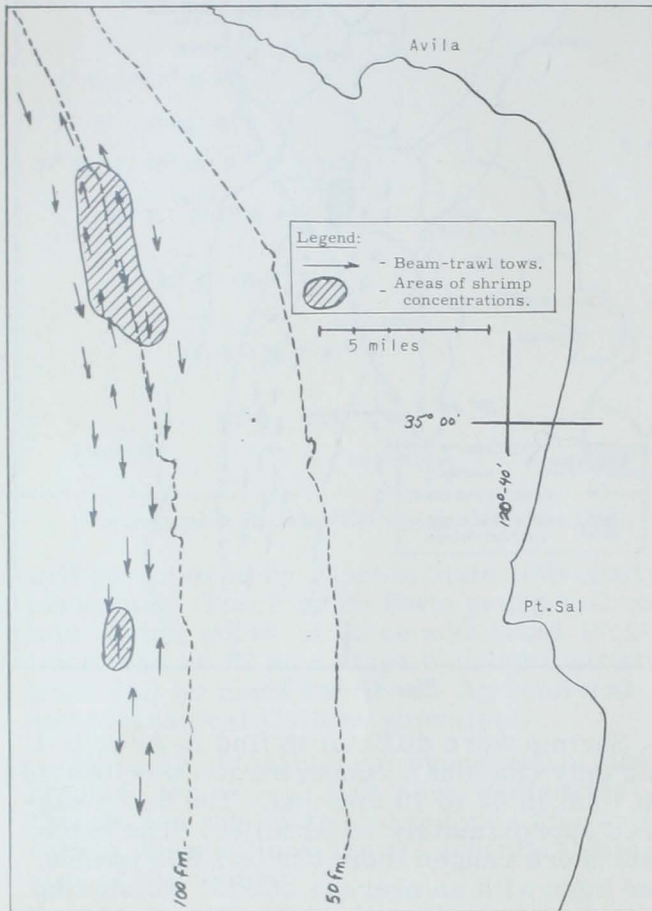


Fig. 5 - M/V Alaska Cruise 62-A-2, Area C. Location of beam trawl tows.

Area C did not yield shrimp in commercial quantity although a minor concentration was found off Pt. San Luis in 95-133 fathoms. This bed was approximately 1.5 x 5.5 miles. Six tows made from it produced an average of 123 pounds per hour with a range of 93 to 183. One tow off Pt. Sal yielded shrimp at the rate of 111 pounds per hour.

Fifty shrimp from each tow made on the shrimp beds were classified by sex, measured, and weighed.

Most of the females had completed spawning and by the latter part of May very few females were carrying eggs.

Type of Shrimp Caught by the M/V <u>Alaska</u> on Cruise 62-A-2					
Area	Age-group			Average Count Per Pound, Heads-on	Count Range
	I (Percent)	II	III		
Klamath R. -Redding Rd.	54	41	5	160	77-264
Usal	84	14	2	166	133-198
Salt Pt. to Russian R.	91	9	0	170	156-197
Pt. San Luis	4	72	24	63	58-68

The catch of incidental fish was generally light because very little weight was used on the footrope. Counts and weights were taken of all species caught in the majority of the tows. The catches consisted primarily of hake (Merluccius productus), sand dabs (Citharichthys sordidus), slender sole (Lyopsetta exilis), rex sole (Glyptocephalus zachirus), Dover sole (Microstomus pacificus), splitnose rockfish (Sebastes diploproa), and stripetail rockfish (Sebastes saxicola). The latter two species predominated in Area C catches.

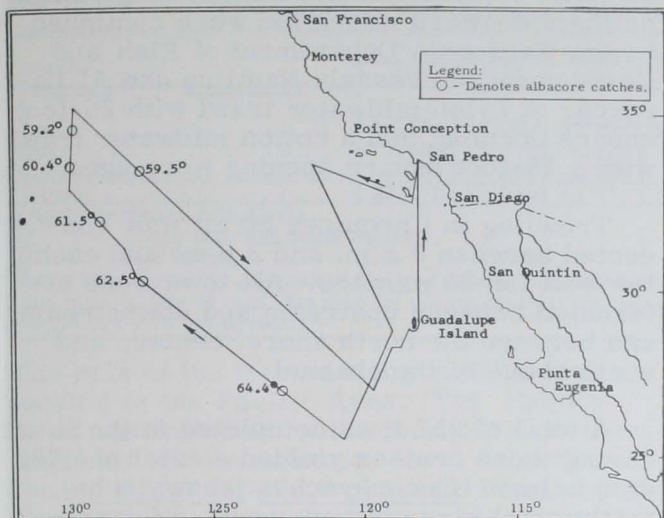
A total of 158 depth casts were made to record temperatures at the surface and the bottom at 158 stations.

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ALBACORE TUNA MIGRATION STUDIES AND TAGGING:

M/V "N. B. Scofield" Cruise 62-S-4-Tuna (May 17-June 14, 1962): Intercepting albacore tuna schools and collecting biological data were the principal objectives of the California Department of Fish and Game research vessel N. B. Scofield during this cruise. The vessel operated in the high seas area off California and northern Baja California between latitudes 25° and 36° N. and offshore to longitude 130° W. The detailed objectives of the cruise were to: (1) intercept albacore schools approaching the Pacific coast fishing grounds prior to the fishing season and to determine their migration route; (2) collect oceanographic and biological data that may be related to albacore occurrence; and (3) tag albacore, and to take scales and stomach contents from those not tagged.

Adverse weather at the beginning of the cruise caused a revision of the cruise plan. Weather for the remainder of the trip permitted normal operations. Surface trolling gear was used during most of the 3,000-mile cruise. Nine albacore were caught. The first fish was caught 250 miles southwest of Guadalupe Island and the second, 600 miles west of Point San Quintin, Baja California. The other seven fish were caught in an area extending from 350 to 425 miles westward from



Cruise (62-S-4-Tuna) of the research vessel *N. B. Scofield* to study migrations of and collect oceanographic and biological data related to albacore tuna.

Point Conception, Calif. In addition, two albacore were lost while pulling in the trolling lines. Sea temperatures in the catch areas ranged from 59.2° F. to 64.4° F.

A sonic depth finder was operated whenever a fish struck the lines. It indicated fish were swimming at depths of 5 to 60 fathoms.

At 74 stations, approximately 40 miles apart, 450-foot depth readings and 10-meter Nansen bottle casts were made. A thermograph provided a continuous record of sea temperatures which ranged from 54° F. to 65.1° F. during the cruise.

Twelve night-light stations were occupied with Pacific sauries collected at every station. Myctophids were numerous, and squid were observed at many stations. Large jack mackerel, obtained by hook and line at two stations, were saved.

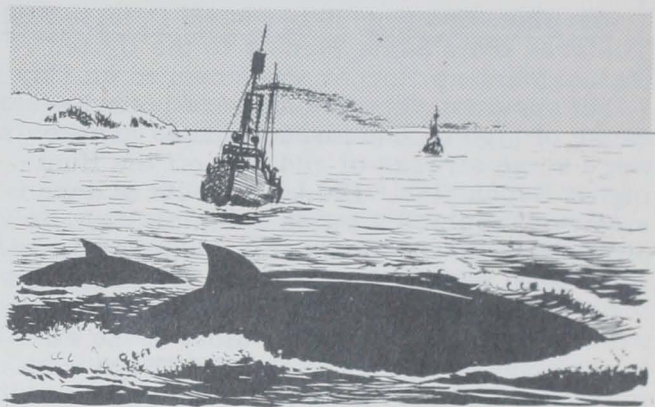
Several hours were spent fishing with a rod and electric reel while drifting over the Fieberling Guyot (32°24' N., 127°52' W.). The least depth found was 242 fathoms. Although the depth finder indicated fish were present, none was caught.

Scale samples were taken from all albacore, and several parasites and food items from the stomachs were saved for analysis. No fish were tagged during the cruise.

* * * * *

PELAGIC FISH POPULATION SURVEY CONTINUED:

Airplane Spotting Flight 62-4-Pelagic Fish (April 9-12, 1962): To determine the distribution and abundance of pelagic fish schools, the inshore area from the United States-Mexican Border to Half Moon Bay was surveyed from the air by the California Department of Fish and Game's Cessna "182" 9042T.



The first day's survey covered the area from Redondo Beach to the United States-Mexican Border; the visibility was poor because of low clouds. No fish schools were seen but a pod of 25 sea lions was observed about 2 miles north of Scripp's pier and 2 gray whales were seen heading north.

On the second day's survey, the coastline between Los Angeles Harbor and Pt. Piedras Blancas was covered. Scouting conditions were good after the fog dispersed. Twenty-six anchovy schools were sighted off Malibu pier and 28 north of Pt. Dume. One of these was strung out for one-half mile under a reddish-colored surface streak. Between Port Hueneme and Coal Oil Point, 125 anchovy schools were counted.

Some of the anchovy schools were under the natural oil slicks at Coal Oil Point. Two school groups off Gorda Pt. were large; one was 3 miles long by about one-half mile wide and estimated to contain between 200 and 300 schools of anchovies. The other large one was estimated to contain between 100 and 200 schools. Twenty-three anchovy schools were sighted off the pier at Cayucos and three off Pt. Buchon. Five gray whales were observed going north.

No survey was made on the third day because of fog and low overcast.

Surveying conditions were excellent on the last day of the flight and the area from Half Moon Bay to San Luis Obispo Bay was covered. Two anchovy schools were spotted off Moss Landing, 18 off Santa Cruz, 1 off Soquel Pt., and 8 in San Luis Obispo Bay. Seven gray whales, all going north, were sighted.

The survey was continued May 7-11, 1962.

Airplane Spotting Flight 62-5-Pelagic Fish: The area from Santa Monica to the United States-Mexican Border was covered on May 7, but surveying conditions were poor because of high clouds and low haze. There were some streaks of red tide off the Huntington Beach pier. Eleven schools of anchovies were sighted 2 miles north of Scripp's pier and 6 off Pacific Beach. Some of these were near the beach and very visible against the white sand bottom. Thirty-five sea lions were in the same vicinity. Most of the anchovy schools sighted in the San Diego area were near the mouth of the Tia Juana River.

On May 8, no flight was possible because of fog and overcast.

Scouting conditions in the area between Santa Monica and San Simeon on May 9 were good after the fog burned off. A total of 255 schools of anchovies were sighted between Malibu and Goleta, 4 in San Luis Obispo Bay, and 1 off the Cayucos pier. Some streaks of red tide were observed off Port Hueneme.

Surveying conditions were good in the area from Long Beach to the United States-Mexican Border on May 10. There were 31 anchovy schools between San Diego and the border, most near the mouth of the Tia Juana River.

In the area between Half Moon Bay and Pt. Sal, on May 11, 38 anchovy schools were counted between the Pajaro River and Soquel Point while flying north. On the flight south, the wind had increased and only a few schools were visible.

Note: See Commercial Fisheries Review, July 1962 p. 12.

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MIDWATER TRAWLING FOR SALMON FINGERLINGS CONTINUED:

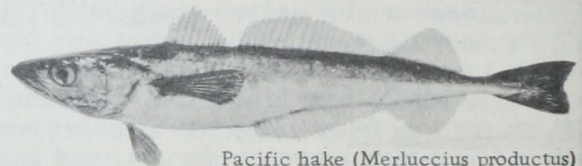
M/V "Nautilus" Cruise 62-N-1i, 5b, 5c-Salmon (April 30-May 4, May 14-17, May 21-25, 1962) and M/V "Al Larocca" Cruise 62-C-5d-Salmon (May 27-June 3, 1962): Mid-water trawl operations in the Carquinez

Strait to capture marked salmon fingerlings on their seaward migration were continued by the California Department of Fish and Game research vessels Nautilus and Al Larocca. A nylon midwater trawl with 25-foot square opening, and a cotton midwater trawl with a 15-foot square opening were used.

Trawling in Carquinez Strait was conducted between 8 a.m. and 3 p.m. and each tow was for 20 minutes. All tows were alternated between upstream and downstream, and between the north shore, center, and south shore of the channel.

A total of 257 tows completed in the Strait during these cruises yielded a catch of 1,783 king salmon (Oncorhynchus tshawytscha). Of the total king salmon caught, 94 were marked fish.

Other species appearing in the catch in significant quantities were: Pacific herring (Clupea pallasii) about 120,000 fish, northern anchovy (Engraulis mordax) about 70,000 fish, Sacramento smelt (Spirinchus thaleichthys) about 10,000 fish, king salmon (Oncorhynchus tshawytscha) 1,783 fish, striped bass (Roccus saxatilis) 1,223 fish, American shad (Alosa sapidissima) 616 fish, splittail (Pogonichthys macrolepedotus) 147 fish, northern midshipman (Porichthys notatus) 146 fish, and fine-scaled goby (Lepidogobius lepidus) 122 fish.



Pacific hake (Merluccius productus)

New species appearing for the first time since mid-water trawling operations began on April 10, 1961, consisted of night smelt (Spirinchus starksi) 4 fish, yellowtail rockfish (Sebastes flavidus) 1 fish, and Pacific hake (Merluccius productus) 1 fish.

Note: See Commercial Fisheries Review, June 1962 p. 7.



Cans--Shipments for Fishery Products

BY AREAS AND QUARTERS, 1961 AND 1960:

In 1961, the Pacific Area or West (including Hawaii and Alaska) utilized 73.4 percent of the 126,017 short tons of steel used in the manufacture of cans for fishery products.

U. S. and Puerto Rico Shipments of Steel Used for Cans for Fishery Products, 1960 and 1961

Area	First Quarter		Second Quarter		Third Quarter		Fourth Quarter		Total	
	1961	1960	1961	1960	1961	1960	1961	1960	1961	1960
(Short Tons)										
West ^{1/}	14,571	16,090	30,801	30,540	27,538	23,776	19,581	17,960	92,491	88,366
East ^{2/}	7,664	5,311	8,179	6,546	7,170	11,854	7,067	7,257	30,080	30,968
Central ^{3/}	737	622	1,191	1,451	678	1,725	840	797	3,446	4,595
Total	22,972	22,023	40,171	38,537	35,386	37,355	27,488	26,014	126,017	123,929

^{1/} Includes Hawaii and Alaska.
^{2/} " Puerto Rico and South Atlantic.
^{3/} " Gulf States.

Note: Statistics cover all commercial and captive plants known to be producing 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.

The bulk of the fish-canning facilities are located in the Pacific Area. The Pacific Area was followed by the Eastern Area (New England, Middle Atlantic, South Atlantic, and Puerto Rico) with 23.9 percent. The Central Area (including the Gulf States and Inland States) used only 2.7 percent.

The over-all 1961 total was up 1.7 percent from the amount used in 1960. An increase



of 4.7 percent in the amount of steel used for cans in the Pacific Area was partly offset by a drop of 2.9 percent in the amount used in the Eastern Area and a decline of 25.0 percent in that used in the Central Area. The increase in the Pacific Area was due to greater packs of tuna and salmon. The decline in the Eastern Area was accounted for by a very light pack of Maine sardines. A substantial drop in the pack of canned shrimp was responsible for the drop in the Central Area.

During the second quarter of 1961, when shipments of steel for the manufacture of cans for fishery products were heaviest for all areas, canneries in the Pacific Area received 33.3 percent of the total amount they consumed, while the Eastern Area received 27.2 percent, and the Central Area received 34.6 percent.

Note: See Commercial Fisheries Review, April 1962 p. 12, August 1961 p. 21.

* * * * *

JANUARY-MARCH 1962:

The amount of steel and aluminum consumed in the manufacture of cans shipped to fish and shellfish canning plants during January-March 1962 was 10.6 percent above that used during the same period in 1961. Prior to this year, these figures covered only tin-

plate cans, but beginning with January 1962 aluminum cans are included.

During this period 584,135 base boxes of steel and aluminum were used, whereas in the same period of 1961 (when only tinsplate was reported), 528,346 base boxes of steel were consumed in making cans shipped to fishery plants. The addition of the data on aluminum was only partly responsible for the increase in cans this year; most of the increase was due to greater packs of tuna, shrimp, and Maine sardines.



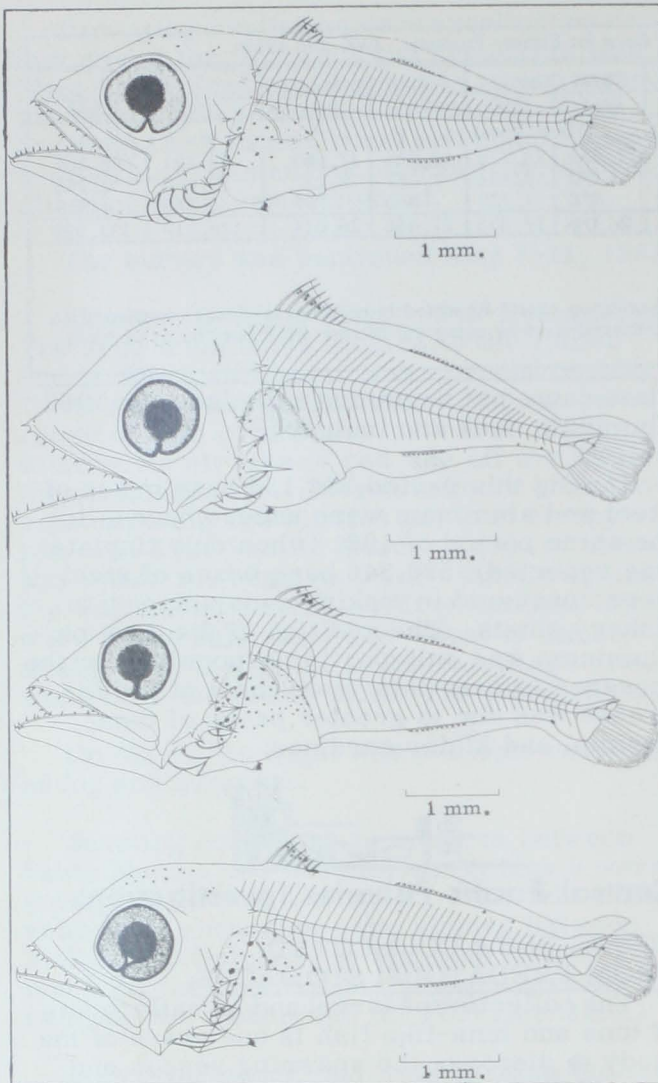
Central Pacific Fisheries Investigations

YOUNG TUNA COLLECTED FROM PREDATORS' STOMACHS:

The collection of larval and juvenile forms of tuna and tuna-like fish is one phase of the study to discover the spawning season and area of the South Pacific albacore tuna. During January-April 1962, the Charles H. Gilbert of the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu, in cooperation with Orsom III of the Institut Francais d'Oceanie, Noumea, New Caledonia, explored the intensively-fished albacore grounds of the South Pacific. Preliminary results of that expedition indicate that apex (highest form) predators may be the best collectors of juvenile tuna now available.

Examination of plankton tows from Ahi-palaha I (the winter expedition's name after the Hawaiian word for albacore tuna) has so far yielded only one albacore larva. But five young albacore tuna estimated to range from 6 cm. to 9 cm. (about 2 to 3.5 inches) were obtained from stomach contents of two blue marlin, a yellowfin, and a wahoo.

Examination of albacore tuna gonads caught by the Charles H. Gilbert and Orsom III re-



Larvae of (top to bottom) albacore, big-eyed, Australian northern bluefin, and Pacific bluefin.

vealed that spawning had already taken place, possibly as long as two months before the expedition. This view was supported by the scarcity of larvae and the presence of young tuna.

It is known that young skipjack tuna are found regularly in the stomachs of their adults and other apex predators. In addition to the five juveniles discovered in the South Pacific, two young albacore tuna were found in the stomachs of predators caught in the North Pacific. As a result, efforts to obtain young tuna by this method will be intensified.

As more and more larvae and juvenile tuna are recorded, the spawning and nursery grounds of both North and South Pacific albacore tuna will be located. Adequate speci-

mens obtained throughout the year will help to solve the problems of age and growth during the early stages of the albacore tuna's life history.



Dams

INTERIOR DEPARTMENT RECOMMENDS MOUNTAIN SHEEP DAMSITE ON THE SNAKE RIVER:

Federal development of the remaining section of the Middle Snake River, between Idaho and Oregon, and a specific recommendation favoring the Mountain Sheep damsite were proposed on June 28, 1962, by Secretary of the Interior Stewart L. Udall.

In a letter to the Federal Power Commission, Secretary Udall recommended that licenses be denied both public and private utility groups which have applications pending and that the Commission recommend Federal construction.

License applications now pending before the Commission are from the Pacific Northwest Power Company, a combination of private utilities operating in the area, and the Washington Public Power Supply System, a combination of public utility organizations in Washington State.

Various engineering studies for the Mountain Sheep site indicate possibility of a dam approximately 665 feet high, creating a storage reservoir up the Snake and Imnaha Rivers of about 3,600,000 acre-foot capacity and with a hydropower plant with a capacity of 1,030,000 kilowatts, approximately half that of the Grand Coulee Dam. Cost is estimated at \$262,800,000.

Primary reason for recommending Federal development of this area of the river, Secretary Udall said, is because a major storage and hydro facility there would affect many fields of resource development in which the United States has vital interests.

"Its impact," he wrote the Commission, "will be so great that we recommend that the United States, and not a non-Federal entity, construct the project ultimately selected as the more desirable. Taking all resources into account, we believe that the Mountain Sheep Dam on the Snake River represents the optimum development."

Secretary Udall pointed out that a storage project on the Middle Snake River would be essentially an addition to the existing Federal Columbia River power system and that all downstream plants through which the stored water would run will be Federally owned. The 2,000,000 acre-feet of active storage at Mountain Sheep would mean 1,700 million kilowatt-hours of prime power annually at the downstream dams by stabilizing the river flow.

The proposed Mountain Sheep Dam would provide 1,550,000 acre feet of flood-control storage space. Under Federal operation, management of this storage space for power as well as flood control could be handled more effectively, thus minimizing or avoiding the possibility of conflict between the two uses. Such benefits are presently realized from Grand Coulee and Hungry Horse Dams and reservoirs, built by the Bureau of Reclamation as a part of the upstream Columbia River system. Their coordinated operation is of benefit to all downstream hydro-power facilities.

Secretary Udall said an expedited Federal fishery research program is seeking a solution to fish-passage problems over large structures and through long storage reservoirs. The Nez Perce site, proposed as a substitute location for a dam, is downstream from the confluence of the Snake and Salmon Rivers and thus would block off migratory salmon heading up the Salmon River to spawn, unless the fish-passage problem is solved.

"The Mountain Sheep Project represents less hazard to the fishery resource than the Nez Perce Project," Secretary Udall wrote. "We hope the research program will develop effective means for fish passage which can be incorporated into new and existing projects, including the Mountain Sheep Project... ."

"Construction and operation of the project by the United States will assure that every effort will be made promptly to preserve and improve this important fishery resource in the light of experience and changing technology."

Secretary Udall pointed out that additional costs would inevitably arise in such extensive readjustments, thus posing an acute problem in a project constructed and operated by a non-Federal entity.

For these and other reasons as stated in the letter, Secretary Udall concluded, "We believe that the varied and predominantly Federal interests involved in the development of this area of the Snake River outweigh other considerations and indicate that the Commission should recommend to the Congress that the Mountain Sheep Dam should be built by the United States."

Note: See Commercial Fisheries Review, May 1961 p. 13, January 1961 p. 20.



Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-MAY 1962:

Fresh and Frozen: For the use of the Armed Forces under the Department of Defense, more fresh and frozen fishery products were purchased in May 1962 by the Defense Subsistence Supply Centers than in the previous month. The increase was 9.9 percent in quantity and 28.4 percent in value. This shows that higher-priced fishery products were purchased in May. Compared with the same month a year earlier, purchases in May 1962 were up 14.4 percent in quantity and 34.0 percent in value.

Table 1 - Fresh and Frozen Fishery Products Purchased by Defense Subsistence Supply Centers, May 1962 with Comparisons

QUANTITY				VALUE			
May		Jan. -May		May		Jan. -May	
1962	1961	1962	1961	1962	1961	1962	1961
. (1,000 Lbs.) (\$1,000)			
2,528	2,210	9,616	9,279	1,439	1,074	5,434	4,609

During the first five months of 1962, purchases were up only 0.4 percent in quantity but up 17.9 percent in value as compared with the same period in 1961. Because of higher prices for and the purchase of higher-priced fishery products, the value of the purchases increased more than the quantity.

Prices paid for fresh and frozen fishery products by the Department of Defense in May 1962 averaged 56.9 cents a pound, 8.2 cents a pound more than in the previous month and 8.3 cents a pound more than in the same month of 1961.

Canned: Canned tuna and canned sardines were the principal canned fishery products purchased for use of the Armed Forces in May this year. For the first five months of this year purchases of canned fish were up

Table 2 - Canned Fishery Products Purchased by Defense Subsistence Supply Centers, May 1962 with Comparisons

Product	QUANTITY				VALUE			
	May		Jan. -May		May		Jan. -May	
	1962	1961	1962	1961	1962	1961	1962	1961
	. . . (1,000 Lbs.) (\$1,000) . . .			
Tuna . .	30	-	3,706	2,662	22	-	2,062	1,175
Salmon .	-	-	1,015	2	-	-	638	2
Sardine .	21	8	32	89	10	4	16	43

substantially as compared with the same period of 1961 because of greater purchases of canned tuna and canned salmon.

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.



Fish Oils

EFFECT OF DIETARY OILS ON BLOOD CHOLESTEROL:

Experiments are being conducted to determine which components of fish oils are active as cholesterol depressants. This work is being done under a U. S. Bureau of Commercial Fisheries contract awarded in 1961 to the Hormel Institute, University of Minnesota.

Results from this investigation as of March 1962 have established the following relationships between the hypercholesteremic condition: (1) whole body oils from tuna and menhaden are more effective cholesterol depressants than pure linoleate, which is one of the most active forms of essential fatty acids; (2) ester fractions from menhaden oil fatty acids have been found to be more effective cholesterol depressants than common dietary fats of either "animal" or "vegetable" origin; (3) the effects of marine oils can be duplicated by ingesting whole fish products containing these oils (i.e. menhaden, mullet, ocean perch, and silver salmon); (4) studies have shown that 8 different marine oils have a significant cholesterol depressant activity. These include the whole body oils of tuna, menhaden, herring, ocean perch, mullet, and silver salmon and the liver oils of cod and dogfish; (5) the marine oils are effective in alleviating a hyperphospholipemia condition as well as a hypercholesteremia in rats and man; these changes are accompanied by a more favorable balance between cholesterol and phospholipids in the blood and tissues of hypercholesteremic rats; (6) the changes in

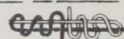
circulating lipids are associated with specific changes in the distribution of classes of lipids and specific fatty acid components in the cardiovascular tissues.

In many of these studies an attempt has been made to correlate the observed changes in plasma cholesterol levels with changes in the other circulating lipids and with the total and specific lipids found in the cardiovascular and associated tissues of these experimental animals. The marine oils, i.e. menhaden oil fractions, have been found to promote a reduction in liver lipid and a series of changes in the distribution of specific kinds of lipids as well as a reduction in plasma cholesterol levels of the rat. Similar changes were observed in rats fed whole fish products, but not in rats fed the more common dietary fats. Considerable effort is now being made to establish the significance of the metabolic shifts occurring in tissue lipids following supplementation with marine oil fractions.

Some of the more unique characteristics of the whole body oils from tuna, menhaden, salmon, ocean perch, herring, mullet, and cod are their relatively high contents of the "linolenic family" of acids, their high degree of total unsaturation and their contents of significant amounts of a wide range of fatty acids having 14 to 22 carbons and 0 to 6 double bonds. However, this is more of a quantitative than a qualitative distinction for the marine oils. There is a considerable gap in our knowledge as to the metabolic function of most of the lipids found in marine oils and other tissue lipids. The availability of information concerning the function of essential fatty acids is meager and speculations as to the obligatory cholesterol depressant activities of these acids and their possible role in electron transport in the cytochromes have since proven to be misconceptions. The transport of these lipids in blood and vascular tissues has received considerable attention in recent years because of the apparent importance of this phenomenon to the problem of blood-vascular diseases. However, the distribution of specific fatty acids in specific esters which varies according to the tissues examined and the distribution of lecithins, cephalins, plasmalogens in the vital organs of the body suggest that such lipids and lipid complexes must play a very important role in the vital activities of all living tissues.

Note: (1) This contract research is supervised by the Technological Laboratory, U. S. Bureau of Commercial Fisheries, Seattle, Wash. Findings are based on unpublished limited experimental data.

(2) See *Commercial Fisheries Review*, March 1962 p. 16.



Fish Protein Concentrate

NATIONAL ACADEMY OF SCIENCES TO STUDY FISH PROTEIN CONCENTRATE:

Secretary of the Interior Stewart L. Udall was advised by Dr. Detlev W. Bronk, President of the National Academy of Sciences, the latter part of June 1962 that the Academy will establish a committee to study fish protein concentrate (FPC). This study was requested recently by Secretary Udall.

Among other subjects, the study will be a determination of whether a wholesome, safe, and nutritious fish protein concentrate product can be made from whole fish; and whether there is a demonstrable need, either nutritionally or economically, for an inexpensive animal protein food supplement among the people comprising the lower income groups of the United States.

In requesting the National Academy of Sciences to make the study, Secretary Udall informed Dr. Bronk:

"The Department of Interior, recognizing the potential value of FPC to the domestic fishing industry and the global need for a cheap animal-protein supplement also considers the use of whole fish to be of vital importance."

The Food and Drug Administration, he pointed out, has held that the fish protein concentrate cannot be marketed in the United States inasmuch as that agency has ruled that it contains portions of the fish not normally regarded as acceptable for human food.

Processes tested and examined by U.S. Bureau of Commercial Fisheries scientists here and abroad reduce the whole fish to a "chemically-cleaned powder ideally suitable as a low-cost protein supplement so desperately needed by a majority of the world's population," Secretary Udall said.

The Fish and Wildlife Service's Bureau of Commercial Fisheries recently began a research project on fish protein concentrate. The goal is to develop new or improved methods of manufacture that would result in "a product of highest suitability in terms of keeping qualities, acceptance, cost, nutritive value, and flexibility for world-wide incorporation in diets of protein-hungry peoples of the world," Secretary Udall said.

Secretary Udall added that the manufacture and utilization of fish protein concentrate covers many scientific areas such as chemistry, pediatrics, food technology, nutrition, engineering, economics, and other disciplines. Bureau of Commercial Fisheries scientists at the College Park, Md., Technological Laboratory have, by conducting a global survey, gathered and coordinated nearly all the information available on FPC studies around the world.

"Increasing concern over the world food deficit has brought into international prominence the urgent need for the technological development of cheap, stable, and nutritious fish protein concentrate suitable for world-wide dietary supplementation," Secretary Udall said. "The Department of the Interior programs now under way are designed to fulfill our Nation's responsibility in meeting this need."



Fish Sticks

NORWEGIAN SUBSIDIARY PLANT IN UNITED STATES TO DOUBLE OUTPUT:

The Norwegian firm with a plant in Mobile, Ala., plans to double the output of fish sticks. This will be accomplished by working two shifts a day, instead of one. At present, the frozen fish stick production of the Mobile plant is about 1,500 tons a year. (News of Norway, May 31, 1962.)



Great Lakes Fishery Investigations

WESTERN LAKE SUPERIOR FISHERY SURVEY FOR 1962 SEASON BEGINS:

M/V "Siscowet" Cruise 1 (May 9-29, 1962): The western Lake Superior survey for the 1962 season by the U. S. Bureau of Commercial Fisheries research Siscowet began May 9.

Studies during the cruise were devoted almost entirely to the distribution and abundance of native and hatchery-reared lake trout in the Apostle Islands region. Semi-balloon trawls were fished at depths of 15 to 44 fathoms, and a standard gang of experimental gill nets (1- to 5-inch mesh by $\frac{1}{2}$ -inch intervals) was fished at 25 fathoms.

A total of 124 young lake trout were taken during the cruise (6 in gill nets and the remainder in trawls), of which 117 were fin-clipped. Of these hatchery-reared fish, 72 were from the 1961 Bayfield shore plant, 30 from the 1960 shore plant, and 6 from the 1959 boat plant. All of the young lake trout were returned alive to the water except a few which were preserved for food studies.

Most of the lake trout, and other species (small numbers of smelt, chubs, trout-perch, and sticklebacks) were taken at depths below 25 fathoms. Most of the trawl catches included yearling coregonines (a rarity in former years), but there was a complete absence of alewives, which in the fall of 1961 were taken in nearly every tow.

In conjunction with the trawling operations, a $\frac{1}{2}$ -meter plankton net towed from 1 to 60 feet below the surface captured about 25 larval fish, most of which were smelt.

Surface water temperatures ranged from 34.2° F. to 43.1° F., and were within that range at all depths.

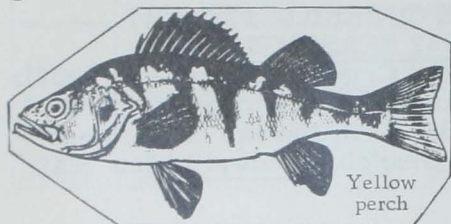
Note: See Commercial Fisheries Review, June 1962 p. 17.

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LAKE ERIE FISH POPULATION SURVEY:

The spring series of 3-day trawl operations (two 10-minute tows at each of three depths, during the morning, afternoon, and evening) were carried out in May 1962 at stations 49 (Bono) and 4 (East Harbor). Bottom topography in the medium offshore depth (15 feet) at the Bono station interfered with trawling and strong northeast winds repeatedly interrupted the schedule at East Harbor.

The catches at Bono, which were slightly greater than at East Harbor, averaged about 400 fish per tow. Yellow perch in about equal numbers from the 1959 and 1961 year-classes made up the bulk of



the total catch. Sheepshead, trout-perch, spot-tail shiners, and emerald shiners were also taken in fair numbers. Alewives, gizzard shad, and white bass were conspicuously absent. At East Harbor, the principal portion of the catch of approximately 325 fish per tow was divided about equally among yellow perch, spot-tail shiners, and sheepshead. Yellow perch predominated in trawl catches earlier in May. Channel catfish and bullheads were taken consistently throughout the series. Twelve yearling yellow pike or walleyes averaging about 9.3 inches long were taken at East Harbor, and six at Bono.

During one 24-hour period at each of the two index trawling stations, water samples were taken for chemical analysis, and quarter-meter plankton nets were towed at the surface, midwater, and bottom. Catches in the plankton nets ranged from a few to upward of 1,000 fry per 10-minute tow. The midwater hauls yielded the most fry, and slightly larger numbers were taken at night than during the day.

Surface water temperature increased steadily from about 58° F. at the beginning of the month to about 70° F. at the end.

Sampling of the commercial catch, which began in April, was completed in early May. Approximately 2,300 scale samples were collected. Many commercial fishermen curtailed operations because of the low market price of yellow perch, excessive numbers of undersize fish, and a scarcity of the more desirable fish species.

Emphasis in June 1962 was on the evaluation of spawning success and the subsequent survival of newly hatched fish in Lake Erie. Tows with half-meter and meter plankton nets yielded from several hundred to as many as 5,000 larval fish per 10-minute haul. By late June most fish of the 1962 year-class were large enough to be caught in regular bottom trawls equipped with $\frac{1}{4}$ -inch-mesh cod ends. As expected, young-of-the-year yellow perch predominated; varying numbers

of white bass, gizzard shad, spot-tail shiners, smelt, and yellow pike (walleyes) also were caught.

The early indications of successful reproduction of yellow pike in 1962 were especially encouraging. More than 200 fingerlings were captured in trawl tows, a much higher number than taken in the corresponding period of 1959 (the year of the last successful hatch). The young yellow pike were widely distributed. Some were caught at each station visited.

Trawl catches of the larger fish consisted mainly of yellow perch, sheepshead, channel catfish, and spot-tail shiners. Yellow perch of all age classes were increasing in weight and appeared to be in a healthy condition. Yearling perch continued to feed on plankton, whereas older perch had changed over to a diet of small fish.

The bottom sediments of the central basin were investigated for two weeks in mid-June to determine the oxygen demand of the sediments and its effects on the water in contact with the bottom materials. Samples were taken by the Musky II at 53 stations between the Bass Islands and Lorain, Ohio (most were south of the international boundary). Data were obtained on the dissolved oxygen, pH, alkalinity, and turbidity of the lake water at various depths at each station, in addition to uptake of dissolved oxygen by mud samples in continual suspension as well as over packed mud cores. Dry and ash weights of the sediment were obtained for each station.

Water analyses and tows with bottom trawls were carried out at two former stations established by the Cisco in the central basin. These locations were selected because of the dissolved oxygen deficiency observed in previous years. The stations were to be checked periodically throughout the summer to determine the relationship, if any, between the low dissolved oxygen in deep water and the identity and number of fish and other forms of aquatic life. The use of a midwater trawl also was to be explored.

Surface water temperatures in the western end of Lake Erie averaged 70° F. at the beginning of the month and increased to about 75° F. by late June. Water temperatures in Sandusky Bay usually ranged several degrees warmer than in the main lake. In general, water temperatures were considerably warmer than for the same period in 1960 and

1961, but compared favorably with temperatures in 1959.

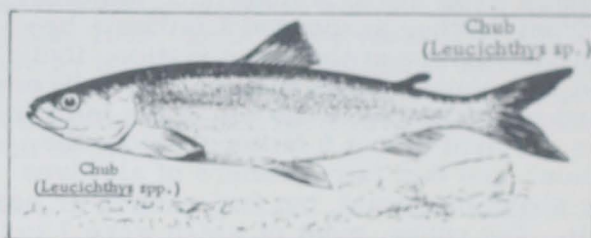
DEPTH DISTRIBUTION OF CHUBS AND ASSOCIATED SPECIES IN LAKE MICHIGAN STUDIED:

M/V "Cisco" Cruise 2 (May 15-19, 1962): One of the primary objectives of cruise 2 in Lake Michigan, off Saugatuck, Mich., was to determine the bathymetric or depth distribution of chubs (*Coregonus* or *Leucichthys* spp.) and associated fish species before thermal stratification developed. The cruise was made by the U. S. Bureau of Commercial Fisheries research vessel Cisco. Surface water had warmed somewhat near shore, but not enough to establish a definite discontinuity layer. The water was homothermous at about 37.4° F. in all areas 8 miles offshore, at depths of 35 fathoms or more. Bottom trawl hauls were made at 7, 10, 12, 15, 20, 25, 30, 35, 40, and 50 fathoms. Chubs (practically all *C. hoyi*) were taken at all depths except 7 and 10 fathoms, but catches were small. Alewives, the most common species taken, were caught at all depths, but were most abundant inside of 20 fathoms. Yellow perch were common out to 15 fathoms. Smelt were rather abundant at 12 and 15 fathoms; only a few were taken at other depths. Slimy sculpins were found at all depths, but were taken in greatest numbers in the 25- to 40-fathom range; deep-water sculpins were caught in only the three deepest tows, and were abundant only at 50 fathoms. Spot-tail shiners were taken as deep as 15 fathoms, trout-perch as deep as 20 fathoms, and log-perch as deep as 12 fathoms.

Gill nets which were set at 84 fathoms in an area where the Cisco took large numbers of *C. kiyi* in 1954 yielded only a few fish of that species. Surprisingly, about 25 percent of the *C. hoyi* at this depth appeared to be in spawning condition, at least 2 months after their regular spawning time. The *C. hoyi* caught in shallower water (50 fathoms and less) seemed to have spawned sometime ago.

Vertical distribution at midwater levels was investigated by the use of trawls, gill nets set obliquely from top to bottom, small-mesh gill nets suspended beneath the surface, and $\frac{1}{2}$ -meter large-mesh plankton nets. Alewives appeared to be rather abundant in mid-levels out to a depth of 35 fathoms. A few smelt were caught in the midwater trawls, and several yellow perch were taken near

the surface in an oblique gill net set in 13 fathoms. Only 4 *C. hoyi* were taken mid-water in the trawls, but 94 were caught off the bottom in an oblique $1\frac{1}{4}$ -inch-mesh gill-net set in 25 fathoms. Some of the *C. hoyi* (which were mostly about 7.5 inches long) were caught within 20 feet of the surface. Several coregonine fry were caught in mid-water over 40-, 50-, and 84-fathom bottoms; they did not seem to be concentrated at any midlevel, but were scattered from near-surface to near-bottom in the homothermous water in which they were found. Tows in water from 7 to 35 fathoms deep failed to produce fry.



A graduate student from the University of Michigan was aboard the vessel for 3 days to collect blood samples from chubs (taken alive from gill nets and trawls) for electrophoresis and serological studies. These studies are designed to develop methods to aid in the identification of the various chub species.

M/V "Cisco" Cruise 1 (April 24-May 8): During cruise 1 the Cisco was under contract to the U. S. Public Health Service. The Bureau furnished the Cisco's regular vessel crew and two biologists from the Ann Arbor Laboratory, and the Public Health Service supplied a scientific staff of three. Hydrographic and bacteriological information was collected at 36 widely-scattered locations in southern and central Lake Michigan.

LAKE MICHIGAN FISHERY SURVEY CONTINUED:

M/V "Cisco" Cruise 4 (June 26-July 9, 1962): Rather pronounced thermal stratification was observed in all areas visited in Lake Michigan, off Saugatuck and Grand Haven, Mich., as far out as midlake during this cruise. Surface water temperatures were approximately 61° to 64° F. Early in the cruise, the temperature gradient or thermocline touched bottom at about 6 fathoms. Drags with a bottom trawl equipped with a small-mesh cod end showed a rapid change in depth distribution of bottom fish near this depth. A 10-minute tow

at 5 fathoms took no chubs (*Coregonus hoyi*) or smelt, 586 alewives, 144 yellow perch, and 2 trout-perch; a similar tow at 7 fathoms, where the bottom water temperature was colder, caught 187 chubs, 198 smelt, 2 alewives, 201 perch, and 196 trout-perch. At 10 fathoms the catch was 395 chubs, 23 smelt, no alewives, 223 perch, and 2 slimy sculpins. A few perch and smelt were caught at 12 fathoms, but in tows at 15, 20, 25, 30, 35, and 40 fathoms the catches were almost entirely chubs except for moderate numbers of slimy sculpins.

Catches from a small-mesh gill net set obliquely from top to bottom in 26 fathoms, and from another suspended 7 fathoms beneath the surface at the same station, indicated that considerable numbers of chubs occupied midlevels up to the top of the temperature gradient (about 5 fathoms below the surface), and that fair numbers of alewives were above that point, but few were in or below it. The chubs, most of which were 7 to 8 inches long, were most abundant at the 5- to 10-fathom level and near the bottom. Small trawls towed midwater at night off Grand Haven took only a few alewives and chubs. Some of the alewives were apparently yearlings, but no yearling chubs were caught.

Half-meter plankton nets of rather large mesh (No. 32 grit cloth) were towed at various levels from the surface to near the bottom at 5-fathom depth intervals, over bottoms from 5 to 45 fathoms deep off Saugatuck, and at 5 to 30 fathoms off Grand Haven. Fish fry, believed to be alewives and smelt, were fairly numerous a few meters below the surface over all bottoms out to 20 fathoms, but not beyond. Coregonine fry were caught in small numbers in the temperature gradient and slightly below it, over bottom depths ranging from 25 to 40 fathoms.

Of 175 chubs caught in a gill net set on the bottom at 84 fathoms, 11 females were ripe and 13 gravid, although the usual spawning season for that species, at least in shallower water, is January to March.

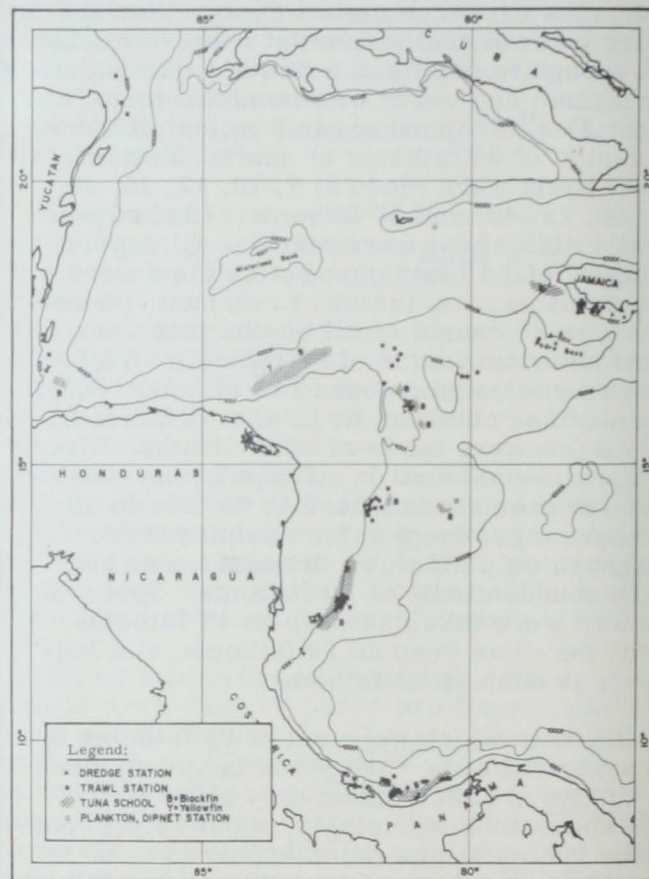
The collection of blood from live chubs for an electrophoresis study was carried out by a University of Michigan graduate student. This study was started on cruise 2.



Gulf Exploratory Fishery Program

WESTERN CARIBBEAN SEA POTENTIALLY-VALUABLE SPECIES ASSESSED:

M/V "Oregon" Cruise 78: To assess the sea bottom for potentially-valuable species of fish and shellfish in the outer Continental Shelf and upper slope zones in the western Caribbean Sea was the first objective of the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon on cruise 78. The second objective of the Oregon (which returned to port on June 15) was to continue the seasonal coverage started with its cruise 46 in August-September 1957.



Shows the station pattern for cruise 78 of the M/V Oregon (May 8-June 15, 1962).

Basic exploratory gear was a 40-foot shrimp trawl. Length of tows varied with bottom conditions. In areas where bottom conditions were too rough for shrimp trawl sampling, a 5-foot tumbler dredge was used. A total of 60 trawling and 13 dredging stations were completed in the survey depths of 50 to 500 fathoms. In addition, 6 trawling stations and 8 dredging stations were completed at lesser depths. Specific areas of

deep-water trawling coverage were off Panama, Nicaragua, Honduras, British Honduras, and to the north and west of Pedro Bank.

Royal-red shrimp (*Hymenopenaeus robustus*) were present in the majority of drags in depths of 200 to 400 fathoms. Only small concentrations were found, chiefly in 250-275 fathoms off Nicaragua, which yielded catches of approximately 20 pounds (heads on) per 1- to 2-hour tow. *Peneopsis megalops* had a similar distribution and were taken at rates of up to 35 pounds per tow. Large scarlet prawns (*Plesiopenaeus edwardsianus*) were found throughout the 250- to 500-fathom depths but catches were small (1 to 15 pounds). Deep-water lobster (*Nephrops binghami*) were present in the 125- to 300-fathom range, which ranged from 4 to 40 count (heads on) per pound. Attempts to simulate commercial-scale trawling with larger trawls were not feasible because of heavy sea conditions. Several catches of 10 to 30 pounds were made with the exploratory gear, chiefly in depths of about 200 fathoms off Nicaragua and British Honduras.

Indications of good trawling grounds for yellow-eye snapper (*Lutjanus vivanus*) were located over an extensive area along Nicaragua in depths of 70 to 110 fathoms. Catches with exploratory gear produced from 45 to 120 pounds of 13-inch to 26-inch snapper, with the best catches from 80-85 fathoms. Depth-recorder tracings from off Little Corn Island to off Cape Gracias a Dios indicated several hundreds of square miles of smooth bottom in these ranges.

Numerous small schools of blackfin tuna were observed throughout the survey area, and 24 trolling captures yielded blackfin ranging from 1½ to 14 pounds. Schools were greatly concentrated at the edges of the shelf, particularly off Nicaragua. Two large schools of yellowfin were observed off Punta Patuca, Honduras. Three trolling captures from these schools yielded yellowfin ranging from 9 to 25 pounds.

A two-day program of ichthyological collecting was conducted on the south coast of Jamaica in cooperation with the Los Angeles County Museum and the Institute of Jamaica. Eleven trawling and dredging stations and one hand-line station were occupied on the Continental Shelf between 8 and 23 fathoms. Of commercial interest was the capture of Caribbean brown shrimp (*Penaeus braziliensis*) at rates of up to 104 individuals per

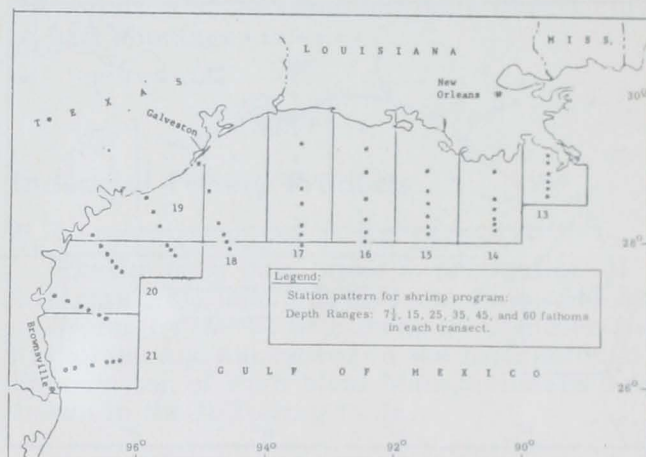
15 minute drag. *P. braziliensis* were present in 5 drags in 14 to 22 fathoms between Minho and Black Rivers. Judicious selection of trawling bottom was necessary because of the broken topography.



Gulf Fishery Investigations

SHRIMP DISTRIBUTION STUDIES:

M/V "Belle of Texas" Cruise BT-20 and "Miss Angela" Cruise MA-14: Only light catches of shrimp were made by the research vessels Belle of Texas and the Miss Angela in May 1962. Both of the vessels are operated by the Galveston Biological Laboratory of the U. S. Bureau of Commercial Fisheries in studying the distribution of shrimp in the Gulf of Mexico.



Shows the station pattern for cruise BT-20 of the M/V Belle of Texas and cruise MA-14 of the M/V Miss Angela in May 1962.

A total of 8 statistical areas were covered. Coverage of two statistical areas was not completed because of a breakdown of the M/V Miss Angela. One 3-hour tow was made in each of 3 depth ranges in each area. A 45-foot shrimp trawl was used. Most of the catches consisted of brown shrimp with traces of white and pink shrimp. The largest single catch was 18 pounds of heads-on shrimp (all brown) of 20-40 count (heads-off) size in 20-40 fathoms in area 19. This same area yielded only 13 pounds (heads-on) brown, white, and pink shrimp in 0-20 fathoms, and only 1 pound (heads-on) of brown shrimp in 40-60 fathoms.

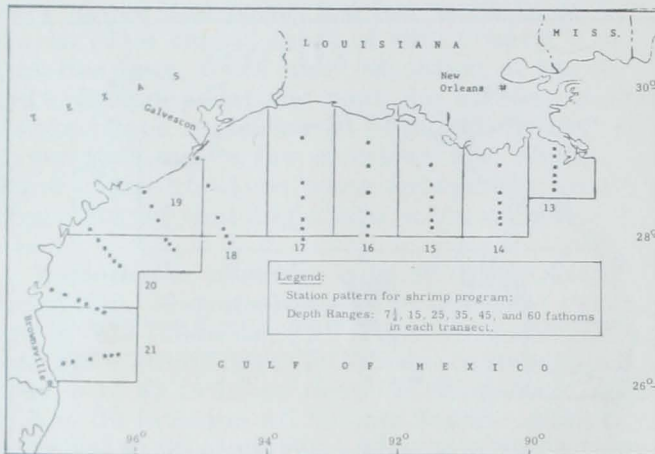
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M/V "Belle of Texas" Cruise BT-21 (June 18-23, 1962): Small catches of mostly brown

shrimp were made by the M/V Belle of Texas.

Four statistical areas were covered and a 45-foot shrimp trawl was used. One 3-hour tow was made in each of the 3 depth ranges in each area. The largest single catch was 15 pounds (heads-on) of 26-30 count heads-off brown shrimp made in the depth range up to 20 fathoms in area 18. The same area yielded 3 pounds (heads-on) of 12-15 count (heads-off) shrimp in the 20-40 fathom range, and 1 pound (heads-on) of the same size in the 40-60 fathom depth.

Each tow in area 19 yielded 12-15 count (heads-off) brown shrimp; 3 pounds (heads-on) in the depth range up to 20 fathoms, 4 pounds (heads-on) in the 20-40 fathom range, and 6 pounds (heads-on) in 40-60 fathom depths.

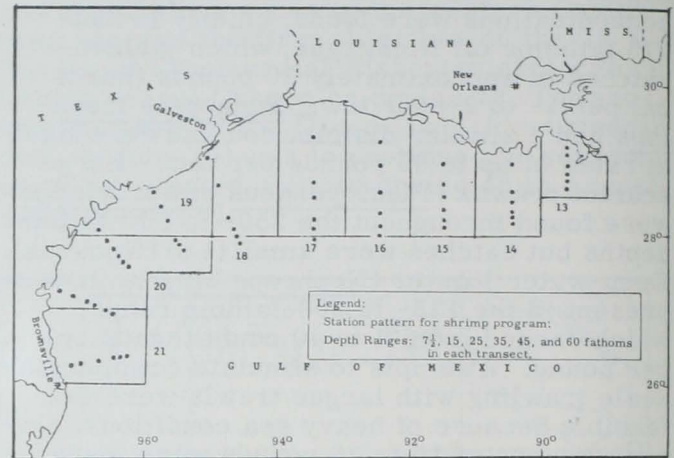


Shows station pattern for cruise BT-21 of the M/V Belle of Texas, June 18-23, 1962.

Concentrations of small brown shrimp counting less than 68 heads-off to the pound were found at 7½ fathoms in areas 20 (10 pounds, heads-on) and 21 (7 pounds, heads-on). Some 15-20 count (heads-off) white shrimp and 31-40 count (heads-off) pink also were caught in the 0-20 fathom depth range in area 20. Large brown shrimp of 12-15 count (heads-off) were taken in area 20--5 pounds (heads-on) in the 20-40 fathom range, and 12 pounds (heads-on) in the 40-60 fathom range.

Area 21 also yielded large 12-15 count (heads-off) brown shrimp; 10 (heads-on) pounds in the 20-40 fathom range and 1 pound (heads-on) in the 40-60 fathom range.

M/V "Belle of Texas" Cruise BT-22 (June 25-July 1, 1962): Good catches of 12-15 count heads-off brown shrimp were made in the 20-40 and 40-60 fathom depth ranges off the Louisiana coast by the Belle of Texas between June 25 and July 1, 1962.



Shows the station pattern for cruise BT-22 of the M/V Belle of Texas, June 25-July 1, 1962.

A total of 5 statistical areas were covered. One 3-hour tow was made in each of 3 depth ranges in each area. A 45-foot shrimp trawl was used. All of the catches consisted of brown shrimp except in area 13 where one tow in the up to 20-fathom range yielded 2 pounds (heads-on) of 12-15 count (heads-off) white shrimp, and only 4 pounds (heads-on) of brown shrimp of the same size. The 20-40 fathom range in this area produced 9 pounds (heads-on) of 15-20 count (heads-off) brown shrimp.

The largest catch was in area 15 which yielded 25 pounds (heads-on) of 12-15 count brown shrimp in the 40-60 fathom depth range, 13 pounds (heads-on) of the same size in the 20-40 fathom range, and 24 pounds (heads-on) of 41-50 count (heads-off) in the 0-20 fathom range. The next largest catch of 12-15 count shrimp was in area 14 which yielded 26 pounds (heads-on) in the 20-40 fathom depth range, and 4 pounds (heads-on) in the 40-60 fathom range. The up to 20-fathom range accounted for 2 pounds of 41-50 count shrimp.

SHRIMP MARKING STUDY IN GULF OF MEXICO:

Small brown shrimp were stained during a cruise off the Louisiana and Texas coasts by the research vessel M/V George M. Bowers operated by the Galveston Biological

Laboratory of the U. S. Bureau of Commercial Fisheries. The vessel returned to Galveston on July 19, 1962. The purpose of the marking study is to determine the movement, growth, and mortality of shrimp stocks in those areas.

Shrimp caught and released off the Louisiana coast were marked with green stain; those off the Texas coast were marked with a blue stain.

The assistance and cooperation of fishermen and packing house personnel in detecting and returning marked shrimp is needed if the study is to be successful. A \$2.00 reward will be paid by Bureau of Commercial Fisheries port agents or samplers for each marked shrimp returned, together with information on the area and depth of recapture.

A similar mark-recapture study with white shrimp off the Louisiana coast was planned for August 1962. (Cruise 40, July 6-19, 1962.)



Hawaii

GOOD RESULTS WITH TILAPIA AS LIVE BAIT FOR SKIPJACK TUNA:

Tilapia from the State of Hawaii's baitfish hatchery in Honolulu have proven very successful as live bait for skipjack tuna (aku), according to the Hawaii Area Director of the U. S. Bureau of Commercial Fisheries. The venture was described as the first full-scale use of tilapia for that purpose. Early this summer, the sampan Broadbill, chartered by the Bureau's Biological Laboratory in Honolulu, using \$35 worth of tilapia from the State's hatchery, caught tuna worth about \$450.



Tilapia (*Tilapia mossambica*)

The fishery research biologist in charge of a cooperative Federal-State program of tuna gill-net fishing experiments aboard the Broadbill, reported that, in his opinion, the hatchery-reared tilapia show definite promise as skipjack tuna bait. He found in recent

fishing around the island of Kauai that schools of both large (25-30 pound) and small (2-4 pound) skipjack tuna responded well to chumming with tilapia averaging 1-2 inches long. The biologist expects that as more experience with the new bait is gained, fishermen will find that using a different vessel speed while fishing and making other modifications of techniques now used with natural bait will further improve the efficiency of tilapia as bait for skipjack.

According to the Director of the State Division of Fish and Game, the tilapia hatchery and rearing setup was getting into quantity production early this summer. It was believed that moderate quantities of bait fish could be supplied intermittently during the rest of the 1962 summer skipjack fishing season. By next year's fishing season, the State of Hawaii's baitfish hatchery is expected to be in a position to contribute importantly to the solution of the Oahu skipjack fleet's chronic bait shortage.



Industrial Fishery Products

U. S. PRODUCTION, JUNE 1962:

Preliminary data on U. S. production of fish meal, oil, and solubles for June 1962 as collected by the U. S. Bureau of Commercial Fisheries and submitted to the International Association of Fish Meal Manufacturers are shown in the following table.

U. S. Production ^{1/} of Fish Meal, Oil, and Solubles, June 1962 (Preliminary) with Comparisons				
Region	Meal Short Tons	Oil 1,000 Gallons	Solubles(Short Tons)....	Homogenized
June 1962:				
East & Gulf Coasts .	54,040	6,258	20,521	3/1,675
West Coast ^{2/}	2,431	62	1,734	-
Total	56,471	6,320	22,255	1,675
Jan.-June 1962 Tot.	112,449	11,311	43,487	5,370
Jan.-June 1961 Tot.	102,502	11,866	36,552	3,648

^{1/}Does not include crab meal, shrimp meal, and liver oils.
^{2/}Includes Hawaii, American Samoa, and Puerto Rico.
^{3/}Includes condensed fish.

MAJOR INDICATORS FOR U. S. SUPPLY, MAY 1962:

For the first five months of 1962, fish meal, solubles, and fish oil production was down as compared with the same period of 1961.

Major Indicators for U. S. Supply of Fish Meal, Solubles, and Oil, May 1962					
Item and Period	1962	1961	1960	1959	1958
..... (Short Tons)					
Fish Meal:					
Production 1/:					
July.....	-	62,586	55,696	52,132	43,467
June.....	-	53,162	44,293	52,006	30,949
May.....	32,500	32,922	17,194	25,312	17,433
Jan.-Apr.....	13,604	13,735	12,222	14,155	11,661
Jan.-Dec. prelim. total 2/.....	-	289,039	257,969	275,396	216,510
Jan.-Dec. final tot.....	-	311,265	290,137	306,551	248,140
Imports:					
July.....	-	18,710	13,131	4,303	13,546
June.....	-	19,317	11,178	10,836	9,091
May.....	-	24,753	9,496	16,329	8,949
April.....	26,390	19,060	10,396	17,654	11,758
Jan.-Mar.....	62,774	44,333	35,304	55,882	26,148
Jan.-Dec. totals.....	-	217,845	131,561	132,955	100,352
..... (Short Tons)					
Fish Solubles:					
Production 3/:					
July.....	-	22,589	18,876	30,163	21,892
June.....	-	17,772	20,735	26,756	16,561
May.....	13,100	13,629	7,370	18,639	9,351
Jan.-Apr.....	8,875	8,799	8,841	13,493	7,518
Jan.-Dec. totals.....	-	112,241	98,929	165,359	130,177
Imports:					
July.....	-	708	96	4,938	607
June.....	-	207	149	202	137
May.....	-	283	59	4,874	1,405
April.....	323	220	134	1,622	45
Jan.-Mar.....	2,830	509	2,176	1,767	706
Jan.-Dec. totals.....	-	6,739	3,174	26,630	14,567
..... (1,000 Gallons)					
Fish Body Oils:					
Production:					
July.....	-	7,553	5,337	4,143	3,792
June.....	-	6,296	4,672	4,826	3,267
May.....	3,600	4,367	1,768	2,604	2,166
Jan.-Apr. 4/.....	838	602	416	580	379
Jan.-Dec. prelim. total.....	-	33,471	26,690	24,418	21,625
Jan.-Dec. final tot.....	-	34,409	27,826	24,945	21,977
Exports:					
July.....	-	589	5,414	3,770	791
June.....	-	280	208	1,514	242
May.....	-	426	324	1,455	293
April.....	1,369	980	761	1,116	254
Jan.-Mar.....	5,510	4,874	3,874	2,497	3,527
Jan.-Dec. totals.....	-	16,331	19,155	19,264	12,539

1/Does not include crab meat, shrimp, and misc. meals.
 2/Preliminary data computed from monthly data. Fish meal production currently comprised 86 percent of the annual total for 1958, 90 percent for 1959, 89 percent for 1960, and 92 percent for 1961.
 3/Includes homogenized fish.
 4/Preliminary data computed from monthly data. Represents over 95 percent of the total production.
 Note: Data for 1962 and 1961 are preliminary.

U. S. PRODUCTION, APRIL 1962:

During April 1962, United States fish meal and scrap production was up 200 tons or 3 percent and marine-animal oil yield was up 206,300 gallons or 46 percent as compared with the same month in 1961.

Menhaden accounted for 54 percent of the April 1962 meal total. Oil from menhaden comprised 81 percent of that month's oil production.



Mending a menhaden purse-seine net requires highly specialized skill.

There were 89 tons more fish solubles produced in April 1962 than in the same month of 1961. The production of homogenized condensed fish was up 700 tons.

U.S. Production of Fish Meal, Oil, and Solubles, April 1962 with Comparisons					
Product	April		Jan.-Apr.		Total 1961
	1/1962	1961	1/1962	1961	
..... (Short Tons)					
Fish Meal and Scrap:					
Herring, Alaska.....	-	-	-	-	3,810
Menhaden 2/.....	3,402	3,612	3,609	4,143	247,551
Sardine, Pacific.....	-	-	889	-	2,518
Tuna and mackerel.....	1,771	1,638	6,295	6,490	21,243
Unclassified.....	1,138	862	3,011	3,024	16,215
Total fish meal and scrap.....	6,311	6,112	13,604	13,657	291,337
Shellfish and marine animal meal and scrap.....	3/	3/	3/	3/	19,928
Grand total meal and scrap.....	3/	3/	3/	3/	311,265
Fish solubles.....	2,716	2,627	7,595	8,183	100,551
Homogenized condensed fish.....	1,050	338	1,280	616	11,590
..... (Gallons)					
Oil, body:					
Herring, Alaska.....	-	-	-	-	727,517
Menhaden 2/.....	530,658	360,630	555,626	370,680	31,355,570
Sardine, Pacific.....	-	-	19,111	-	86,167
Tuna and mackerel.....	55,820	43,533	159,514	144,281	762,509
Other (including whale).....	65,700	41,686	103,676	105,185	1,477,042
Total oil.....	652,178	445,849	837,927	620,146	34,408,805

1/Preliminary data.
 2/Includes a small quantity produced from thread herring.
 3/Not available on a monthly basis.

During the first four months of 1962, meal and scrap production was slightly below that for the same period of 1961; the marine-animal oil yield was up 217,800 gallons.

U. S. FISH MEAL AND SOLUBLES:

Production and Imports, April 1962: Based on domestic production and imports, the United States available supply of fish meal for the first 4 months of 1962 was 25,700 tons or 33 percent greater than during the same period of 1961. Domestic production was slightly less, but imports were 25,800 tons greater than in the 4-months period of 1961. Peru continued to lead other countries with shipments of 67,700 tons during the first 4 months of 1962--22,400 tons above the imports in the same period of 1961.

The total United States supply of fish meal in calendar year 1961 of 529,100 tons exceeded the peak year 1959 when the quantity amounted to almost 440,000 tons.

The United States supply of fish solubles (including homogenized fish) during January-April 1962 was 2,500 tons more than during the same period in 1961. Solubles and homogenized fish of 8,900 tons manufactured from domestically-caught fish made up 74 percent of the 4 months supply in 1962.

U. S. Supply of Fish Meal and Solubles, January-April 1961-62 and Total for 1961			
Item	January-April		Total
	1/1962	1961	1961
 (Short Tons).....		
Fish Meal and Scrap:			
Domestic production:			
Menhaden	3,609	4,143	247,551
Tuna and mackerel.....	6,295	6,490	21,243
Herring, Alaska.....	-	-	3,810
Other	3,700	3,024	38,661
Total production	13,604	13,657	311,265
Imports:			
Canada	14,748	9,879	38,218
Peru	67,725	45,324	151,439
Chile	2,039	3,582	12,074
Angola	-	1,433	1,543
So. Africa Republic	4,501	3,036	13,026
Other Countries	151	139	1,545
Total imports	89,164	63,393	217,845
Available fish meal supply ..	102,768	77,050	529,110
Fish Solubles:			
Domestic production 2/.....			
	8,875	8,799	112,241
Imports:			
Canada	600	465	1,001
So. Africa Republic.....	101	180	1,351
Other Countries	2,452	84	4,387
Total imports	3,153	729	6,739
Available fish solubles supply.	12,028	9,528	118,980

1/Preliminary.
2/50-percent solids. Includes production of homogenized condensed fish.

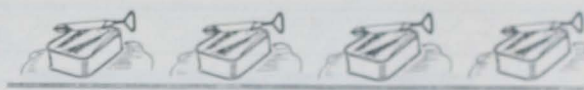


Maine Sardines

CANNED STOCKS, JUNE 1, 1962:

Distributors' stocks of Maine sardines totaled only 99,000 actual cases on June 1, 1962--116,000 cases or 54 percent less than the 215,000 cases on hand at the same time in 1961, according to estimates made by the U. S. Bureau of the Census.

Canners' stocks on June 1, 1962, totaled only 50,000 standard cases (100 3/4-oz. cans), a decline of 244,000 cases (83.0 percent) as



compared with June 1, 1961. This reflected one of the shortest packs in recent years for 1961.

The Maine Legislature authorized a 1962 season of 13 months--December 2, 1961-January 1, 1963. The 1961 season was from April 15 to December 1, the usual legal packing season for canned sardines in Maine. The pack December 2-June 1 totaled 45,000 cases, and by June 9 the pack reached 163,976 cases. Through June 30, 1962, this season's pack totaled 452,519 standard cases. During April 15-June 30, 1961, a total of 53,844 cases were packed. During April 15-June 30, 1960, a total of 337,000 cases were packed.

As is evident, the bulk of the 1962 season pack to date was canned in June. Most of the fish were caught in the Boothbay-Portland (western) area. The catch was very disappointing in the middle and eastern areas of Maine.

On April 15, 1962, the date on which the packing season started in former years, carryover stocks totaled about 33,000 cases. One year earlier, on April 15, 1961, carryover stocks totaled 457,000 cases.

OSK

Massachusetts

FISHERY LANDINGS BY GEAR AND AREA, 1961:

Landings by fishing craft of all sizes at Boston, Gloucester, New Bedford, and other Massachusetts ports during 1961 totaled nearly 432 million pounds--a 3-percent decrease compared with the amount landed the previous year. Haddock was the leading species with 114.4 million pounds, followed by whiting (71.6 million pounds), and flounders (59 million pounds).

Canned Maine Sardines--Wholesale Distributors' and Canners' Stocks, June 1, 1962, with Comparisons 1/

Type	Unit	1961/62 Season				1960/61 Season					1959/60 Season	
		6/1/62	4/1/62	1/1/62	11/1/61	7/1/61	6/1/61	4/1/61	1/1/61	11/1/60	7/1/60	6/1/60
Distributors	1,000 actual cases	99	148	193	202	208	215	267	233	277	172	197
Canners	1,000 std. cases 2/	50	45	144	221	201	294	506	1,029	1,258	359	235

1/ Table represents marketing season from November 1-October 31.
2/ 100 3/4-oz. cans equal one standard case.

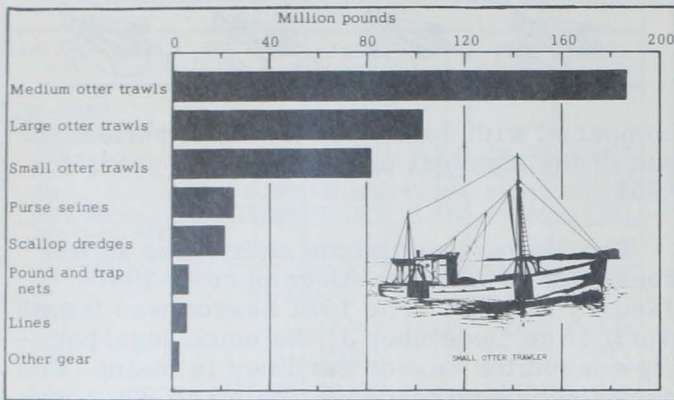


Fig. 1 - Massachusetts landings--catch by gear, 1961.

Fishing grounds off the New England coast yielded 359 million pounds or 83 percent of the entire landings. About 16 percent was taken on grounds off Nova Scotia, while the remaining 1 percent came from the Gulf of St. Lawrence, the Grand Banks, and from areas off the Middle Atlantic States.



Fig. 2 - Unloading a small dragger at Gloucester, Mass.

A total of 712 fishing craft was required to capture the 432 million pounds of fish and shellfish taken in 1961. Of that number, 434 craft using otter trawls caught 86 percent of the total landings. Purse seines accounted for 6 percent, scallop dredges took 5 percent, and the remainder was taken on lines, in pound and trap nets, by harpoons, or with gill nets.



Mississippi

FISHERY LANDINGS, 1961:

Landings of fish and shellfish at Mississippi ports during 1961 totaled 391.9 million pounds valued at \$7.6 million ex-vessel--a gain of 25 percent in volume and less than 1 percent in value. Fish for industrial use (378.1 million pounds) comprised 96 percent of the year's total catch.

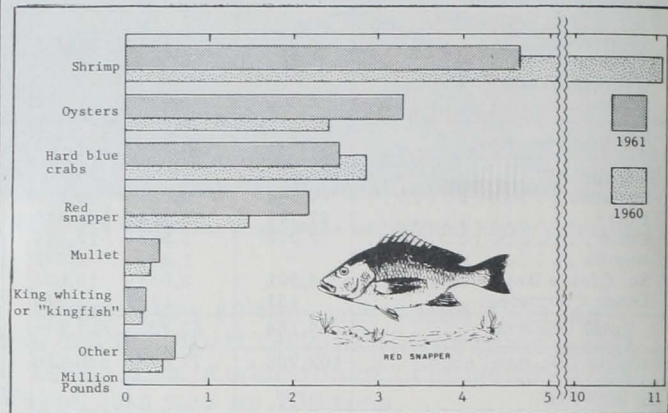


Fig. 1 - Landings of certain edible fish and shellfish, 1961-1960.

Total food finfish landings (3.4 million pounds valued at \$660,000) were 33 percent above the previous year primarily because of greater landings of red snapper. An increase in the catch of spotted sea trout taken by trammel nets also contributed to the year's increased production.

The 1961 record catch of menhaden (301.3 million pounds valued at \$3.4 million) was up 38 percent in quantity and 55 percent in value as compared with 1960. The increased value was the result of an improved market for fish meal. The menhaden oil market remained at the previous year's low level.



Fig. 2 - Crab processing plant in Mississippi on the Biloxi Back Bay.

Total landings of shellfish amounted to 10.4 million pounds valued at \$2.3 million--down 36 percent in volume and 37 percent in value as compared with 1960.

The worst shrimp year since the early 1900's was principally responsible for the sharp decreases in shellfish landings. Compared with 1960, the catch (4.6 million pounds heads-on, valued at \$1.4 million) was down 58 percent in quantity and 53 percent in value. As the shrimp fishery uses the largest number of people in the fishing industry, the drop in landings affected most of the industry in the State.

A 36-percent increase in oyster landings in 1961 was the only bright spot in the State's 1961 shellfish fisheries. The market was good due to strong demand.



Fig. 3 - Picking blue crabs in a crab plant in Mississippi.

Hard blue crab landings of 2.5 million pounds with a value of \$143,000 were down 11 percent in quantity and 15 percent in value from 1960.

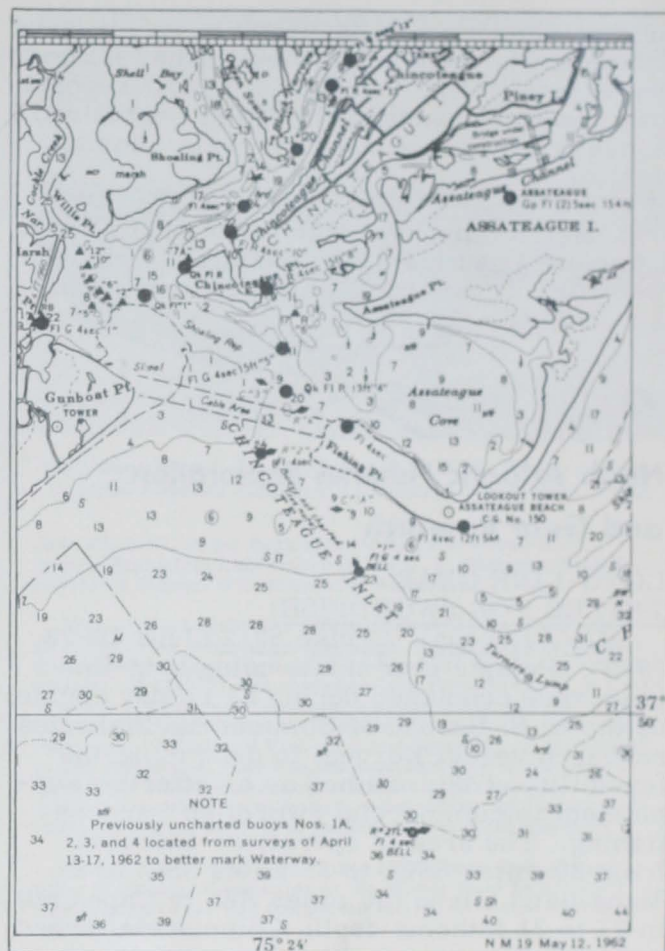


Navigation

MARCH STORMS ROUGHED-UP OCEAN BOTTOM AND ALTERED NAVIGATION CHANNELS ALONG ATLANTIC SEABOARD:

The March 1962 storms along the Atlantic seaboard roughed-up the ocean bottom as much, if not more than it altered the beaches, according to a June 1962 report by the Coast and Geodetic Survey, U. S. Department of Commerce.

Working from Survey launches and ships, the hydro-parties have come up with a number of surprising discoveries. Major changes, for example, were noted around Cape Henlopen, Del., where 40-foot depths were found to have shoaled to less than 3 feet. Cape Henlopen, itself, has built out several hundred feet to the northwest, partially blocking



Typical chartlet. This is for Chincoteague Inlet, Va.

the old channel. Another survey party, working Sinepuxent Channel, between Assateague Island and the mainland near Ocean City, Md., reportedly found a depth of 19 feet where less than 6 feet of water had been recorded prior to the storm.

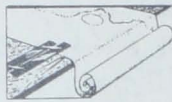
New soundings and hydrography reflecting the widespread displacement of channels, the appearance of new shoals and the reduction of others, are shown on five emergency chartlets. These are Ocean City, Md.; Ocracoke Inlet, N. C.; Indian River Inlet, Del.; Chincoteague Inlet, Va.; and Cape Henlopen, Del. Cape Lookout, N. C., and Moriches Inlet, L. I., N. Y., chartlets were ready for issue about June 30, and others will be prepared as field data becomes available.

Commercial and pleasure boatmen are warned of the dangerous shoaling and are urged to supplement their standard nautical charts with these free emergency chartlets.

The Director of the Survey stated that "Some of the changes noted in the configuration of the sea bottom constitute a real and

immediate danger to the hundreds of pleasure boatmen who have already begun the 1962 boating season." The U. S. Coast Guard reports that losses of nearly \$570,000 are sustained annually in damage due to vessels running aground.

Chartlets are available to the public from authorized nautical chart agents, or from the Director, Coast and Geodetic Survey, Washington 25, D. C.



North Atlantic Fisheries Exploration and Gear Research

LONG-LINE GEAR TESTED FOR SWORDFISH:

M/V "Rorqual" Cruise 62-2 (June 18-28, 1962): Pelagic gear trials using long-line gear were conducted during an 11-day cruise by the U. S. Bureau of Commercial Fisheries research vessel Rorqual to determine the feasibility of this method as an effective supplement to commercial swordfish harpoon fishing. The area of operations extended from 20 miles SSW. to 35 miles SSE. of No Mans Land Island (50 miles SW. of Cape Cod) in 27 to 31 fathoms depth. Commercial swordfish vessels were working successfully in those waters at the time.

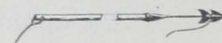
Long-line gear units consisted of 72-fathom baskets, each with 3 hooks spaced at 24 fathoms. Each set was baited, half with frozen squid and half with frozen blueback herring. The fishing depth of 5 out of the 6 sets made was estimated to be 0 to 10 fathoms from the bottom. Depth of the final set was estimated to be 9 to 20 fathoms from the bottom. Setting times were arranged to fish the gear according to tidal current in relation to bottom contours and to determine possible differences in swordfish feeding habits. A hydraulic crab and long-line block was successfully used to retrieve all sets, although a need for modifying its installation on the vessel was indicated. The six sets made, comprising 270 hooks, demonstrated that use of the gear for swordfish in the area fished would be impractical because of shark infestation at that time of year. From a total of 93 fish caught, 89 were sharks.

In addition to long-line fishing, night-lighting collections were preserved, depth



Hydraulic crab and long-line block used to retrieve fishing gear.

casts taken, and biological examination made on the catch. Six swordfish were examined aboard a commercial fishing vessel. Sexual glands and eyesockets of all swordfish were preserved for future detailed analysis to determine sex and age. Swordfish stomach contents consisted of hake (Urophycis spp.), squid (Loligo pealli), blueback herring (Alosa aestivalis), and butterfish (Poronotus triacanthus). Partial identification of dip-net catches included the Atlantic saury (Scorpaenopsis saurus), blueback herring (Alosa aestivalis), squid (Loligo pealli), and the pelagic stage of the American lobster (Homarus americanus).



North Atlantic Fisheries Investigations

LIVE MARINE SPECIMENS AND BIOLOGICAL DATA ON HAKE COLLECTED:

M/V "Delaware" Cruise 62-8 (June 25-28, 1962): To collect live specimens of the common offshore marine species off the New England coast was the purpose of this cruise of

the research vessel Delaware of the U. S. Bureau of Commercial Fisheries.

Three bottom tows were made in the South Channel area and ten tows south of Marthas Vineyard. Seven of the ten tows south of Marthas Vineyard were made to collect biological data on the American hake and to collect live specimens.



Barn-Door Skate

Yellowtail flounder, whiting, butterfish, long-horned sculpin, spiny dogfish, sea raven, eel pout, and skate were among the live specimens brought to the laboratory. Otoliths (ear bones) and stomachs were collected from American hake caught on the cruise.

* * * * *

OCEAN BOTTOM SEDIMENTS AND MARINE ANIMAL LIFE STUDIED:

M/V "Delaware" Cruise 62-7 (June 11-20, 1962): A study of ocean bottom sediments and the quantitative and qualitative composition of ocean bottom life on the continental shelf south of Nantucket and Marthas Vineyard was the objective of this cruise of the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware completed on June 20, 1962.

Approximately 300 sediment samples were collected on 8 north-south transects across the shelf. In addition, 600 samples of bottom animals were collected. These samples will be analyzed in the laboratory as part of the program studying the relations of bottom-living fish. Fine and medium sands most commonly occurred in shoal water, while the silt-clay sediments were found mostly in deeper water. Water temperature measurements were made at all stations.

* * * * *

WOODS HOLE BIOLOGICAL LABORATORY IN MASSACHUSETTS DEDICATED:

A Federal fishery program that had a modest beginning at a simple lighthouse station 91 years ago, was honored



Aquarium and maintenance building of U. S. Bureau of Commercial Fisheries Biological Laboratory, Woods Hole, Mass.

June 23, 1962, at the dedication of the new Woods Hole, Mass., Biological Laboratory of the U. S. Fish and Wildlife Service's Bureau of Commercial Fisheries.

The original Fisheries Laboratory at Woods Hole--the first fisheries and marine biological research laboratory in the United States--was established in 1871 at the Lighthouse Station. In 1883, it was moved to land given to the U. S. Commission of Fish and Fisheries, a predecessor agency of the Fish and Wildlife Service. Spencer F. Baird, the first Commissioner of Fish and Fisheries and Secretary of the Smithsonian Institution, also was the first director of the laboratory. The scientific accomplishments of the staff and of visiting scientists from leading universities, who conducted research during summers, gained international attention.

The ravages of time and three hurricanes took a heavy toll. Replacing of facilities at the Woods Hole Laboratory was begun in 1957 and completed in 1961 at a cost of more than \$1 million.

The present staff of 25 scientists, supported by 55 technical and administrative personnel, conducts biological and oceanographic research programs concerned with the offshore groundfish of the northwest Atlantic--one of the most valuable fisheries of the world, utilized and managed by 13 nations under agreements established by the International Commission for the Northwest Atlantic Fisheries (ICNAF). The research commitments of the United States under ICNAF agreements are responsibilities of the staff of the Woods Hole Laboratory. The Laboratory's programs are concerned with the problems of conservation of haddock, cod, ocean perch, whiting, flounders, sea scallops, and industrial species. It computes the natural production of these species in order to advise what measures must be taken to achieve a sustained maximum yield. It also collects information necessary for documenting the natural changes that occur in environment and in populations.

The new three-story Laboratory Building has 24,000 square feet of floor space devoted to "wet laboratories," equipped with running sea water, and other laboratories, offices, a scientific library, and conference room.

A second building houses maintenance facilities and an aquarium for experiments on marine fishes, but functions during the summer as a public exhibition. It was visited last year by more than 200,000 persons.

The new dock facilities are designed to accommodate ocean-going vessels, as well as smaller vessels to be used in inshore work. The new fishery-oceanographic research vessel Albatross IV, scheduled for delivery in October 1962, will be docked there.



North Pacific Exploratory Fishery Program

SURVEY OF DEEP-WATER MARINE FAUNA OFF MOUTH OF COLUMBIA RIVER CONTINUED:

M/V "Commando" Cruise 4: The sixth in a series of cruises designed to study deep-water marine animal life along a track line southwest of the Columbia River mouth was completed on June 15, 1962, by the U. S. Bureau of Commercial Fisheries chartered research vessel Commando. Twenty drags of one-hour each were made with a standard 400-mesh eastern otter trawl with a small mesh liner at depths from 50 to 450 fathoms (300 to 2,700 feet) to monitor stations which had been established on previous cruises. Eight additional short drags were made in the area of the track line to supply Dover sole and sablefish for Oregon Fish Commission personnel to tag. The track line was extended from 500 to 1,000 fathoms and stations were located using a high-resolution low-frequency echo-sounder. At each of the deeper stations, a drag was made using a 42-foot shrimp trawl hauled on a single wire with 20-fathom bridles. To help maintain the gear on the bottom, each door was weighted with approximately 150 pounds of steel plate. Stainless steel ball-bearing swivels were needed to eliminate twisting of the wire and bridles. Cable to depth (scope) ratios of less than 1.7 to 1 were used when trawling at the deeper stations.

Samples of fish were collected for the Atomic Energy Commission and delivered to the Laboratory of Radiation Biology, University of Washington, for radiological analysis. Additional samples were collected for the Bureau's Technological Laboratory in Seattle and the College of Fisheries, University of Washington.

The cooperative study with the Oregon Fish Commission to study the migrations of deep-water commercial species in the area of the track line was expanded, resulting in the release of tagged fish--1,626 Dover sole and 576 sablefish--at depths from 50 to 300 fathoms. A total of 3,455 Dover sole and 576 sablefish had already been tagged up to then, with recoveries of 12 Dover sole and 1 sablefish.

Commercial species of fish caught were the same as those taken in previous cruises (see table). Several other species of rockfish were also taken. Dover sole were

Commercial Species of Fish Caught by M/V Commando
During Cruise 4 (May 14-June 15, 1962)

Species	Scientific Name
Sablefish	<u>Anoplopoma fimbria</u>
Dover sole	<u>Microstomus pacificus</u>
English sole	<u>Parophrys vetulus</u>
Petrale sole	<u>Eopsetta jordani</u>
Halibut	<u>Hippoglossus stenolepis</u>
Turbot	<u>Atheresthes stomias</u>
Hake	<u>Merluccius productus</u>
Ocean perch	<u>Sebastes alutus</u>

caught out to 400 fathoms and sablefish to 600 fathoms. The greatest catch of both species was 1,500 pounds per hour, with Dover sole being most abundant at 225 fathoms and sablefish at 325 fathoms. There was a definite trend for larger individuals to be taken in deeper water. The greatest catch of ocean perch was made in 225 fathoms where 2,000 pounds were taken in a 1-hour tow. Other commercial species of fish were not caught in great abundance.

The only commercial species of invertebrates taken in large numbers was the tanner crab (Chionoecetes tanneri). Males were found to be concentrated at 300 fathoms with females most abundant at 375 fathoms. That was in sharp contrast to the winter distribution when both sexes were found concentrated together in 350 fathoms. The distribution was similar to that found at the same time the previous year. Although the catch per hour in numbers in the areas of highest concentration of males and females was greater for females, the larger size of the males resulted in a similar catch per hour in pounds for both sexes (160 pounds per one-hour tow). Deep-water sampling with the shrimp trawl extended the observed depth range of juvenile crabs in the study area down to 1,000 fathoms. A species similar to the tanner crab was being harvested by the Japanese in northern waters and a fishery is just developing in southeastern Alaska. Indications are that large quantities of this crab may exist along our coast but further explorations will be needed in the deeper waters along the continental shelf before the populations can be fully delineated.

The successful extension of the track line to 1,000 fathoms has resulted in the capture of several species of fish and invertebrates new to this study. In particular are the following: (1) a large cottid fish (possibly Cottunculoides), (2) a melamphid fish, (3) several large pycnogonids (sea spiders), and (4) two species of large deep-water shrimp.

Note: See Commercial Fisheries Review, Feb. 1962 p. 32.

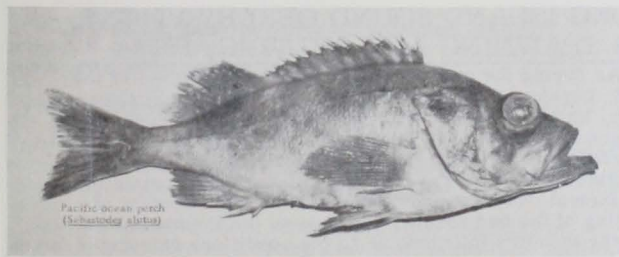
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SURVEY OF BOTTOMFISH POPULATIONS IN GULF OF ALASKA CONTINUED:

M/V "John N. Cobb" Cruise 54: An 8-week exploratory bottomfish cruise to the Gulf of Alaska was completed June 8, 1962, by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb.

The survey was undertaken in cooperation with the International Pacific Halibut Commission and the Alaska Region of the Bureau of Commercial Fisheries. Primary objectives of the survey were to assess the magnitude of latent bottomfish populations in the Gulf of Alaska, and obtain information on the age and size composition of bottomfish encountered.

The area explored extended from Cape St. Elias to Portlock Bank near Kodiak Island. Eighty-three exploratory drags of one-hour each were made with a commercial otter-trawl net. The drags were made in water 40 to 270 fathoms deep. Total catches ranged from 130 to 5,300 pounds and averaged 1,350 pounds per individual drag. Turbot (*Atheresthes stomias*), flathead sole (*Hippoglossoides elassodon*), small pollock (*Theragra chalcogrammus*), and tanner crab (*Chionoecetes*) dominated the catches. Good catches of up to 2,000 pounds of Dover sole per hour of trawling were taken in Albatross Gully in 250 fathoms of water. The largest catch of Pacific ocean perch (*Sebastes alutus*) was 3,000 pounds, and most catches of that species were less than 500 pounds.



While the John N. Cobb was surveying Albatross Gully, personnel aboard the vessel were able to observe the operations of two Russian trawlers. They were estimated to be approximately 160 feet in length and were similar in design to North Atlantic side trawlers. An estimated catch of 15,000 pounds of Pacific ocean perch was observed taken by one of the Russian trawlers after it had trawled for about 1½ hours. No other species except Pacific ocean perch were seen; however, the catch was dumped directly

into the hold. The net appeared to be rigged to fish 4 to 5 feet off the bottom.

Note: See Commercial Fisheries Review, Dec. 1961 p. 42, Oct. 1961 p. 24.

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OCEANIC FISH SURVEY OFF PACIFIC NORTHWEST AND CALIFORNIA COASTS:

M/V "John N. Cobb" Cruise 55: To study the oceanic or offshore fish off the coasts of Washington, Oregon, and southern California, was the primary purpose of a 12-week cruise of the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb. Oceanographic data also are to be obtained off the Washington and Oregon coasts. The vessel left Seattle on July 9, 1962.

Phase 1, July 9-29: Albacore tuna investigations in waters between 48° N. latitude and 42° N. latitude and seaward to 130° W. longitude.

Phase 2, August 5-31: California Cooperative Oceanic Fisheries Investigation drag lines 60, 70, 80, 90, 100, and 110. Waters off California from 38° N. latitude to approximately 35.5° N. latitude and seaward to 125° W. longitude.

Phase 3, September 1-21: Gear test evaluation in coastal waters of southern California.

Trolling and midwater trawling will be the main methods for catching fish. All albacore tuna in suitable condition will be tagged and released. Pertinent information on albacore tuna catches will be broadcast to the fishing fleet by radio from the John N. Cobb. Night light fishing stations will be made along the track line of Phase 1 of the cruise. Oceanographic stations will be occupied daily.

During the second phase of the cruise, California Cooperative Oceanic Fisheries Investigation stations on lines 60, 70, 80, 90, 100 and 110 will be occupied using the John N. Cobb's large midwater trawl. All tows will be made, if possible, by retrieving cable to sample equally from maximum depths fished to surface. During the third phase of the cruise, a concentrated effort will be made to determine the fishing capabilities of the large midwater trawl. Information supplied by the La Jolla Biological Laboratory, California Fish and Game, and other sources will be used to determine those areas showing

most promise for conducting midwater trawl experiments.



Oregon

RESEARCH IS KEY TO EXPANDING SHRIMP FISHERY:

Shrimp are being landed by commercial vessels in abundant supply to canneries in the Coos Bay-Charleston area. In Oregon, four canneries are operating in that area, employing an estimated 100 pickers, cannerymen, and other personnel. Since this time of year is normally a slack period in cannery operations, the landings of shrimp are a boon to employment.

Preliminary investigations for possible shrimp-producing areas were first conducted along the Oregon coast in 1951 and 1952 by the Oregon Fish Commission. Although shrimp had been harvested for many years off Alaska, British Columbia, and Puget Sound, Washington, it was not known whether sufficient quantities of shrimp were available to support a commercial harvest in Oregon waters. It was known, however, that shrimp of commercial size did occur to some degree.

The Fish Commission's exploratory cruises in the Coos Bay area were conducted aboard the Nel-Ron-Dic, a commercial otter-trawl vessel. This operation involved the use of heavily-weighted nets towed along the ocean floor in depths of from 300 to 600 feet. Results indicated that a commercial fishery for shrimp was feasible in that area as well as several others along the Oregon coast.

Since that time, the shrimp industry in the Coos Bay-Charleston area has undergone a healthy rate of growth. In place of 1 cannery working part time initially to handle the catch of a few boats, 4 canneries now function full time to accommodate the catches of a sizable fleet of shrimp vessels. Astoria and Brookings areas also support a shrimp fishery, adding further to the importance of this Oregon product.

This is an excellent example of how research into a new field has paid big dividends in boosting local and State economy and providing a new product for the consumer.

* * * * *

BEHAVIOR OF YOUNG SALMON IN RESERVOIRS BEING STUDIED:

The opening of a new research laboratory at Redmond, Oregon, was announced by the Oregon Fish Commission on July 9, 1962. The Commission's Director of Research, stated that studies will be carried out there on the behavior of young salmon-like fish (salmonids) in reservoirs. "Much more has to be known about the behavior of juvenile salmon in reservoirs," the Director of Research said, "and the purpose of this study is to try and gain the needed information in order to help with the design of future fish passage facilities." This is a phase of the over-all fish passage research program initiated by the Secretary of the Interior in 1961, and the research will be done under a contract from the Bureau of Commercial Fisheries.

Field work for the project will be conducted at Lake Simtustus, behind Pelton Dam on the Deschutes River. Floating traps and small-mesh gill nets will be used to gather specimens and SCUBA gear will be employed for underwater observations. This particular study will last three years with two full years of field work. An identical study under the same program is being conducted by Commission personnel at North Fork Reservoir on the Clackamas River.

Note: See Commercial Fisheries Review, October 1961 p. 12.



Oysters

LONG ISLAND SOUND OBSERVATIONS ON SPAWNING AND SETTING, 1962:

As during the previous 25 years, the biologists of the U.S. Bureau of Commercial Fisheries Biological Laboratory, Milford, Conn., will conduct systematic observations on gonad development, spawning and setting of oysters and starfish in Long Island Sound. These studies have been carried on for several reasons, chiefly, to ascertain the ecological conditions that control time and intensity of setting of the two species and to keep the members of the oyster industry informed as to the conditions existing in the Sound.

The basic ten stations at which observations will be made and samples taken will remain the same as last year. Several supplementary stations may be established later in the season, if conditions require it.

This summer the biologists will continue to evaluate the effectiveness and safety of the chemical method for control of shellfish predators. The center of the studies will be located in one of the relatively isolated inlets, commonly called "gut," which at present maintains an extremely high population of drills rendering any oyster operations virtually impossible.

The studies will be conducted in cooperation with members of the Connecticut oyster industry. It is planned to treat approximately 30 acres of oyster bottom with a mixture of sand, Polystream and Sevin to destroy oyster drills. After the treatment, cultch consisting of old shells will be placed on the bottom to collect a set of oysters.

To verify some of last year's observations, that chemically-treated cultch collects more set, one 4-acre plot will be planted with chemically-treated shells, while an adjacent plot of the same dimensions will be covered with untreated shells.

Extensive studies to be made in the experimental area will include:

(1) Examination of the condition of approximately 150 bushels of mature, ready-to-spawn oysters, which will be planted in the area treated with sand, Polystream, and Sevin.

(2) Observations on time and intensity of setting of oysters and starfish at 5 stations located within the experimental area.

(3) Examination of numerous plankton samples to determine the composition of microscopic plant and animal organisms in sea water, especially the kind and number of molluscan larvae.

(4) Observations on juvenile clams, both the hard clam (*Mercenaria mercenaria*) and the soft clam (*Mya arenaria*), that will be placed on the bottom prior to the treatment and after the treatment. These observations will consist, in part, of observing survival and growth of the different groups.

(5) A team of divers will examine the conditions on the bottom to determine the effectiveness of the treatment and its effects on bottom forms in general.

(6) Numerous oyster drill traps, baited with mussels, will be used to determine the density of drill populations prior to the treatment and after it.

During the past winter the biologists found an extremely simple, effective and safe method of marking shells of mollusks in studies of their growth, etc. The method consists in painting the shells with an instant-dry, waterproof preparation known under the name of "Magic Marker." (*Bulletin No. 1*, July 9, 1962.)

* * * * *

MARYLAND OBSERVATIONS, 1962 SEASON:

Since August 24, 1961, oysters generally fattened and grew well during both the fall and spring seasons in the Maryland Chesapeake area, according to the "Special Oyster Bulletin" of the State of Maryland Chesapeake Biological Laboratory, Solomons.

Salinity of the water at Solomons remained near or somewhat above normal since mid-October 1961 after two years of below normal levels.

Water temperatures were above normal during the fall and were below during the winter and early spring. In late April and during May water temperatures were higher than normal. At the end of June the water temperature was at about the seasonal level (approx. 78° F.).

In some areas, oysters reached spawning condition in May and those examined during June from areas near and below Solomons were mostly either partly spawned or ready to spawn.

Oyster Mortalities: Certain known causes of oyster mortality have been less destructive during the past year.

The fungus *Dermocystidium* remained present from the Solomons area on down-bay. Infection of oysters was light and generally resulted in only minor losses.

The development of "stagnant" or oxygen-deficient water at the bottom was confined to deeper water last season than for several preceding years so that little, if any, deep-water oyster kill resulted.

The parasite MSX, which has proved so destructive in Delaware Bay and certain areas of Virginia, continues to be

present in Pocomoke Sound and at scattered points throughout the Tangier Sound area. Fewer infected oysters have been found this summer than were present in samples taken last fall and the majority of samples have been negative. Those taken in June have not yet been completely analyzed.

An encouraging note comes from Delaware Bay where it is reported by Rutgers University that oyster mortalities in New Jersey were much lighter during 1961 than for the previous years of the MSX epidemic. There is indication that the few old oysters which survived the earlier kill are resistant to the parasite and that the new set from these resistant oysters has suffered less mortality from MSX than did the original stock. The development of resistant strains of oysters is believed to be the most effective method by which production in the hard hit MSX areas can be restored.

Evidence from infected oysters grown in tanks of low salinity water at Solomons, and from field observations by the Virginia Fisheries Laboratory on the upper James and on lightly infected seed transplanted to lower salinity grounds in Virginia, continues to indicate recovery from light MSX infection when oysters are moved to low salinities.



Planting seed oysters.

With the opening of the James River seed beds to out-of-state buyers, the Maryland Department of Tidewater Fisheries put into effect a permit system under which oysters from MSX-free portions of the James could be planted in Maryland. The State Laboratory at Solomons this spring examined numerous samples of Virginia seed for which permits were sought. The pattern of infestation as previously described by the Virginia Fisheries Laboratory applied generally to findings for these samples. Since the processing of numerous samplings is very time-consuming, the granting of later permits has been based largely upon knowledge of MSX conditions in the areas from which the seed originated.

The following describes the general MSX picture for the Chesapeake area. Conditions in Virginia are based upon extensive studies by the Virginia Fisheries Laboratory supplemented by examination at Solomons of scattered samples of Virginia seed to be transplanted into Maryland.

James River beds above Wreck Shoal have remained free of MSX and are considered safe for transplanting to uninfected areas. However, they are susceptible to MSX and will become infected when planted in areas where MSX is present. Oysters on Wreck Shoal have shown MSX infection during each of the past two fall seasons when salinities are high but have recovered during the following spring when salinities are low. It is possible that some residual undetected infection may be carried that develops again the following fall.

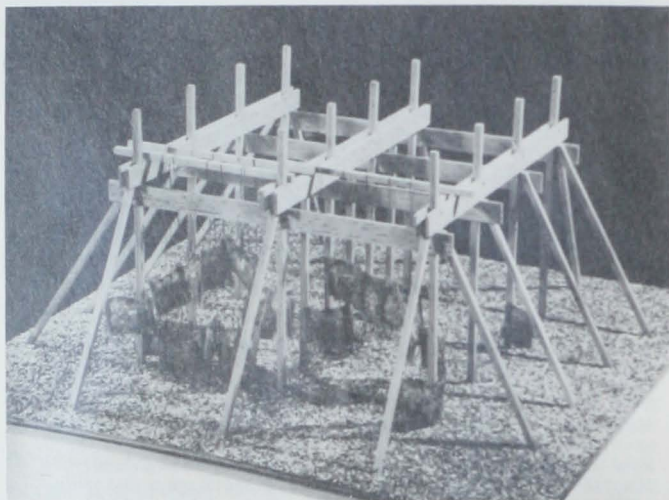
Below Wreck Shoal moderate to heavy MSX infestation has been found throughout the year accompanied by oyster losses that occasionally are severe. Samples of seed from the upper portion of Bennett Creek and Warwick River indicate that low salinity areas of tributaries to the infested portion of the seed area may also remain free of the parasite.

In general, most other major oyster producing waters of Virginia have shown the presence of MSX except in the upper Rappahannock and the Potomac River tributaries. The heaviest infestation and most severe losses have occurred in the lower portions of the Bay area. The only Maryland waters

in which infected oysters have been found are from Hooper Straits through Tangier and Pocomoke Sounds, and in all of the Maryland Seaside. No MSX has yet been found in the Holland Straits seed area.

Very light infestations of MSX can be easily missed since the number of oysters processed seldom can exceed more than 10 to 30 from a given sample. From those portions of the James where the presence of MSX is questionable or extremely light, it is felt that seed can be safely transplanted to the Pocomoke or Tangier Sound areas without endangering native stocks. It probably is capable of producing good yields. It is also likely that such seed would do well in other Maryland areas but, where MSX has not yet been found, it seems unwise to plant seed that may contain it until we are positive that low salinity can prevent its spread.

The fact that salinities in the Bay this year are running about 2 parts per thousand higher than during the past two seasons may permit a more intensive development of MSX in the areas now lightly infested and may also permit its penetration further up the Bay if salinities continue to run high. However, the infestation of Maryland beds by this parasite is not at present alarming and it is hoped that natural conditions and build up of resistance will continue



This is a model of a rack sustaining setting in depth spat collecting bags arranged to cover depth from bottom to 7 feet. This rack was developed in 1958 at Annapolis by the Bureau of Commercial Fisheries and is not necessarily the same used by the Chesapeake Biological Laboratory.

Setting Observations: Test shells have been exposed in the Solomons-Potomac-Holland Straits area commencing June 4. These are clean shells in wire bags suspended just above the bottom. The shells are changed approximately once a week and the spat attached to the inner faces of twenty shells are counted. Since both the outer and inner faces have been found to catch equally well, the counts given represent the quantity on ten shells (both sides). Assuming that a bushel would contain about 500 of these approximate 4 inch shells, then the count per bushel would be 50 times the figures listed.

From the examination of oyster bar samples, it was found that a very light set of 1962 spat had occurred during the latter part of May as shown by small spat 1/4 to 3/8 inch long that were found on oysters and old cultch removed from the bar during the second week of June. These were found at only three locations in Tangier Sound and ranged from 2 per bushel on Lambstone to 14 per bushel on Great Rock. While the quantity is insignificant, this set is of interest since it is one of the earliest recorded in our area.

No intensive 1962 oyster set had yet occurred as of July 6 on test shells. An unusually heavy barnacle set occurred during the third week in June that amounted to as much as 100 barnacles per shell face at Cinder Hill in Holland Straits.



Shrimp

UNITED STATES SHRIMP SUPPLY INDICATORS, JUNE 1962:

Item and Period	1962	1961	1960	1959	1958
..... (1,000 Lbs., Heads-Off)					
Total Landings, So. Atl. and Gulf States:					
August	-	10,944	20,441	18,595	14,173
July	-	10,477	21,746	17,493	13,457
June	10,000	8,220	12,427	14,547	10,241
Jan.-May	20,600	22,732	24,348	20,965	25,856
Jan.-December ...	-	91,280	141,035	130,660	116,552
Quantity canned, Gulf States 1/:					
August	-	1,206	5,041	2,427	2,809
July	-	3,042	6,319	3,085	4,805
June	5,000	3,744	7,537	7,641	5,107
Jan.-May	2,600	1,661	2,303	3,297	2,002
Jan.-December ...	-	15,760	28,594	24,679	26,404
Frozen inventories (as of end of each mo.) 2/:					
August 31	-	12,728	20,171	23,780	15,274
July 31	-	14,849	17,397	22,357	12,351
June 30	4/	19,416	15,338	19,283	10,664
May 31	13,685	24,696	17,540	21,137	11,013
April 30	15,637	27,492	20,502	23,331	12,211
January 31	-	31,842	34,332	30,858	17,963
Imports 3/:					
August	-	6,743	6,407	5,107	6,628
July	-	6,635	7,319	7,861	6,340
June	4/	8,065	8,932	8,300	6,018
May	11,221	8,278	9,902	8,264	5,666
Jan.-April	43,383	40,825	32,531	33,262	20,594
Jan.-December ...	-	126,268	113,418	106,555	85,393
1/Pounds of headless shrimp determined by multiplying the number of standard cases by 33.					
2/Raw headless only; excludes breaded, peeled and deveined, etc.					
3/Includes fresh, frozen, canned, dried, and other shrimp products as reported by the Bureau of the Census.					
4/Not available.					
Note: Data for 1962 and 1961 are preliminary. June 1962 data estimated from information published daily by the New Orleans Fishery Market News Service. To convert shrimp to heads-on weight multiply by 1.68.					



South Atlantic Exploratory Fishery Program

CALICO SCALLOP EXPLORATIONS OFF NORTH CAROLINA:

M/V "Silver Bay" Cruise 39: To determine the availability of scallops northward of Cape Lookout was the first purpose of this cruise. A second purpose was to assess the animal life of the area off the North Carolina coast, primarily between 50 and 100 fathoms. The 20-day trip (completed June 12, 1962) was made by the exploratory fishing vessel

Silver Bay of the U. S. Bureau of Commercial Fisheries.

Between Capes Lookout and Hatteras 70 stations were dredged to determine the status of the calico scallop (*Pecten gibbus*) resource earlier located by the M/V Silver Bay and which passed out of the fishery during 1961. Mixed dead shell (mostly *Pecten*) was dredged throughout the area surveyed. The only live commercial-size scallops were several taken in 19 fathoms near Cape Lookout. In the general area off Core Banks where commercial concentrations were located before, small seed scallops (3 to 5 millimeters in diameter) attached to the dead shells were present in large numbers at several stations. Commercial-size scallops were not found in quantity in the survey area at the time.

A total of 68 stations were dredged north of Cape Hatteras. Sea scallops (*Pecten grandis*) were caught in depths from 20 to 58 fathoms between latitudes $35^{\circ}24'$ and $36^{\circ}32'$ N. Catches ranged up to $5\frac{1}{4}$ bushels of scallops (81 to 158 millimeters in diameter, 110 average) per 30-minute drag. Scallops as small as 14 mm. in diameter were taken. The best depth for larger catches was $39\frac{1}{2}$ fathoms and meat counts averaged 30 to 35 per pound.

Fish trawling with 40- and 60-foot 2-seam balloon trawls was tried at 25 stations, primarily between 50 and 100 fathoms eastward and north from Cape Lookout to the Virginia boundary. Catches were small. Lobsters (*Homerus americanus*) were taken occasionally as far south as latitude $35^{\circ}56.5'$ N.

On June 6 the Silver Bay encountered a U.S.S.R. exploratory fishing vessel off the North Carolina coast north of Cape Hatteras. M/V Silver Bay personnel were invited aboard and learned that the vessel was exploring for offshore menhaden stocks. On June 11 what appeared to be a sistership was observed along the 20-fathom curve off South Carolina.

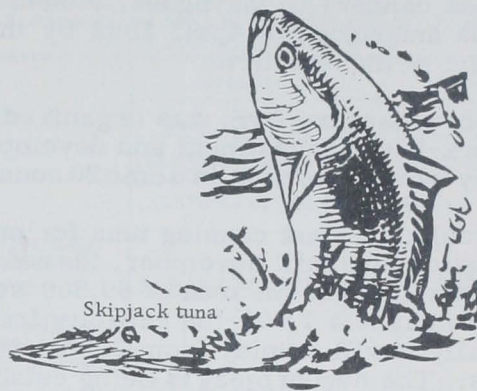


Tuna

FIRST RECORDED SKIPJACK MIGRATION FROM EASTERN PACIFIC TO HAWAII:

A 26-pound skipjack tuna captured on June 12, 1962, by the sampan Yellowfin off Oahu has provided the first evidence of movement of this species from the fishing grounds off

the American coast into Hawaiian waters, according to the Hawaii Biological Laboratory of the U. S. Bureau of Commercial Fisheries.



This skipjack was tagged on September 5, 1960, in the Eastern Pacific, off Baja California about 20 miles WSW. of Turtle Bay (approximate coordinates, $27^{\circ}30'$ N. lat.; 115° W. long.) by scientists of the Inter-American Tropical Tuna Commission on board the San Diego clipper M/V Westport. At time of release the fish was estimated to have weighed between 6 and 7 pounds. During the 22 months the skipjack grew about 19 pounds and travelled a minimum of 2,500 miles. The fish, on recovery, was in excellent condition, with the tagging wound perfectly healed.

In the past few years, since large-scale tagging of tuna has been started in the Pacific, there have been several spectacular trans-oceanic recaptures of albacore which were tagged off the American coast and retaken by Japanese fishermen. Skipjack, although they have been tagged in large numbers and quite successfully, as attested by good percentages of tagged fish recaptured, have not hitherto been shown to move from one fishery to another. For example, the Bureau's scientists have released over 13,000 marked skipjack in the central Pacific area, of which 1,331 have been recaptured, all by Hawaii fishermen. Releases of over 80,000 skipjack in eastern Pacific waters by scientists of the Inter-American Tropical Tuna Commission and California Department of Fish and Game have produced many recaptures, all but the latest one being within the area of the West Coast fishery. Much skipjack is fished in Japanese waters, and some have been tagged there in the past, but there has been no indication of any interchange between the far western Pacific and the other areas where this species is exploited.

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NEW CANNERY BEING BUILT IN PUERTO RICO:

A new United States firm, recently established, with offices in New York City, is building a tuna cannery in Mayaguez, Puerto Rico. This was announced in April 1962 by the President of the new firm.

The new cannery firm was organized by a New York-based investment and development company which operates in some 20 countries.

Scheduled to start canning tuna for private label customers next November, the new packing plant will cover an area of 60,000 square feet and include a 1,000-ton capacity freezer. Eventually it will employ from 200 to 300 persons. The new project is being established with the cooperation of Puerto Rico's Economic Development Administration and involves an over-all investment of \$1.7 million.

This is the third company to locate a tuna cannery in the maritime zone of Mayaguez, on the Island's west coast 108 miles from San Juan.



U. S. Fishing Vessels

FISHERIES LOAN FUND AND OTHER FINANCIAL AID FOR VESSELS, APRIL 1-JUNE 30, 1962:

From the beginning of the program in 1956 through June 30, 1962, a total of 1,169 loan applications for \$33,008,423 were received by the U. S. Bureau of Commercial Fisheries, the agency administering the Federal Fisheries Loan Fund. Of the total, 618 applications (\$14,646,311) have been approved, 405 (\$10,599,362) have been declined or found ineligible, 123 (\$5,726,011) have been withdrawn by applicants before being processed, and 23 (\$407,011) are pending. Of the applications approved, 251 (\$1,629,728) were approved for amounts less than applied for.

The following fishery loans were approved from April 1, 1962, through June 30, 1962:

New England Area: Sheldon S. Kent, Sr., Fairhaven, Mass., \$98,000; and Boat Sunbeam, New Bedford, Mass., \$9,200.

South Atlantic and Gulf Area: G. Conrad and Claudia Rogers, Darien, Ga., \$15,271; W. J. Pyron, St. Marys, Ga., \$12,000; Tilman P. Charpentier, Galliano, La., \$11,825; Jacqueline Valence, Jr., Westwego, La., \$57,240; and Henry W. Humphreys, Brownsville, Tex., \$36,800.

California: Louis E. Albin, Crescent City, \$6,864; Jim M. and Bernice J. Stillman, Long Beach, \$13,445; Harold C. Buckman, Morro Bay, \$1,613; Raymond Wadsworth, San Leandro, \$9,000; and Ivan Goyette, San Pedro, \$10,269.

Pacific Northwest Area: John Edelman, Anacortes, Wash., \$10,000; Boris Olich, Anacortes, Wash., \$38,000; Charles R. Beechey, Ocean Park, Wash., \$8,000; Robert S. Kanekkeberg, Port Orchard, Wash., \$6,000; Mathias J. Hoddevik, Seattle, Wash., \$9,000; Bernard and Richard Linvog, Seattle, Wash.,

\$21,750; Dan Luketa, Seattle, Wash., \$33,500; and Clayton H. Harris, Tacoma, Wash., \$25,000.

Alaska: Vernon Eckman, Juneau, \$10,000; Peter N. Holm, Juneau, \$81,530; and Ralph D. Hillmer, Ketchikan, \$1,093.

Under the Fishing Vessel Mortgage Insurance Program (also administered by the Bureau) during the second quarter of 1962, approval was granted for the insurance of mortgages on fishing vessels owned by the following and in the amounts indicated: International Tuna Co., San Diego, Calif., \$527,490; Joseph R. Fribrock, Seattle, Wash., \$30,546. Under this program, which started July 5, 1960, approval was granted before the last quarter of 1961 to the following: Major J. Casey Corp., New Bedford, Mass., \$60,000; Sylvester Maloney, New Bedford, Mass., \$60,000; Ric-Man Shrimp Co., Inc., Tampa, Fla., \$34,500; Joseph R. Fribrock, Seattle, Wash., \$75,000. Since the start of this program, 12 applications were received for \$1,402,346. Of the total, 9 applications have been approved for \$937,346.

In the Fishing Vessel Construction Differential Subsidy program, the following construction differential subsidies were approved during the second quarter of 1962: Boston Fishing Boat Co., Inc., Boston, Mass., \$161,379; Jacobsen Fishing Co., Inc., Fairhaven, Mass., \$76,750; Trawler Jeanne D'Arc, Inc., Rockland, Maine, \$70,814; Charlevoix Transit Co., Sturgeon Bay, Wis., \$161,379. The first approval in this program was made in March 1961. The amount approved for subsidy represents one-third the cost of a new vessel. Since the beginning of the program on June 12, 1960, 10 applications were received for \$699,313, of which 5 applications were approved for \$507,646. Approval of 2 applications under this program is pending. Three applications from ineligible fisheries were disapproved.

Note: See *Commercial Fisheries Review*, May 1962 p. 32.

* * * * *

DOCUMENTATIONS ISSUED AND CANCELLED, MAY 1962:

During May 1962, a total of 47 vessels of 5 net tons and over were issued first documents as fishing craft, as compared with 63 in May 1961. There were 31 documents cancelled for fishing vessels in May 1962 as compared with 24 in May 1961.

Table 1-U.S. Fishing Vessels ^{1/}--Documentations Issued and Cancelled, by Areas, May 1962 with Comparisons

Area (Home Port)	May		Jan.-May,		Total 1961
	1962	1961	1962	1961	
Issued first documents ^{2/} : (Number)					
New England	4	4	13	15	33
Middle Atlantic	1	1	2	2	12
Chesapeake	4	4	16	25	75
South Atlantic	3	3	13	15	44
Gulf	10	18	38	52	103
Pacific	25	32	62	70	149
Great Lakes	-	1	-	5	12
Puerto Rico	-	-	-	2	2
Total	47	63	144	186	430
Removed from documentation ^{3/} :					
New England	3	1	11	6	20
Middle Atlantic	5	3	24	15	32
Chesapeake	1	2	6	18	28
South Atlantic	1	3	16	11	29
Gulf	12	5	46	45	104
Pacific	9	10	59	44	111
Great Lakes	-	-	8	7	17
Hawaii	-	-	3	-	-
Total	31	24	173	146	341

^{1/}For explanation of footnotes, see table 2.

Table 2--U.S. Fishing Vessels--Documents Issued and Cancelled, by Tonnage Groups, May 1962

Gross Tonnage	Issued ^{2/}	Cancelled ^{3/}
(Number).....	
5-9	12	5
10-19	15	9
20-29	3	2
30-39	4	3
40-49	2	1
50-59	2	2
60-69	1	3
70-79	4	2
80-89	-	1
110-119	-	1
120-129	1	-
190-199	-	1
210-219	1	-
240-249	-	1
480-489	2	-
Total	47	31

^{1/}Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.
^{2/}Includes redocumented vessels previously removed from records. Vessels issued first documents as fishing craft were built: 32 in 1962, 1 in 1961, 2 in 1960, 1 in 1959, 1 in 1955, 1 in 1953, 1 in 1951, 6 prior to 1951, and 2 unknown. Assigned to areas on the basis of their home ports.
^{3/}Includes vessels reported lost, abandoned, forfeited, sold alien, etc.
 Source: Monthly Supplement to Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.



U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, APRIL 1962:

Imports of fresh, frozen, and processed edible fish and shellfish into the United States in April 1962 were down 11.8 percent in quantity and 7.5 percent in value as compared with the previous month. During that period there were greater imports of fish blocks or slabs, canned salmon (mostly from Japan), frozen cooked tuna loins and discs, frozen shrimp, canned sardines not in oil, and live lobsters from Canada. But imports were down for all types of fillets and steaks, fresh and frozen salmon (mostly from Canada), frozen tuna, canned tuna in brine, canned sardines in oil, canned crab meat, and canned oysters (mostly from Japan).

Compared with the same month in 1961, the imports in April 1962 were up 29.5 percent in quantity and 47.4 percent in value. Higher prices for most imported products and an increase in the imports of higher-priced products account for the greater increase in the value. This April there were more imports of frozen cod, ocean perch, blocks and slabs, and swordfish fillets (from Japan), frozen salmon (from Canada), and canned salmon (from Canada and Japan), frozen tuna (from Japan, West Africa, and Peru), canned light meat tuna in brine (from Japan), canned sardines in oil, canned crab meat (from Japan), live lobsters (from Canada), and frozen spiny lobster tails (from Australia, New Zealand, and South Africa), frozen shrimp, and frozen scallops (from Canada). Imports dropped off for frozen haddock fillets, canned white meat tuna in brine (from Japan), canned sardines not in oil (from South Africa), and frog legs (from Cuba).

In the first four months of 1962, imports were up 14.0 percent in quantity and 22.9 percent in value as compared to the same period in 1961. The greater increase in value was because of the higher prices which prevailed in the first part of this year for nearly all imported fishery products. This year there were more imports of blocks and slabs (the increase was mostly from Norway and Denmark), sea catfish fillets (increase mostly from West Germany), canned salmon (from Japan and Canada), frozen tuna (mostly from Japan, Ecuador,

West Africa, and Peru), canned tuna (from Japan), canned sardines in oil, frozen shrimp, frozen scallops, live lobsters, and spiny lobster tails. Imports were down for swordfish fillets (from Japan), frozen salmon from Canada, canned sardines not in oil (from South Africa), canned oysters (from Japan), and frozen frog legs (from Cuba).

U. S. Imports and Exports of Edible Fishery Products, April 1962 with Comparisons

Item	Quantity				Value			
	Apr.		Jan.-Apr.		Apr.		Jan.-Apr.	
	1962	1961	1962	1961	1962	1961	1962	1961
	. (Millions of Lbs.) .				. (Millions of \$) .			
Imports:								
Fish & Shellfish:								
Fresh, frozen, & processed ^{1/}	90.8	70.1	366.7	321.8	30.8	20.9	125.1	101.8
Exports:								
Fish & Shellfish:								
Processed only ^{1/} (excluding fresh & frozen)	2.0	1.7	12.1	10.3	1.2	1.1	5.2	5.1

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

United States exports of processed fish and shellfish in April 1962 were up 17.6 percent in quantity and 9.1 percent in value as compared with April 1961. The increase was due to greater exports this April of canned and frozen salmon, sardines not in oil, and squid (principally to Greece). Exports were down for canned mackerel; and because of the scarcity on the United States market, exports were down for frozen shrimp, canned shrimp, and canned oysters.



Compared with the previous month, the exports in April 1962 were down 45.9 percent in quantity, and the value was down 7.7 percent. The lower-priced products like canned squid were exported in greater amounts in April, with some increase in the exports of canned salmon and oysters. Exports dropped for canned mackerel, canned shrimp, frozen shrimp, and frozen salmon.

Processed fish and shellfish exports for the first four months of 1962 were up 17.5 percent in quantity, but the value was up only 2 percent as compared with the same period of 1961. The following products were exported in substantially greater quantities in 1962: canned mackerel, frozen salmon, canned salmon, and canned squid; but exports dropped for canned sardines not in oil, canned and frozen shrimp, and canned oysters. Since most of the increase in exports January-March this year was in the lower-priced products, the value of the exports did not increase at the same rate as the quantity.

Source: United States Foreign Trade (Trade by Commodity), Summary Report FT 930-E, April 1962, U. S. Department of Commerce.

EDIBLE FISHERY PRODUCTS, MAY 1962:

Imports of fresh, frozen and processed edible fish and shellfish into the United States in May 1962 were up 20.2 percent in quantity and 11.7 percent in value as compared with the previous month. During that period there were greater imports of fish blocks or slabs, cod fillets, flounder fillets (mostly from Canada), frozen swordfish fillets (mostly from Japan), sea catfish fillets, frozen tuna other than albacore, canned tuna (mostly from Japan), canned sardines not in oil (mostly from South Africa), live lobsters from Canada, canned lobster meat from Canada, frozen shrimp, and sea scallops (mostly from Canada). But imports were down for canned salmon (from Canada and Japan), frozen albacore tuna, canned sardines in oil, canned crab meat from Japan, and canned oysters (mostly from Japan).

Compared with the same month in 1961, the imports in May 1962 were up 30.8 percent in quantity and 32.3 percent in value. Most fishery products were imported in greater quantity this May, and imports were up substantially for fish blocks or slabs, canned salmon (mostly from Japan), frozen tuna, canned albacore tuna (mostly from Japan), canned sardines (in oil and not in oil), frozen shrimp, and fresh and frozen scallops from Canada. Cod fillets was the only item showing a sizable decline.

In the first five months of 1962, imports were up 17.4 percent in quantity and 24.8 percent in value as compared to the same period in 1961. The greater increase in value was because of the higher prices which prevailed in the first part of this year for nearly all imported fishery products.

This year there were more imports of fish blocks and slabs, flounder fillets from Canada, sea catfish fillets (increase mostly from West Germany), canned salmon (from Japan and Canada), frozen tuna (increase mostly from Japan, British West Pacific Islands, Ecuador, Peru, and British West Africa), canned tuna (from Japan), canned sardines in oil, frozen shrimp, scallops, live lobsters (from Canada), and canned lobster meat from Canada. Imports were down for cod fillets (from Iceland), haddock fillets (from Canada and Iceland), fresh and frozen salmon from Canada, canned oysters from Japan, and frog legs from Cuba. The increase in canned sardines in oil reflects the small Maine pack for the 1961 season.

U. S. Imports and Exports of Edible Fishery Products, May 1962 with Comparisons								
Item	Quantity				Value			
	May		Jan.-May		May		Jan.-May	
	1962	1961	1962	1961	1962	1961	1962	1961
	. (Millions of Lbs.) .				. (Millions of \$) .			
Imports:								
Fish & Shellfish:								
Fresh, frozen, & processed 1/	109.1	83.4	475.8	405.2	34.4	26.0	159.5	127.8
Exports:								
Fish & Shellfish:								
Processed only 1/ (excluding fresh & frozen)	2.1	1.4	14.2	11.7	0.7	0.6	5.9	5.8

United States exports of processed fish and shellfish in May 1962 were up 50.0 percent in quantity and only 13.3 percent in value as compared with May 1961. Exports of canned sardines not in oil were much higher this May and there was some increase in the exports of frozen salmon, frozen oysters to Canada, and canned squid. But exports were down for frozen shrimp, canned shrimp, and canned mackerel.

Compared with the previous month, the exports in May 1962 were up 5.0 percent in quantity, but the value was down 41.6 percent. The increase in quantity was due to greater exports of canned sardines not in oil, canned mackerel, frozen shrimp, frozen oysters, and canned squid (to the Philippines). The over-all decline in value was mainly due to a sharp drop in exports of canned salmon to the United Kingdom. Exports of frozen salmon and canned shrimp were also down.

Processed fish and shellfish exports for the first five months of 1962 were up 21.4 percent in quantity, but the val-



ue was up only 1.7 percent as compared with the same period of 1961. The following were exported in substantially greater quantities in 1962: canned mackerel, frozen salmon, and canned squid (to Greece and the Philippines). Because of the scarcity on the United States market, exports were down for canned sardines not in oil, canned sardines in oil, frozen shrimp, canned shrimp, and frozen oysters (principally to Canada). Since most of the increase in exports January-May this year was in the lower-priced products, the value did not increase at the same rate as the quantity.

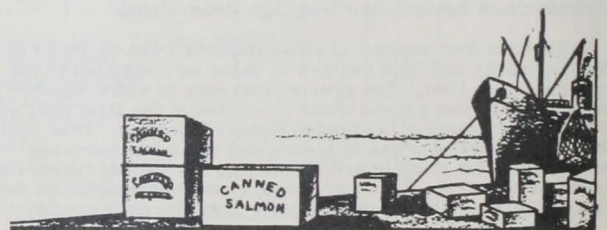
SELECTED FISHERY PRODUCTS, JANUARY-MARCH 1962:

Imports (January-March 1962 as compared to January-March 1961): During the first quarter of 1962, a number of fishery products showed important increases in imports over the similar period of last year; included were fresh and frozen tuna, tuna loins, northern lobster, canned salmon, sardines canned in oil, scallops, fish meal, and fish solubles. Significant decreases were recorded in the imports of canned bonito and yellowtail, canned oysters, fresh and frozen salmon, canned sardines (not in oil), frog legs, and swordfish.

Imports of groundfish and ocean perch fillets and blocks were about the same in 1962 as in 1961. Imports of fillets other than groundfish increased 30 percent.

All tuna categories showed a decided increase, with the exception of tuna canned in oil which decreased 17 percent and bonito and yellowtail which decreased 33 percent. Fresh or frozen tuna imports increased 29 percent, Japan being the leading supplier. Canned tuna in brine increased 21 percent, the greater part being shipped from Japan.

India and Pakistan doubled their exports of shrimp to the United States this year, but shrimp exports from Mexico, El Salvador, Panama, and British Guiana dropped. The net result was a 5-percent increase in United States shrimp imports in the first quarter of 1962.



Receipts of canned salmon principally from the two main suppliers--Canada and Japan--increased 46 percent, but im-

Table 1-U.S. Imports of Selected Fishery Products, January-March 1962 with Comparisons

Commodity	January-March	
	1962	1961
(1,000 Lbs.).....	
Groundfish and ocean perch:		
Fillets	19,567	20,925
Blocks or slabs	28,597	27,479
Total	48,164	48,404
Fillets other than groundfish:		
Flounder	3,599	3,008
Fresh-water fish	2,453	1,979
Other	5,628	4,015
Total	11,680	9,002
Swordfish fillets, etc.	5,808	6,644
Tuna, fresh or frozen:		
Albacore	30,519	25,883
Other	40,528	28,985
Total	71,047	54,868
Tuna, loins and discs	2,608	1,878
Tuna, canned in brine:		
Albacore	7,138	6,129
Other	7,329	5,779
Total	14,467	11,908
Tuna, canned in oil	111	133
Bonito and yellowtail, canned ..	2,120	3,162
Crab meat, canned	952	995
Lobsters, fresh or frozen:		
Northern	3,937	3,031
Spiny	10,994	11,362
Lobsters, canned	405	540
Oysters, mostly canned	1,915	2,429
Salmon:		
Fresh or frozen	1,055	1,718
Canned	1,950	1,332
Sardines:		
Canned in oil	11,488	7,374
Canned not in oil	2,036	3,830
Scallops	1,717	1,026
Shrimp (mostly frozen)	33,164	31,617
Frog legs	249	495
(Tons).....	
Fish meal	62,774	44,333
Fish solubles	2,830	509

ports of fresh or frozen salmon declined 39 percent. Norway and Denmark supplied most of the 56-percent increase in canned sardines in oil. Imports of canned sardines not in oil decreased 47 percent, the Republic of South Africa shipping only half the quantity shipped in the same period last year.

Imports of sea scallops increased 67 percent. Canada and Japan were the major suppliers; Canada almost doubled its shipments.

Imports of fresh or frozen lobster from Canada increased 30 percent. Other increases were from Brazil, Australia, and New Zealand.

Fish solubles more than tripled shipments in the corresponding period of 1961.

Imports of fish meal increased 42 percent, Canada and Peru supplying the major share.

Table 2-U.S. Exports of Selected Fishery Products, January-March 1962 with Comparisons

Commodity	January-March	
	1962	1961
(1,000 Lbs.).....	
Fish oils	41,323	36,549
Oysters, shucked	93	249
Salmon:		
Fresh or frozen	562	197
Canned	2,611	2,649
Mackerel, canned	2,013	975
Sardines:		
Canned not in oil	1,430	3,085
Canned in oil	45	65
Shrimp:		
Frozen	613	639
Canned	349	562
Squid, canned	2,631	413
Misc. canned fish	132	156
Misc. fresh or frozen fish	985	643

Exports (January-March 1962 as compared to January-March 1961):

Fresh or frozen salmon exports were almost three times those of the same period in 1961. Canned salmon exports remained about the same. El Salvador took 85 percent of total exports of canned mackerel which more than doubled the first quarter exports of a year before. Exports of canned sardines, not in oil, decreased 54 percent. Exports of fresh or frozen shrimp decreased 4 percent and of canned shrimp 48 percent below shipments in the first quarter a year ago.

* * * * *

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

United States imports of tuna canned in brine during January 1-June 30, 1962, amounted to 27,679,895 pounds (about 1,318,100 std. cases), according to data compiled by the Bureau of Customs. This was 17.4 percent more than the 23,575,216 pounds (about 1,122,600 std. cases) imported during January 1-June 30, 1961.

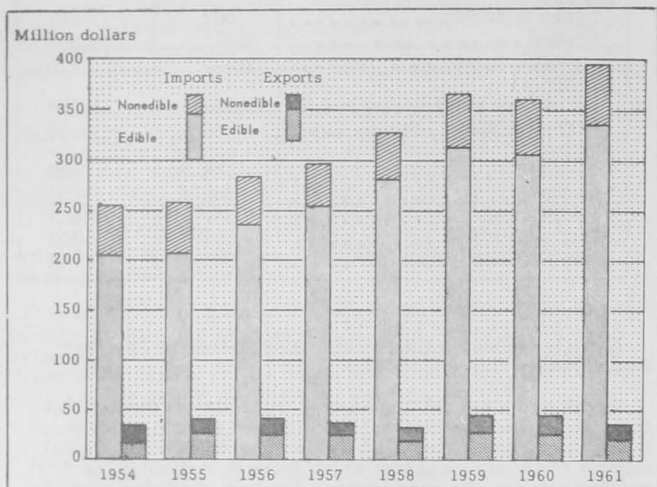
The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1962 at the 12½-percent rate of duty is limited to 59,059,014 pounds (about 2,812,000 std. cases of 48 7-oz. cans). Imports in excess of the quota are dutiable at 25 percent ad valorem.

* * * * *

IMPORTS AND EXPORTS OF FISHERY PRODUCTS, 1957-1961:

United States foreign trade in fishery products (imports and exports of domestic products) was valued at \$432 million in 1961--an increase of \$27.5 million as compared

with the previous year. The value of fishery products imported for consumption was \$397 million--the highest on record. It exceeded the former record established in 1959 by 8 percent and was 10 percent above 1960. The value of fishery products exported was \$35 million--a decline of 21 percent from the previous year and the lowest since 1958.



United States imports and exports of fishery products, 1954-61.

Imports of edible products in 1961 totaled 1.1 billion pounds valued at a record high of nearly \$336 million. Compared with 1960, the quantity remained about the same but the value increased by 9 percent. The gain in value was due to generally higher prices and changes in the composition of the imports. Major increases occurred in imports of groundfish fillets and blocks, fresh or frozen shrimp, tuna canned in brine, and sardines. Imports were down for canned salmon, fresh or frozen sea herring, and tuna.

Imports of nonedible fishery products amounted to over \$61 million--16 percent more than in 1960. The gains were for fish meal, sperm whale oil, and cultured pearls.

Edible fishery products exported in 1961 totaled 40 million pounds with a value of \$19.6 million--a decrease of 35 percent in quantity and 24 percent in value as compared with the previous year. Exports of nonedible domestic products, valued at \$15 million, were 18 percent less than in 1960.

Exports of foreign fishery products amounted to \$6.5 million in 1961 as compared with \$3.4 million the previous year.

Note: See *Commercial Fisheries Review*, May 1962 p. 35.

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STATISTICAL DETAIL FOR IMPORTS BEYOND THAT PROVIDED IN NEW TARIFF CLASSIFICATION:

The statistical classifications currently used in compiling data for imports and presented in Schedule A, "Statistical Classification of Commodities Imported into the United States," are based on the Tariff classifications contained in the Tariff Act of 1930. With the enactment of Public Law 87-456, "Tariff Classification Act of 1962," this foundation is changed, therefore necessitating a revision of the statistical classification structure to align it with the new Act. To provide importers and Customs officers with reporting instructions which integrate statistical requirements with the determination of rates of duty, as is done in the current "United States Import Duties Annotated," it is contemplated that the revised statistical classifications will be put into effect concurrently with the effective date of the new tariff, which is January 1, 1963.

The Tariff Commission, Bureau of Customs, and Bureau of the Census (with the guidance of the Interagency Advisory Committee on Foreign Trade Statistics) will determine the additional statistical classifications to be provided beyond those already provided in the new structure. In so doing, every effort will be made to carry forward as much of the present statistical detail as possible without violating the principle of eliminating the illogical classes and anomalies of the old structure which is based on the 1930 Tariff Act categories. At the same time consideration will be given to recommendations from users of the statistics for retaining or combining present statistical classes as well as for providing additional statistical detail, all within the framework of the 1962 Tariff Classification Act.



Whiting

RESULTS OF STUDY ON IMPROVING QUALITY:

The results of a year's study by the U.S. Bureau of Commercial Fisheries Technological Laboratory at Gloucester, Mass., on improving the quality of whiting were presented at an industry meeting in June 1962. The study was requested by industry leaders.

Representatives of 14 whiting firms or associations, from Massachusetts and Maine, and officials from the National Fisheries Institute and the States of Maine and Massachusetts heard the Bureau's reports on its studies conducted on handling and processing whiting, both on the vessel and ashore, and on developing and marketing new whiting products to stimulate this New England industry and the use of this greatly underutilized fishery resource. The whiting industry ranks eleventh in volume and twentieth in value in United States fisheries.

The Bureau's investigations and laboratory work were aimed at finding ways to eliminate or minimize problems that have continued to plague the industry. Bureau technologists explained that although the physical attributes and plentiful supply of whiting make it more desirable than some other species for fried fish, it loses its initial delicious quality at a more rapid rate unless handled with greater than ordinary care.

The Bureau also pointed out to the industry a variety of acceptable fish products made of whiting, including canned whiting, which could be marketed. New whiting products made up and tested for acceptability, taste appeal, and storage life at the Bureau's laboratory included such items as croquettes, burgers, steamed and smoked sausages, smoked whiting, and a freeze-dried patty. Eight of those products were taste-tested at the industry meeting and were termed "encouraging." However, as the Bureau's report commented, "None of these products can be marketed successfully for

any period of time unless the highest quality fish is used consistently."

To reach and maintain this necessary standard of high quality, the Bureau outlined actions the industry could take both aboard the vessels and in the processing plants, such as providing shelving in the vessels' storage pens because whiting is a soft fish particularly susceptible to bruising damage; reducing dock-side layovers to no more than 12 to 14 hours; and using easily-cleaned, salt-resistant aluminum for the fish-hold penboards. Bureau tests resulted in the recommendation of storing fish on the vessels and at the processing plants in tanks of sea water refrigerated to 30° F., eliminating most of the problems arising from storage in ice, and improving greatly the quality of the whiting.

The Bureau's report also included recommendations for increasing efficiency of processing plant operations, reducing labor costs, and new methods of processing. These recommendations were developed by two members of the Bureau's laboratory staff who visited 26 whiting plants during the year.



Wholesale Prices

EDIBLE FISH AND SHELLFISH, JUNE 1962:

As landings continued to increase seasonally, the June wholesale price index for edible fishery products (fresh, fro-

zen, and canned) dropped more than 1.0 percent from the previous month, but was up almost 13.0 percent as compared to June 1961.



Scene on Fulton Street dock (East River) of Fulton Fish Market showing journeyman preparing to load truck.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, June 1962 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ (\$)		Indexes 2/ (1957-59=100)			
			June 1962	May 1962	June 1962	May 1962	April 1962	June 1961
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					4/118.3	119.4	118.9	104.3
Fresh & Frozen Fishery Products:					4/117.5	118.1	117.2	101.0
Drawn, Dressed, or Whole Finfish:					114.3	119.9	119.1	106.7
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.08	.08	59.5	65.7	91.6	67.0
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.44	.41	130.1	122.2	133.1	109.5
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.96	1.00	134.5	139.7	120.5	122.2
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.69	.71	103.0	106.0	126.9	91.0
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.45	.71	73.7	116.3	139.2	92.5
Processed, Fresh (Fish & Shellfish):					5/	119.7	120.4	104.1
Filletts, haddock, sml., skins on, 20-lb. tins.	Boston	lb.	.32	.33	76.5	80.1	91.1	70.4
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	1.04	1.02	121.9	119.6	116.0	90.8
Oysters, shucked, standards	Norfolk	gal.	7.50	7.50	126.5	126.5	130.7	126.5
Processed, Frozen (Fish & Shellfish):					112.7	110.2	108.0	88.9
Filletts: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.38	.40	96.3	100.1	100.1	98.8
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.33	.33	96.7	96.7	96.7	95.2
Ocean perch, lge., skins on, 1-lb. pkg.	Boston	lb.	.30	.32	106.1	110.4	115.7	99.9
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	1.03	.99	122.2	116.8	112.7	81.8
Canned Fishery Products:					120.1	122.1	122.1	110.5
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	28.50	28.50	124.2	124.2	124.2	122.0
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	12.15	12.15	107.9	107.9	107.9	97.7
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 24 cans/cs.	Los Angeles	cs.	5.25	5.25	118.5	118.5	118.5	101.5
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	11.81	12.81	145.1	164.3	164.3	112.2

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.
 2/Beginning with January 1962 indexes, the reference base of 1947-49=100 was superseded by the new reference base of 1957-59=100.
 3/Recomputed to be comparable to 1957-59=100 base indexes.
 4/Because of an error, this index will be revised when the July 1962 index is released. Actual index is slightly lower than shown.
 5/Not available.

Fresh Western halibut wholesale prices at New York City rose from May to June in spite of the seasonal landings in the Pacific Northwest. The demand for halibut was quite strong because frozen stocks at the beginning of the season were almost completely sold out. During the same period, prices were down for all other products under the drawn, dressed, or whole finfish subgroup and the index dropped 4.7 percent. Prices were down for fresh large haddock by 9.4 percent, fresh king salmon at New York City by 3.7 percent, Lake Superior whitefish at Chicago by 2.8 percent, and Lake Michigan yellow pike at New York City by 36.6 percent. Salmon supplies in June were moderate, the demand continued good, but the market was not as steady as in May. Heavier seasonal landings of Great Lakes yellow pike were responsible for the price drop in that product. The market for Great Lakes whitefish although still relatively strong in June was not at the same level as in May. Compared with June 1961, the subgroup index this June was up 7.1 percent because of higher prices for fresh and frozen halibut, large and medium king salmon, and Lake Superior whitefish. These increases were somewhat offset by lower prices for fresh drawn haddock and fresh yellow pike.

From May to June, fresh haddock fillet prices at Boston were down 4.5 percent. With continued light landings in the South Atlantic States, fresh shrimp prices at New York City rose 1.9 percent during the same period. As a result, the processed fresh fish and shellfish index for June was somewhat lower than the May index. The subgroup index this June

was up substantially as compared with the same month in 1961 because of higher prices for fresh shrimp (up 34.3 percent) and fresh haddock fillets (up 13.8 percent).

The price index for processed frozen fish and shellfish in June 1962 was up 2.3 percent from the previous month and 26.8 percent higher than a year earlier only because of higher frozen shrimp prices at Chicago. Continued light supplies in June caused a price advance for frozen shrimp of 4.6 percent from the previous month and of 49.4 percent from June 1961. Prices for frozen fillets of haddock did not change from May to June, but were down 3.8 percent for flounder fillets and 3.9 percent for ocean perch fillets. Compared to June 1961, prices were up for haddock and ocean perch fillets, and down for flounder fillets.

The June index for the canned fishery products subgroup was down 1.6 percent from May, but was up 8.7 percent as compared with June 1961. Of the items in the subgroup, the only change from May to June was for canned Maine sardines--prices dropped 11.7 percent. The new pack of Maine sardines early in June was substantially greater than the previous season and prices, which had been abnormally high because of short supplies, returned to more normal levels. Compared with June 1961, prices this June were up 1.8 percent for canned pink salmon, 10.4 percent for canned tuna, 16.7 percent for California sardines, and 29.3 percent for Maine sardines.



BY HAND

This term means the gathering or collecting of fish or shellfish without the aid of any tools or equipment. This includes skin diving with a snorkel tube, "treading" of clams (feeling for the clams with the feet and lifting them from the bottom with one foot), and "signing" (locating clams by their syphon holes and digging them out by hand).



Gathering by hand.

Note: Excerpt from Circular 109, Commercial Fishing Gear of the United States, for sale from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., single copy, 40 cents.