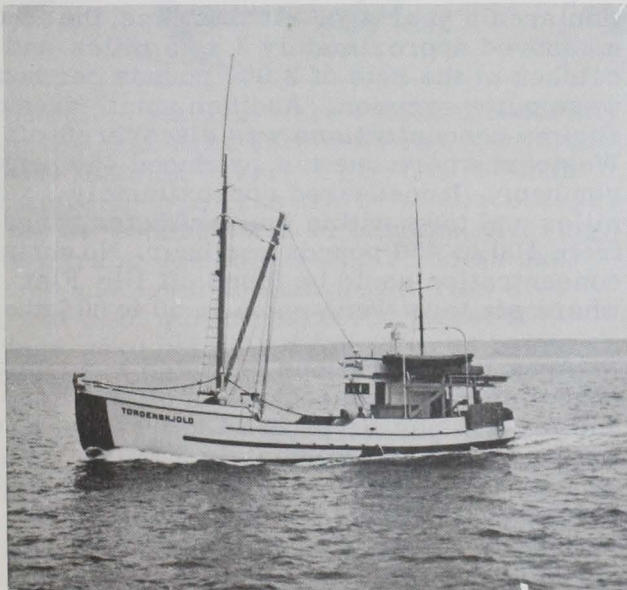


TRENDS AND DEVELOPMENTS

Alaska Fishery Exploration and Gear Research

EXPLORATORY FISHING FOR BOTTOM FISH IN GULF OF ALASKA:

M/V "Tordenskjold" Cruise 2: Exploratory fishing to determine the availability and distribution of the various bottom species from close inshore to 250 fathoms in the Gulf of Alaska between Capes Spencer and St. Elias, was conducted by the U. S. Bureau of Commercial Fisheries from June 2 to September 6, 1961. This work was followed by a short comparison survey in the latitude of Nuka Bay to Portlock Bank until September 15, 1961. The M/V Tordenskjold, a Seattle commercial schooner-type trawler, was chartered for the project. The gear used was a commercial-size otter trawl net spread by galvanized steel doors of special design but readily available commercially in Seattle.



M/V Tordenskjold, the chartered schooner-type trawler.

Objectives of the cruise were multiple. The primary purpose was to obtain general information of latent bottom fish populations,

a vital prelude to systematic exploration and ultimate commercial utilization. Secondary purposes accomplished included tagging of king crab and other species; collection of specimens and scientific data on sizes, ages, and sex ratios of commercially valuable species; and recording of oceanographic and meteorological conditions.

The method was to follow a grid pattern of 261 one-hour trawl stations drawn on U. S. Coast & Geodetic Survey Chart #8002, fishing, wire dragging or sounding alone, whichever seemed best. These stations were 6 miles of latitude apart and 8 miles of longitude. Edges at 140 and 250 fathoms were also tested.

A total of 261 stations were established in the area, of which 200 were found feasible to attempt fishing. The most productive grounds for fish and shellfish appeared to be shoreward from about 70 fathoms, with exceptions of certain deeper tows in submarine canyons and on deeper edges beyond 100 fathoms. Large mid-depth areas were found almost completely unproductive of commercial species.

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



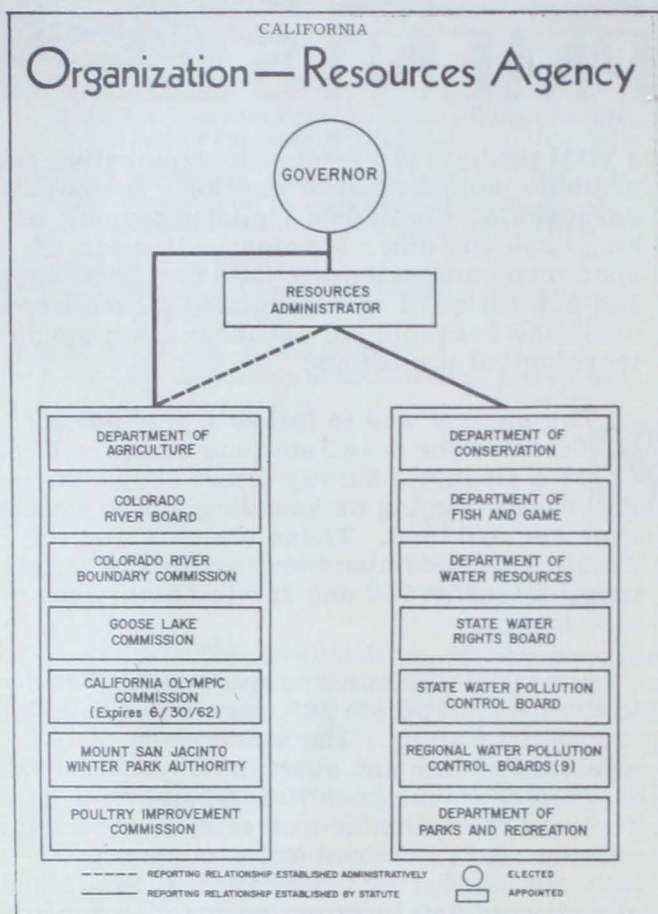
California

FISHERIES INCLUDED IN NEW NATURAL RESOURCES AGENCY:

As of October 1, 1961, the California Department of Fish and Game became one of several new state agencies, whose administrators are responsible to the Governor of California for the policy-making and program evaluation activities of most state departments, boards, and commissions. The administrators were appointed by the Governor.

Fish and Game is now a part of the Resources Agency.

Part of the reorganization came about as a result of legislative action requested by the Governor. The rest is a result of temporary administrative action on the part of the Governor.



In submitting the new combined agencies plan the Governor said that State government has grown too unwieldy with too many department heads answering directly to the Governor.

The Governor says the new setup will permit much better coordination among and within the agencies and give him a more workable organization in that lines of communication will be more direct within the agencies and between the agencies and his office. He believes also that the top level authority of the agency administrators--just under the Governor's level--will afford better long-range planning and program evaluation.

* * * * *

SHRIMP AND CRAB STUDIES CONTINUED:

M/V "N. B. Scofield" Cruise 61S7: Exploring for concentrations of pink shrimp and dungeness crabs was the objective of the California Department of Fish and Game research vessel N. B. Scofield from September 28 to November 9, 1961. The area covered was the coastal waters off northern and central California from Fort Bragg to San Francisco.

SHRIMP: The shrimp phase of the trip was: (a) to explore for concentrations of pink shrimp, Pandalus jordani; (b) to determine size, sex, and weight of shrimp from different areas; (c) to make bathythermograph casts to obtain bottom temperatures in shrimp fishing areas.

A total of 66 tows was made with a 20 x 6 ft. beam trawl having a cotton net of 1 $\frac{1}{4}$ -inch mesh--32 of the 66 tows were in Area B-1 from Big Flat to Westport and 34 in Area B-2 from Ft. Ross to Bodega Head.

The best shrimp catches in Area B-1 were made off Usal in 75 to 80 fathoms and off Westport in 70 to 73 fathoms. One tow off Usal produced 1,800 pounds of shrimp per hour and another 900 pounds per hour. The area of concentration, which measured approximately 1 $\frac{1}{2}$ x 4 miles, was considerably reduced compared with the concentration area a year ago. At that time, the school measured approximately 3 x 15 miles and catches at the rate of 2,000 pounds per hour were quite common. Another small area of shrimp concentrations was discovered off Westport where one tow produced 450 pounds per hour. It measured approximately 2 x 3 miles and tows within the perimeter ranged from 100 to 450 pounds per hour. No shrimp concentration could be found off Big Flat where six tows were made in 50 to 80 fathoms.

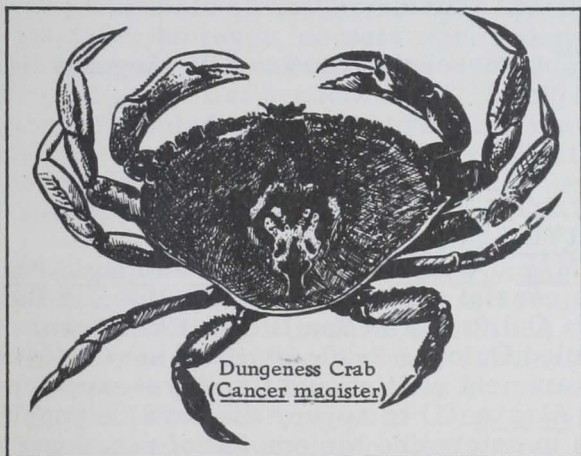
Area B-2 operations revealed a shrimp school of minor concentration off Ft. Ross and the Russian River in 54 to 64 fathoms of water. It was approximately 3 miles wide by 7 miles long. Most of the tows within the perimeter produced catches of 100 to 200 pounds per hour; one tow produced 390 pounds per hour.

Samples of shrimp were obtained in both areas (B-1 and B-2) and in 56 of the 66 tows made. Fifty shrimp from each tow were

sexed, measured, and weighed at sea. The counts typically ranged from 70 to 100 per pound (heads on) in both areas. Many of the female shrimp contained head roe and a few were carrying eggs.

Sixty-four bathythermograph casts were made. Bottom temperatures were obtained in all areas where shrimp were found. These temperatures will be determined from the slides at a later date. Surface temperatures ranged from a high of 58.5° F. off Bodega Head on October 1 to a low of 50.4° F. off Usal on October 10.

CRAB: The crab phase of the trip was: (a) to random-sample the pre-season population of market or dungeness crabs (Cancer magister); (b) to determine size, sex ratios, and conditions of crabs from different areas.



Sampling stations were selected randomly from the crab area between Point Montara and the Russian River. Fifty-five 40-inch commercial-type crab traps, without escape ports, were fished 6 to 40 fathoms. A string of five traps was baited with rockfish carcasses and squid and allowed to fish overnight at each station; however, several strings were not pulled for 43 to 96 hours because of bad weather.

In all, 4,316 crabs were taken in the traps; 1,595 legal males, 2,566 sublegal males, and 155 females. Twenty-five of the females were carrying eggs. The average legal catch per trap was 3.2 crabs which is very poor compared with previous years. The sublegal males averaged 5.1 per trap which was much higher than last year's catch.

The best catches were in the vicinity of the San Francisco Lightship northwest

toward Point Reyes and south to Pt. Montara in 10 to 25 fathoms.

The pre-season catch of legals this year was down 44 percent from last year, indicating a poor season is in store for San Francisco crab fishermen. The decrease in abundance of legal crabs is believed to be due to unfavorable environmental conditions which reduced the strength of the incoming year-classes. This is borne out by the fact that the pre-season sublegal catch was low in both 1959 and 1960.

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

* * * * *

MIDWATER TRAWLING FOR SALMON FINGERLINGS CONTINUED:

M/V "Nautilus" Cruise 61N17a & b-Salmon: The midwater trawl operations of the California Department of Fish and Game research vessel Nautilus were continued (Nov. 7-10, 20-22, 1961) in the Carquinez Strait area to capture marked salmon fingerlings on their seaward migration. A nylon midwater trawl with 25-foot square opening was used.

Trawling in Carquinez Strait was conducted between 8 a.m. and 3 p.m. and each tow was for 20 minutes. Surface tows were alternated between upstream and downstream and between the north shore, center, and south shore of the channel. A flow meter was used to measure the amount of water strained by the net on each tow.

A total of 78 tows was completed in the Strait during this cruise yielding a catch of 158 king salmon (Oncorhynchus tshawytscha) fingerlings, and 2 king salmon adults, none of which was marked. One marked adult steelhead (Salmo gairdneri) was also captured.

Other species appearing in the catch, listed in order of abundance were: northern anchovy (Engraulis mordax)--6,950; American shad (Alosa sapidissima)--4,701; striped bass (Roccus saxatilis)--1,527; topsmelt (Atherinops affinis)--125; Pacific herring (Clupea pallasii)--75; starry flounder (Platichthys stellatus)--5; jack smelt (Atherinopsis californiensis)--1; tom cod (Microgadus proximus)--1; northern midshipman (Porichthys notatus)--1; three-spined stickleback (Gasterosteus aculeatus)--1; and threadfin shad (Dorosoma petenense)--1 fish. The

recovery of the threadfin shad marks the first observation of this species in delta waters.

Note: See Commercial Fisheries Review, Jan. 1962 p. 14.

* * * * *

M/V "N. B. SCOFIELD"
STUDIES RADIOACTIVITY
OFF SAN CLEMENTE ISLAND:

Cruise 61S6: To collect a variety of biological and water samples which might be expected to accumulate radioactive particles resulting from a U. S. Navy experiment using radio-isotopes as a tracer in underwater explosions and to observe the effects on marine life of a 5-ton high explosive charge were the objectives of the cruise September 18-20, 1961. The area covered was in the vicinity of Wilson Cove on northeast side of San Clemente Island.

On September 19 at approximately 3:25 p.m., eleventh in a series of high-explosive charges was detonated by the U. S. Navy. Facts concerning the charge are: (a) size and form--10,000 pounds of HBX-1 precast in a spherical shape about 5½ feet in diameter with a booster charge of 125 lbs. of TNT; (b) depth of charge--16 feet; (c) distance from shore--2,400 feet; (d) depth of water--300 feet; (e) location of charge--lat. 32°57'21" N., long. 118°30'20" W.; (f) radioactive tracer--approximately 600 grams of insoluble particulate Lutetium Oxide containing about 16 grams (500-800 curies) of radioactive Lutetium-177 Oxide (half-life 6-8 days) was placed inside the charge; (g) a single recording barge, and six small boats carrying instruments were located at points about 1,200 feet from the shot point.

On the morning of September 19 the N. B. Scofield placed anchored set lines and lobster traps at two locations on a line between the shot point and Wilson Cove.

After the detonation, the vessel proceeded into the explosion area and a skiff was put over the side to allow greater freedom in picking up samples.

The Navy marked the explosion area with green dye (fluorescein) and two parachute buoys. One buoy had a 50-foot line, and the other a 20-foot line. Both were marked with flashing lights and served to indicate the general drift of the water mass.

The fish kill included approximately 25 rockfish (*Sebastes* sp.) and 2,000 jack mackerel (*Trachurus symmetricus*).

At 1700 a drift set-line was placed about 200 feet north of the edge of the green dye marker.

The vessel then picked up samples of dead fish, occupied a night-light station, made several plankton tows and water sample collections.

The set lines and traps were picked up during the morning of September 20. A plankton tow was conducted about 5 miles NNE. of the northern tip of San Clemente Island in the area where the last traces of green dye were perceived and where the water mass appeared thoroughly mixed with open-sea water.

The vessel returned to Los Angeles Harbor.

* * * * *

PELAGIC FISH POPULATION
SURVEY CONTINUED:

M/V "Alaska" Cruise 61A7-Pelagic Fish: The coastal waters from Santa Rosalia Bay, Baja California to San Diego, Calif., were studied October 2-20, 1961, by the California Department of Fish and Game research vessel Alaska (1) to survey the sardine population to determine the amount of recruitment from the 1961 spawning and to measure the population density of older fish; (2) to sample Pacific mackerel, jack mackerel, and anchovies for age and distribution studies.



M/V Alaska Cruise 61A7-Pelagic Fish.

A total of 79 night light stations were occupied. Sardines were taken at 5, anchovies at 9, Pacific mackerel at 6, and jack mackerel at 4.

The vessel traveled 469 miles between light stations during which 36 anchovy schools and 16 unidentified schools were observed. An extensive school group of large Pacific mackerel was sighted during daylight hours off Cape Colnett.

Sardines of the 1961 year-class were taken at two stations. These young fish were taken from schools comprised of over 98 percent anchovies. In addition, one sample comprised of fish of the year mixed with adult sardines was taken. Adult sardines were taken at two additional stations.

Many schools of anchovies were attracted to the light; however, no sets were attempted when only small "pinhead" size anchovies were present. Large anchovies (110-135 mm.) were distributed more offshore than the smaller ones. Stations located 6 to 15 miles offshore in warmer and clearer water produced the larger fish.

This cruise completes the 1961 young fish survey in Baja California. This and cruises 61A5 and 61A6, show results similar to the 1960 surveys in the same area: sardines were scarce and anchovies were abundant. As in 1960, the incoming year class appears to be of subnormal strength. Anchovies are again abundant, especially in central Baja California.

One set was made with a deep-sea free-floating fish trap on loan from Scripps Institution of Oceanography. The set, made in 850 fathoms, caught two deep-water crabs (*Paralomis* sp.). Recovery of the trap at night was difficult because, at close range, radar echoes from waves obscure the echo from the trap reflector. This problem can be alleviated in the future by scheduling the return of the traps to the surface during daylight hours when visual means can be used to supplement radar.

Sea surface temperatures ranged from 58.9° F. near Point Santo Tomas to 70.2° F. at Santa Rosalia Bay. Fair weather prevailed during the entire cruise.

* * * * *

M/V "Alaska" Cruise 61A8-Pelagic Fish:
A survey was made of the coastal waters from Los Coronados Islands to Point Conception, including the Channel Islands by the California Department of Fish and Game research vessel Alaska during October 30-November 17, 1961. The purpose of the trip was: (1) to determine the amount of recruitment from this year's sardine spawning and to measure the population density of older fish; (2) to sample Pacific mackerel, jack mackerel, and anchovies for age and distribution studies; (3) to make incidental collections of other species.

A total of 108 light stations were occupied. Sardines were collected at three stations, northern anchovies at 13, Pacific mackerel at 10, and jack mackerel at 8. Squid were seen or sampled at 32 stations.

In the course of 510 miles of nighttime scouting, 159 schools were sighted. These included 67 anchovy, 67 mackerel, and 25 unknown schools. No schools were identified as sardines.

Adult sardines caught off Gaviota and fish of the year caught in Los Angeles Harbor were mixed with large numbers of anchovies. Only the adult sardines taken near Santa Catalina Island were from an unmixed school.

The southern California survey in 1961 showed the lowest density of sardines since 1957. The sardine density was about one-half of that found during the 1960 survey and about one-sixth of that found in 1959. The lack of sardines in southern California this year is consistent with the very poor commercial season to date.

Sea surface temperatures ranged from 56.3° F. at Carrington Point, Santa Rosa Island and San Mateo Point, to 62.2° F. off the west end of Catalina Island.

Note: See Commercial Fisheries Review, December 1961 p. 25, November 1961 p. 15.



Cans--Shipments for Fishery Products, January-October 1961

Total shipments of metal cans during January-October 1961 amounted to 108,437

short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 107,858 tons in the same period of 1960. Canning of fishery products in January-October 1961 was confined largely to tuna,

jack mackerel, Pacific salmon, and Maine sardines. Although the packs of Maine and California sardines, and shrimp were down, greater packs of tuna and salmon more than offset those declines.

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



Central Pacific Fisheries Investigations

TUNA STUDIES IN SOUTH PACIFIC BY M/V "CHARLES H. GILBERT":

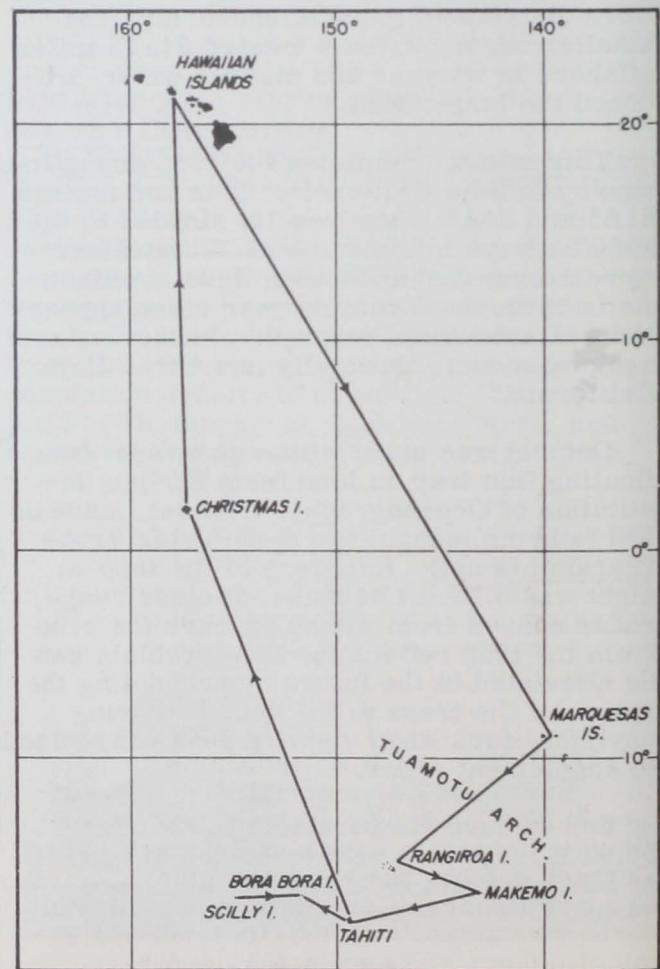
Cruise 54 (September 29-December 4, 1961): Two months of tuna studies in the Marquesas, Tuamotu, Society, and Line Islands were completed when the U. S. Bureau of Commercial Fisheries research vessel Charles H. Gilbert returned to its base at Kewalo Basin, Honolulu, on December 4, 1961. The expedition successfully carried out its principal missions of collecting tuna blood samples and observing the behavior of skipjack tuna in the various island areas.

Blood specimens from 760 skipjack and a smaller number of yellowfin tuna were collected. Analysis for blood types is expected to provide information with which to check and refine the biologists' theories about the relationships of the skipjack populations of the various South Pacific island groups to one another and to the skipjack (aku) of Hawaiian waters. During the cruise, observations of the ocean's temperature and salinity were combined with blood collection work with the idea that some environmental factors might appear related to the population differences shown by blood analysis.

High-speed movie cameras were used in the underwater observation chambers of the Charles H. Gilbert to film the extremely rapid movements of feeding skipjack (Katsuwonus pelamis). The details of fin and

mouth movements revealed by these films may give clues to an understanding of the variable and unpredictable response of tuna to bait and fishing lures, a practical problem for commercial fishermen. Material was also gathered for a comparison of the rate at which tuna schools take the hooks and the amount of food in the stomachs of the fish. Four skipjack and 1 yellowfin (Neothunnus macropterus) schools were observed from the bow chamber. Owing to a shortage of bait, no skipjack were caught by pole-and-line for stomach analyses from these 4 schools. Biologists feel that it would be premature to draw any conclusions from their first experiment with plastic skipjack "decoys" towed in the vicinity of skipjack schools, but it was their impression that the skipjack showed a curious interest in the artificial tuna and were not repelled by them.

The availability of the Marquesan sardine used as tuna bait was moderately good in



M/V Charles H. Gilbert Cruise 54.

certain areas of the Marquesas, but the schools of sardine were smaller than those found on earlier cruises. Skipjack were moderately abundant in all of the areas visited. However, with the exception of a few schools of 28-30 pound fish encountered in the Marquesas, the schools were composed of medium and small skipjack.

In the Marquesas Islands, attempts were made on 5 different schools to obtain synchronous records of skipjack behavior, stomach contents, and catch rates throughout a fishing period. Three of the schools remained at the boat long enough to obtain the desired data. During one of the 3 sequences not only skipjack but also yellowfin and dolphin (*Coryphaena hippurus*) were observed and caught. Digestive tracts of 203 skipjack, 15 yellowfin, and 4 dolphin were preserved.

The expedition accomplished a number of interesting secondary missions, including transportation of 2,000 live pearl oysters from Scilly Island (Fenua Ura) to Bora Bora at the request of French authorities, collection of reef-fishes from over 20 localities, and collection of blood serum from Marquesan fresh-water eels. In cooperation with the Division of Fish and Game of the State of Hawaii, about 7,000 live groupers and snappers, valuable food fish of types lacking in Hawaiian waters, were brought from Moorea in the live-wells of the Charles H. Gilbert and released around Oahu.

* * * * *

MONOFILAMENT GILL NETS TESTED IN HAWAIIAN SKIPJACK FISHERY:

Trials of monofilament gill nets in the Hawaiian skipjack tuna fishery were carried out from July 23, 1961 to September 29, 1961. These nets were successful in catching skipjack but have not yet been fished in such a manner as to demonstrate their commercial feasibility.

This study, a cooperative effort of the Hawaii Division of Fish and Game and the U. S. Bureau of Commercial Fisheries Biological Laboratory in Hawaii, was undertaken to develop a means of increasing the skipjack catch. The Hawaiian pole-and-line skipjack fishery is presently a declining industry, as a result of a static level of fishing efficiency and increasing operational costs.

Monofilament nets fulfilled the basic requirement of being usable by the existing fleet and were, in addition, noted for a high fishing efficiency and modest cost. Although several modifications of the gear were used, the basic shackle was 100 fathoms in length and 10 fathoms in depth. Nets were of two mesh sizes; a $5\frac{1}{2}$ -inch mesh (stretched measure) net for the smaller skipjack ranging from 4 to about 10 pounds and a $7\frac{3}{4}$ -inch mesh net for skipjack of about 18 pounds. A skipjack sampan, the Broadbill, was chartered for the trials.

The two months of field work were concentrated on developing a daylight fishery, and in this respect the method developed has not been tried in other fisheries. The method was to locate a skipjack school by the usual pole-and-line method of finding "working" bird flocks, to chum the fish school to the stern of the boat, set a single shackle of net from a wooden bin while the boat moved ahead at chumming speed, carry out pole-and-line fishing, and haul in the net with a powerblock. The use of live-bait was to create a feeding frenzy, since skipjack are able to see monofilament nets in the clear waters surrounding the Hawaiian Islands.

Field work was suspended when the small catches by the commercial boats indicated an earlier than usual end of the skipjack season. While the results were inconclusive, they were moderately encouraging. The highest catch from a single set of the monofilament gill net was 122 skipjack. The catches from 32 sets were not large enough to make it appear likely that the gill net will supplant the present pole-and-line method. It appears likely, however, that a combination of the two methods can be used effectively to increase the catch from each school fished. Additional trials are planned during the 1962 skipjack season.

Note: See Commercial Fisheries Review, Oct., 1961 p. 11.



Federal Aid for Sport Fish and Wildlife Restoration

INTERIOR APPORTIONS MORE FUNDS TO STATES:

Distribution of an additional \$6,950,000 to States for restoration of fish and wildlife projects for the year ending June 30, 1962,

was announced on November 30, 1961, by Secretary of the Interior Stewart L. Udall. This brings to \$19,800,000 the total to be apportioned, since \$12,850,000 was allotted on a preliminary basis last July 1 for State fish and wildlife projects.

Of the \$19,800,000, a total of \$14,000,000 is for State and territorial areas for restoration of wildlife and \$5,800,000 for restoration of fish.

The fish and wildlife restoration funds come from Federal excise taxes collected from manufacturers, importers, and producers of certain types of hunting and fishing equipment.



Federal Aid money is matched by the States on the basis of not to exceed 75 percent Federal to 25 percent state funds.

Federal Aid to Fish and Wildlife Restoration programs are administered by the Bureau of Sport Fisheries and Wildlife, U. S. Fish and Wildlife Service.

Note: See Commercial Fisheries Review, August 1961 p. 24.



Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-SEPTEMBER 1961:

Fresh and Frozen Fishery Products: For the use of the Armed Forces under the Department of Defense, 1.6 million pounds of fresh and frozen fishery products were purchased in September 1961 by the Military Subsistence Supply Agency. This was lower than the quantity purchased in August 1961 by 20.6 percent and 5.9 percent under the amount purchased in September 1960. The value of the purchases in September 1961 was lower by 12.1 percent as compared with the previous month, but 2.5 percent greater than in the same month of 1960. Higher prices accounted for the greater value for September 1961.

During the first 9 months of 1961 purchases totaled 16.6 million pounds (valued at \$8.4 million)--a drop of 6.4 percent in quantity and 9.1 percent in value as compared with the same period in 1960.

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Supply Agency, September 1961 with Comparisons

QUANTITY				VALUE			
Sept. 1961		Jan.-Sept. 1961		Sept. 1960		Jan.-Sept. 1960	
(1,000 Lbs.)				(\$1,000)			
1,586	1,686	16,587	17,722	951	928	18,355	19,188

Prices paid for fresh and frozen fishery products by the Department of Defense in September 1961 averaged 60 cents a pound, 5.8 cents more than the 54.2 cents paid in August 1961 and 5 cents more than the 55 cents paid during September 1960.

Canned Fishery Products: Canned salmon was the principal canned fishery product purchased for the use of the Armed Forces dur-

Table 2 - Canned Fishery Products Purchased by Military Subsistence Supply Agency, September 1961 with Comparisons

Product	QUANTITY				VALUE			
	Sept. 1961		Jan.-Sept. 1961		Sept. 1960		Jan.-Sept. 1960	
	(1,000 Lbs.)				(\$1,000)			
Tuna	-	116	4,393	2,370	-	51	1,940	1,044
Salmon	1,401	2,304	1,403	2,308	891	1,565	893	1,568
Sardine	6	-	121	99	2	-	57	41

ing September 1961. In the first 9 months of 1961, purchases of the three canned fishery products were up 23.9 percent in quantity, and 8.9 percent in value.

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-OCTOBER 1961:

Fresh and Frozen Fishery Products: For the use of the Armed Forces under the Department of Defense, 2.6 million pounds of fresh and frozen fishery products were purchased in October 1961 by the Military Subsistence Supply Agency. This was substantially greater than the quantity purchased in September 1961 by 65.8 percent and was 48.9 percent above the amount purchased in October 1960. The value of the purchases in October 1961 was up by 80.5 percent as compared with the previous month and 86.4 percent more than in the same month of 1960. The greater increase in value was because of higher prices in 1961.

During the first 10 months of 1961 purchases totaled 19.2 million pounds (valued at \$10.1 million)--a drop of only 1.4 percent in quantity and 0.4 percent in value as compared with the same period in 1960.

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Supply Agency, October 1961 with Comparisons

QUANTITY				VALUE			
Oct.		Jan.-Oct.		Oct.		Jan.-Oct.	
1961	1960	1961	1960	1961	1960	1961	1960
..... (1,000 Lbs.) (\$1,000)			
2,629	1,766	19,216	19,488	1,717	921	10,072	10,109

Prices paid for fresh and frozen fishery products by the Department of Defense in October 1961 averaged 65.3 cents a pound, 5.3 cents more than the 60 cents paid in September 1961 and 13.1 cents more than the 52.2 cents paid during October 1960. The higher average price for purchases in 1961 was because of generally higher prices for all types of fresh and frozen fishery products and probably an increase in the purchase of higher-priced products.

Canned Fishery Products: Canned tuna was the principal canned fishery product purchased for the use of the Armed Forces during October 1961. In the first 10 months

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Supply Agency, November 1961 with Comparisons

QUANTITY				VALUE			
Nov.		Jan.-Nov.		Nov.		Jan.-Nov.	
1961	1960	1961	1960	1961	1960	1961	1960
..... (1,000 Lbs.) (\$1,000)			
2,358	1,723	21,574	21,211	1,289	898	11,361	11,007

During the first 11 months of 1961 purchases totaled 21.6 million pounds (valued at \$11.4 million)--up 1.7 percent in quantity and 3.2 percent in value as compared with the same period in 1960.

Prices paid for fresh and frozen fishery products by the Department of Defense in November 1961 averaged 54.7 cents a pound, about 2.6 cents more than the 52.1 cents paid in November 1960 and 10.6 cents more than the 65.3 cents paid the previous month. This means that more of the higher-priced fishery products were bought in October than in November 1961.

Canned Fishery Products: Canned tuna was the principal canned fishery product purchased for the use of the Armed Forces

Table 2 - Canned Fishery Products Purchased by Military Subsistence Supply Agency, October 1961 with Comparisons

Product	QUANTITY				VALUE			
	Oct.		Jan.-Oct.		Oct.		Jan.-Oct.	
	1961	1960	1961	1960	1961	1960	1961	1960
..... (1,000 Lbs.)								
..... (\$1,000)								
Tuna	2,217	771	6,610	3,141	1,114	2,349	3,054	1,393
Salmon	-	1,285	1,403	3,593	-	868	893	2,436
Sardine	4	25	125	124	2	10	59	51

of 1961, purchases of the three canned fishery products were up 18.9 percent in quantity and 3.2 percent in value. In 1961 considerably more tuna and substantially less salmon was purchased than in 1960, which accounts for the smaller increase in value.

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-NOVEMBER 1961:

Fresh and Frozen Fishery Products: For the use of the Armed Forces under the Department of Defense, 2.4 million pounds of fresh and frozen fishery products were purchased in November 1961 by the Military Subsistence Supply Agency. This was less than the quantity purchased in October 1961 by 10.3 percent, but was 36.9 percent above the amount purchased in the same month of 1960. The value of the purchases in November 1961 was down 24.9 percent as compared with the previous month, but 43.5 percent more than in the same month of 1960.

Table 2 - Canned Fishery Products Purchased by Military Subsistence Supply Agency, November 1961 with Comparisons

Product	QUANTITY				VALUE			
	Nov.		Jan.-Nov.		Nov.		Jan.-Nov.	
	1961	1960	1961	1960	1961	1960	1961	1960
..... (1,000 Lbs.)								
..... (\$1,000)								
Tuna	48	422	6,658	3,563	26	196	3,080	1,589
Salmon	-	-	1,403	3,593	-	-	893	2,436
Sardine	6	2	131	126	4	1	63	52

during November 1961. In the first 11 months of 1961, purchases of canned fishery products were up 12.5 percent in quantity, but down 1.0 percent in value. The value was down because considerably more tuna and substantially less salmon was bought in 1961.

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.

MILITARY SUBSISTENCE SUPPLY AGENCY NAME CHANGED:

The Military Subsistence Supply Agency, effective January 1, 1962, changed its name to Defense Supply Agency. Also the field offices were redesignated Defense Subsistence Supply Centers. The change in the

titles of the Military Subsistence Supply Agency Offices does not affect the mission or responsibilities of those offices.

Note: See Commercial Fisheries Review, Oct. 1959 p. 26.



Fisheries Loan Fund

LOANS APPROVED, NOVEMBER 1-DECEMBER 31, 1961:

From the beginning of the program in December 1956 through December 31, 1961, a total of 1,066 applications for loans amounting to \$30,843,057 were received by the U. S. Bureau of Commercial Fisheries, the agency administering the Federal Fisheries Loan Fund. Of the total, 560 (\$13,705,439) were approved, 363 (\$9,580,710) were declined or found ineligible, 104 (\$5,466,077) were withdrawn by applicants before being processed, and 39 (\$542,037) were pending as of the end of 1961. Of the applications approved, 222 (\$1,548,794) were approved for amounts less than applied for.

The following loans were approved from November 1, 1961, through December 31, 1961:

New England Area: Harold D. Abbott, East Boothbay, Maine, \$1,700; Gaetano S., Inc., Boston Mass., \$10,000; and Little Chuck Corp., Boston, Mass., \$7,400.

South Atlantic and Gulf Area: Tiliakos Bros., Fernandina Beach, Fla., \$16,500; Harold L. Von Harten, Key West, Fla., \$4,255; James L. Simpson, St. Mary's Ga., \$18,000; John Zar, Jr., Lafitte, La., \$14,000; and O. W. Franks, Morgan City, La., \$11,500.

California Area: Jim A. Trammell, Costa Mesa, \$5,970; Bruce L. Thompson, Crescent City, \$4,200; David H. Krueger, Eureka, \$8,300; William Hansen, Morro Bay, \$2,180; Edmund Gann, et al, San Diego, \$128,700; Frank A. Maniscalco, San Francisco, \$5,000; and Neal O. Busch, Sebastopol, \$10,000.

Hawaii Area: Maui Fisheries & Marine Products, Ltd., Kahului, Maui, \$73,292; Sea Queen Fishing Co., Honolulu, \$20,330.

Pacific Northwest: Adolph J. Sund, Ilwaco, Wash., \$8,750; Raymond Hall, Newport, Oreg., \$40,000; Wesley H. Christensen, Port Angeles, Wash., \$8,900; Dwane E. Clark, Port

Angeles, Wash., \$11,000; and George A. Strand, Stanwood, Wash., \$16,528.

Alaska: Douglas Freed, Elfin Cove, \$4,600, and Andrew J. Barlow, Sr., Wrangell, \$5,600.



Fish Flour

INTERIOR DEPARTMENT AIDS IN INTERNATIONAL PROTEIN-DEFICIENCY STUDY:

Participation in a long-range international program to determine the effectiveness of fish flour as an additive in protein-deficient diets by the U. S. Department of the Interior was announced on December 19, 1961.

The program, sponsored by the Food and Agriculture Organization of the United Nations, is an outgrowth of the FAO International Conference on Fish in Nutrition held in Washington, D. C., in September 1961. At the Washington sessions, many scientists expressed the belief that diets deficient in animal protein could be fully corrected by adding from 3 to 10 percent fish flour.

At the close of the meeting a panel of experts, convened by FAO, recommended a long-range program on fish flour research and human feeding studies and asked member nations to volunteer to supply the fish flour needed for the feeding program. The panel also recommended that FAO determine where the feeding studies were to be made. Chile and Peru have offered to furnish facilities for manufacturing the fish flour and have been selected as the countries where the first feeding studies will be made.

The Department has assigned a technologist of the U. S. Bureau of Commercial Fisheries Technological Laboratory, College Park, Md., to assist in this program. The Bureau technologist went to South America and worked with the Chief of the Economic Branch of the Fisheries Division, FAO, Rome, in inspecting fish flour facilities offered by the two Latin American countries and recommending whatever mechanical or manufacturing changes may be necessary to supply the types of protein concentrate needed in the study.

After completing his FAO assignment in Chile and Peru, the Bureau technologist inspected other laboratories and processing plants in South America where fish protein concentrates are being developed. He observed processes in Uruguay. Also, he visited the University of Concepcion in Chile, where fish flour problems are being studied. He consulted with authorities at a Government hospital in Guatemala, where important work on the use of incaparina, a compounded protein food made from locally-available vegetable matter, is being carried out. He stopped in San Salvador to review studies on the use of fish flour as a food supplement in attempts to prevent or cure kwashiorker, a devastating protein-deficiency disease.

In addition to assisting in the FAO study in Latin America, the Bureau technologist collected information regarding fish flour technology and utilization. This will be valuable to research now under way at the Bureau's College Park Technological Laboratory.



Frozen Fish Distribution

TIME-TEMPERATURE STUDIES IN DISTRIBUTION CHANNELS:

Temperature fluctuations of frozen fishery products in distribution channels are being studied by the Gloucester Technological Laboratory of the U. S. Bureau of Commercial Fisheries with the cooperation of the Food Technology Department of the University of Massachusetts.

Arrangements have been made to ship recording thermometers and time-temperature indicators through several distributor-to-retailer channels in the Boston and Gloucester (Mass.) areas and also from warehouses in Hartford, Conn., and Pittsfield, Mass., to retail stores in the northwestern part of Massachusetts. The instruments will be collected at retail stores in various parts of Massachusetts by the University staff who will monitor the temperature of the shipments and provide the Gloucester Laboratory with the data obtained.



Great Lakes

NEW BUREAU OF COMMERCIAL FISHERIES RESEARCH VESSEL BASE IN LAKE MICHIGAN:

Two U. S. Bureau of Commercial Fisheries research vessels arrived at the port of Saugatuck, Mich., on the eastern shore of Lake Michigan in late November 1961. The biological research vessel Cisco, previously based at Bay City, on Saginaw Bay, Mich., has worked intermittently in Lake Michigan since she was constructed in 1951. The exploratory fishing and gear research vessel Kaho is new, having been accepted from the builders in Toledo, Ohio, just prior to sailing for Saugatuck.

The Saugatuck base, not yet fully completed, will serve as "home port" to these vessels while they take part in scientific programs on the commercial fisheries of the Great Lakes. Saugatuck was chosen as base of operations because of its relatively ice-free winter conditions and its accessibility to Ann Arbor from where Great Lakes research is directed.

The biological research vessel Cisco (a name applied collectively to several species

of Great Lakes whitefish), is of all-steel construction and 65 feet in length, with a 16-foot beam and draft of 7½ feet. She is powered by a 170-hp. Diesel engine and cruises at 10½ m.p.h. The Cisco has accommodations for 4 crew members and 5 scientists.

The Kaho (name derived from Chippawa Indian word for "hunt"), especially designed for exploratory fishing and gear research activities, is also of all-steel construction, with the exception of an aluminum pilothouse. She is 65 feet in length with an 18-foot beam and draft of 7 feet. The Kaho is powered by twin 150-hp. Diesel engines, and has a cruising speed of over 12 m.p.h. The Kaho accommodates a crew of 4 plus 3 scientists at present.

Both vessels are fitted with modern navigation, communication, research, and fishing equipment. Special electronic instruments furnish data on water depth, bottom condition, and subsurface fish distribution; and provide for positioning the vessels accurately on selected fishing or testing stations. Other scientific equipment records water temperatures from lake surface to bottom, recovers water samples simultaneously from various depths, and obtains samples of lake bottom material.

The Cisco has just completed a 2-year study of the status of the chub stocks of Lake Michigan to measure changes that have resulted from decreased predation by the lake trout, and increased predation by the sea lamprey. The small chubs, which were the principal food of lake trout and too small to be attacked by the sea lamprey, are even more abundant than they were during a similar survey in 1954-55.

During the next few years the Cisco will be used primarily in research on Lake Michigan. She will be used in fishery and environmental studies to learn more about factors that influence the abundance, growth, distribution, and movements of commercially important fish. This information should help to develop optimum utilization of the fishery resources of the lake.

The Kaho will be used in studies designed to help Great Lakes commercial fishermen adjust to the changes in fish populations that have resulted from altering environmental conditions and the invasion of the notorious

sea lamprey. Traditional Great Lakes fishing methods were practical when the bulk of commercial catches consisted of such valuable species as lake trout, whitefish, yellow pike, and the larger chubs. To realize profitable fishing on the less valuable species that are now available in great numbers, but are largely underutilized, much more efficient methods are necessary.

Since 1958, the Bureau's Exploratory Fishing and Gear Research, working in Lake Erie with a converted trap net vessel and in Lake Michigan with chartered vessels, has determined that the trawl method of fishing is very effective for taking such plentiful species as chubs, alewife, and smelt. This work will be continued more intensely and primarily in Lake Michigan in the immediate future by the Kaho. The seasonal availability of underutilized species will be determined by area and depth. Standard commercial types and sizes of trawl nets will be used to obtain the vital information. The results will indicate where and when the best fishing is to be expected.

These biological and exploratory fishing activities are part of an integrated Bureau program which also includes studies in processing, marketing, economics, and statistics of commercial fish. The objective of all this attention to Great Lakes commercial fisheries is to determine the extent and characteristics of Great Lakes commercial fish resources and how to best utilize them at a sustained level in complete harmony with other industrial and recreational uses of those waters.



Great Lakes Fishery Investigations

LAKE ERIE FISH POPULATION SURVEY FOR 1961 SUMMARIZED:

The schedule of the U. S. Bureau of Commercial Fisheries research vessel Musky II for November 1961 was reduced in part because of adverse weather and partly to allow time for the annual fall collection of scale samples from fish in the commercial catch. In this final report, the Bureau's biological research on Lake Erie for 1961 is briefly summarized.

A rescheduling of vessel operations early in 1961 permitted staff limnologists to con-

duct special studies aboard the Musky II during one or two weeks a month. Consequently, data on certain physical, chemical, and biological features (temperatures, pH, alkalinity, dissolved oxygen, plankton, and bottom fauna) of the waters of the western basin were collected on a seasonal basis. Special attention was given to low concentrations of dissolved oxygen in the deeper areas of the central basin during midsummer.

Fishery and limnological studies were combined during several cruises. One of these was the annual summer cruise to seven established index stations in the western basin of Lake Erie, and another was a two-week cruise into eastern Lake Erie and western Lake Ontario in late September. The visit to Lake Ontario was the first by a Bureau research vessel.

Fishery operations for 1961 were begun during the first week of April. During the season, experimental trawling was accomplished at 20 different stations on a total of 73 separate vessel trips. Two stations were visited semimonthly to gather pertinent data on abundance, distribution, and seasonal growth of fish. A consecutive three day-night trawling series was conducted at two stations (Bono and East Harbor) during the spring, summer, and fall. Data from collections during the three seasonal series will be tabulated to provide information on the degree of variability among catches in a given area over a short period of time. The data will also contribute to the life-history studies for the various species. Gill-net operations in 1961 were limited to a few overnight sets in the Island region early in the year.

The hatch and survival for the majority of species in Lake Erie appeared to be much better in 1961 than in 1960, although not as successful as in 1959. White bass, yellow perch, and spot-tail shiners were generally plentiful, but catches of young fish of other species were somewhat sporadic.

The cooler water temperatures which prevailed during 1961 apparently influenced the growth rate of numerous species. A retardation of growth of young-of-year fish was clearly apparent by the end of year. Average lengths in inches of young fish in western Lake Erie, at the end of the growing season, were as follows: yellow pike or

walleye, 8.6; yellow perch, 3.5; white bass, 3.4; sheepshead, 3.8; gizzard shad, 3.9; alewife, 4.2; spot-tail shiner, 3.0; emerald shiner, 2.6; and channel catfish, 3.1.

The current status of the yellow pike tagging program is as follows: Of 4,000 yearling yellow pike tagged in the spring of 1960, 447 (11.2 percent) have been recaptured to date--334 in 1960 and 113 in 1961. The 1961 recoveries demonstrated a pronounced movement of yellow pike to the extreme western end of Lake Erie and northward.

Sampling of the major species of fish in the commercial catch was undertaken in the spring and fall. Scale samples were obtained from a total of 3,242 specimens. Yellow perch, white bass, and sheepshead were readily available, but yellow pike catches continued to drop, and other high-value species such as blue pike, whitefish, and ciscoes have practically disappeared from the catch.

The Musky II was placed in dry dock for the winter.

Note: See Commercial Fisheries Review, Jan. 1962 pp. 17-18.

* * * * *

LAKE MICHIGAN FISH POPULATION SURVEY FOR 1961 COMPLETED:

M/V "Cisco" Cruise 9 (October 31-November 13, 1961): Operations of the U. S. Bureau of Commercial Fisheries research vessel Cisco during cruise 9 were seriously curtailed by almost continuous heavy seas. Scheduled work off Sturgeon Bay, Wis., and Frankfort, Mich., was cancelled.

Standard gangs of nylon gill nets (50 feet each of $1\frac{1}{4}$ - and $1\frac{1}{2}$ -inch mesh, 100 feet of 2-inch mesh, and 300 feet each of $2\frac{3}{8}$ -, $2\frac{1}{2}$ -, $2\frac{3}{4}$ -, 3-, $3\frac{1}{2}$ -, and 4-inch mesh) were set overnight at 25 and 50 fathoms off Charlevoix, Mich., and off Manistique, Mich. All sets were in areas where the water was homothermous (or nearly so); bottom temperatures were 45° to 50° F. (several degrees warmer than during the summer).

Chubs (Leucichthys hoyi), smelt, and alewives were the predominant catches in the Charlevoix area--chubs and alewives at 50 fathoms and smelt at 25 fathoms. In the Manistique area, catches consisted primarily of smelt, chubs, and alewives at 25

fathoms, and chubs, deep-water sculpins, alewives, and smelt at 50 fathoms.

Thirty-minute tows were made with a 50-foot balloon trawl at 15, 25, 35, and 50 fathoms off Manistique, and at 30 fathoms in Little Traverse Bay, east of Charlevoix. Chub catches were 15, 54, 194, 65, and 102 pounds, respectively. All catches contained alewives (11 to 45 pounds) and smelt (up to 287 pounds at 15 fathoms off Manistique). Ninespine sticklebacks (up to 1,000 per tow) were taken in all catches except at 15 fathoms off Manistique, and trout-perch were taken in 3 tows (including the tow at 50 fathoms). Twenty small whitefish (mostly 8 to 9 inches long) were caught in the 15-fathom tow off Manistique. This catch of young whitefish was the largest ever made by the Cisco. Other species in the trawl catches were deep-water sculpins (up to 52 pounds), slimy sculpins, and (in the tow in Little Traverse Bay) spot-tail shiners. The occurrence of sticklebacks, trout-perch, and spot-tail shiners in deep water may be attributed to the general uniformity of the water temperature.

Hydrographic collections and observations were made at 40-fathom stations off Charlevoix, off Manistique, and in midlake between the two ports. The fall overturn was in progress and homothermous conditions prevailed to depths as great as 50 fathoms. Surface water temperatures off Charlevoix were about 11.8° C. (53.2° F.) at the beginning of the cruise and 10.0° C. (50.0° F.) at the end. Extremes recorded in the open lake were 7.0° C. (44.6° F.) and 12.0° C. (53.6° F.).

M/V "Cisco" Cruise 10 (November 21-26, 1961): This short cruise was the last for the 1961 season. The vessel was taken to her new winter berth in Saugatuck, Mich., after the scheduled operations had been completed.

Regular gangs of nylon gill nets (50 feet each of $1\frac{1}{4}$ - and $1\frac{1}{2}$ -inch mesh, 100 feet of 2-inch mesh, and 300 feet each of $2\frac{3}{8}$ -, $2\frac{1}{2}$ -, $2\frac{3}{4}$ -, 3-, $3\frac{1}{2}$ -, and 4-inch mesh) were set overnight at 25, 50, and 80 fathoms off Frankfort, Mich. Catches consisted mostly of chubs (Leucichthys hoyi), alewives, and lake herring at 25, 50, and 80 fathoms. The L. kiyi, L. alpenae, L. zenithicus, and lake herring appeared to be at the beginning of their spawning season. Only one spent fish, a L. kiyi, was taken, but all other individuals of these species were ripe, or nearly so. A

burbot, which weighed 2 lbs. 10 oz., was the second caught by the Cisco this year. It bore no lamprey scars.

The customary data were collected at the 40-fathom hydrographic station off Frankfort. Bathythermograph casts were made at 5-mile intervals from Charlevoix, Mich., to Frankfort. Surface water temperature ranged from 5.8 to 8.9° C. (42.4 to 48.0° F.). Slight thermal stratification still remained at depths greater than about 25 fathoms.

Note: See Commercial Fisheries Review, Jan. 1962 pp. 18-19.

* * * * *

WHITEFISH SPAWNING POPULATIONS ASSESSED IN APOSTLE ISLANDS AREA OF LAKE SUPERIOR:

M/V "Siscowet" Cruise 9: The annual assessment of whitefish spawning activities in the Apostle Islands region was made November 17-22, 1961. Large-mesh gill nets (4½- to 5¼-inch mesh) fished at depths of 1 to 4 fathoms on spawning grounds off Rocky and Cat Islands yielded 82 ripe whitefish (71 males, 11 females). Only 1 whitefish was found to bear a sea lamprey scar (healed). Biologists tagged and released 72 of these fish.

The primary reason for tagging the spawning whitefish was to determine whether the fish have a "homing" instinct, i.e., return to the same spawning grounds each year. Over 50 spawning whitefish were tagged on Rocky and Cat Island Shoals in 1960 but none were recovered during cruise 9. (Of the fish tagged in 1960, 22 percent were captured during the year by commercial fishermen.)

Small-mesh gill nets (150 feet each of 1½- and 2½-inch mesh) were also fished on the whitefish spawning grounds. Longnose suckers, round whitefish, and lake herring predominated in the catches. Stomachs from fish of each species were examined, but only the longnose suckers contained fish eggs (presumably of whitefish).

Trawl tows in the Apostle Islands area yielded 82 small lake trout, of which 81 were fin-clipped. Of these hatchery-reared fish, 60 were from the 1961 Bayfield spring plant, 16 from the 1960 spring plant, 3 from the 1960 fall plant, and 2 from the 1959 spring plant. Other species taken in the trawl included smelt, pygmy whitefish, sculpins,

alewives, and sticklebacks. Young-of-the-year alewives were taken in most of the trawl tows, and appeared to be distributed throughout the island area at depths of 17 to 29 fathoms. These catches were of special interest because young-of-the-year alewives had not previously been collected by the Siscowet in Lake Superior.

Water temperatures on the whitefish spawning shoals ranged from 41.0° F. to 42.4° F. The water was nearly homothermous at all depths.

Note: See Commercial Fisheries Review, Jan. 1962 pp. 19-20.



Groundfish

FORECAST OF ABUNDANCE ON NEW ENGLAND BANKS IN 1962:

Little change is expected in the abundance of groundfish on New England fishing banks during 1962. Biologists at the Bureau of Commercial Fisheries Biological Laboratory at Woods Hole, who keep an eye on the fluctuating abundance of the commercially-important species in that area, have this to say for the coming year. Georges Bank haddock, the most important fish in the area, is expected to remain in moderate supply throughout 1962. Scrod will make up a good portion of the catch. This scrod will come mostly from the 1959 age group. The picture for 1963 is not quite so bright for Georges Bank haddock since there are no strong age groups following that of 1959. Bureau surveys indicate a weak 1960 age group and practically no show of the 1961 group.

Other important species such as cod, ocean perch, and whiting are expected to remain moderately abundant as during 1961. Although detailed biological information is not available for those species, as it is for haddock, there is no reason to believe there will be any significant change in their abundance in 1962.

Yellowtail flounder is presently enjoying a high level of abundance. It will remain high during 1962 although there will be a slight drop from the levels of the past two years.

Sea scallops also have been in unusual abundance during the last two years. In 1962 abundance is expected to remain

high, but at levels somewhat below that of 1961.



Gulf Exploratory Fishery Program

EXPERIMENTAL MIDWATER TRAWL TESTED AND SHRIMP AREAS EXPLORED:

M/V "Oregon" Cruise 76: This cruise of the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon was conducted in five intermittent phases from September 20 to December 17, 1961. Specific objectives were to: (1) obtain further performance data on experimental midwater trawls, (2) take motion pictures of escape-behavior of various pelagic fishes, and (3) explore the outer shelf areas of the north-central and north-western Gulf for commercial concentrations of brown shrimp (*Penaeus aztecus*).

The phases were planned to permit exploratory shrimp trawling during nighttime periods and midwater trawling trials and underwater motion picture work during daylight hours. A total of 90 shrimp trawl drags and 37 midwater trawl tows were completed during the cruise.

Performance data were obtained on two midwater trawls of different design, various flotation and depressor devices, four corner elevator-depressors, and three different types of doors. Of particular interest was the performance of a trawl of new design, which permitted towing speeds up to 5 knots

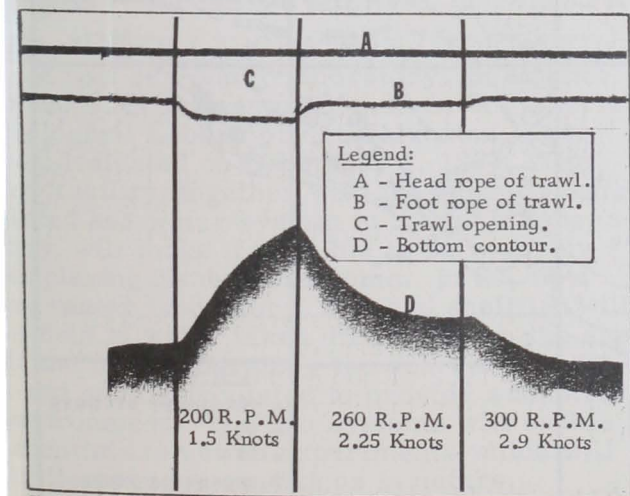


Fig. 1 - British Columbia-Type Trawl: Note inverse relationship between vessel's speed and vertical opening of net.

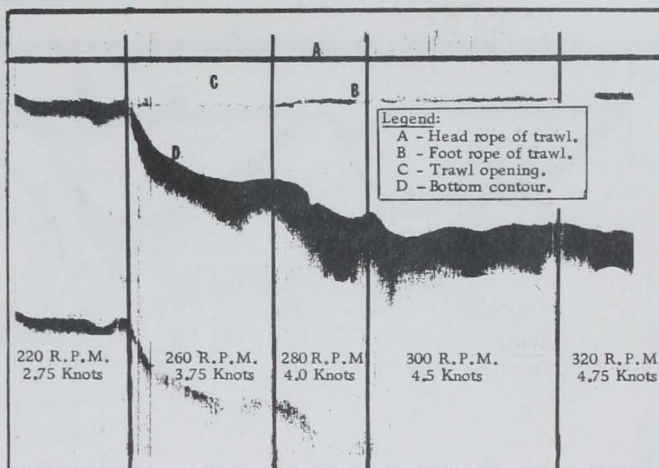


Fig. 2 - Pascagoula High-Speed Trawl: Note stabilized vertical opening of trawl through indicated speed range.

with no apparent reduction in the vertical opening of the trawl. The echographs (figs. 1 and 2) show the relation between speed and vertical opening for both the British Columbia-type trawl and the experimental Pascagoula high-speed trawl.

A headrope-mounted sonic transducer and two remote-controlled motion picture cameras--one mounted on the headrope and one in the funnel--were used to record trawl configuration and fish behavior and to enable exact vertical positioning of the trawl. Approximately 2,000 feet of 16 mm. film were exposed during the cruise, resulting in approximately 500 feet of intelligible film.

Only slight-to-moderate depth-sounder indications of pelagic fish schools were encountered during this period. Midwater trawl catches were generally small, ranging from a few hundred pounds to 1,500 pounds (heads on) per tow. The catches were comprised predominantly of butterfish (*Poronotus triacanthus*) and harvestfish (*Peprilus paru*). The echograph reproduction in figure 3 shows concentrations of butterfish entering the trawl mouth.

At the further request of members of the Gulf shrimping industry, three phases of the cruise were concerned with exploration for brown shrimp in the 20- to 60-fathom depth range both east and west of the Mississippi Delta. This work was a follow-up to earlier shrimp exploratory work which was reported in Oregon Cruise Reports 75 and 76A.

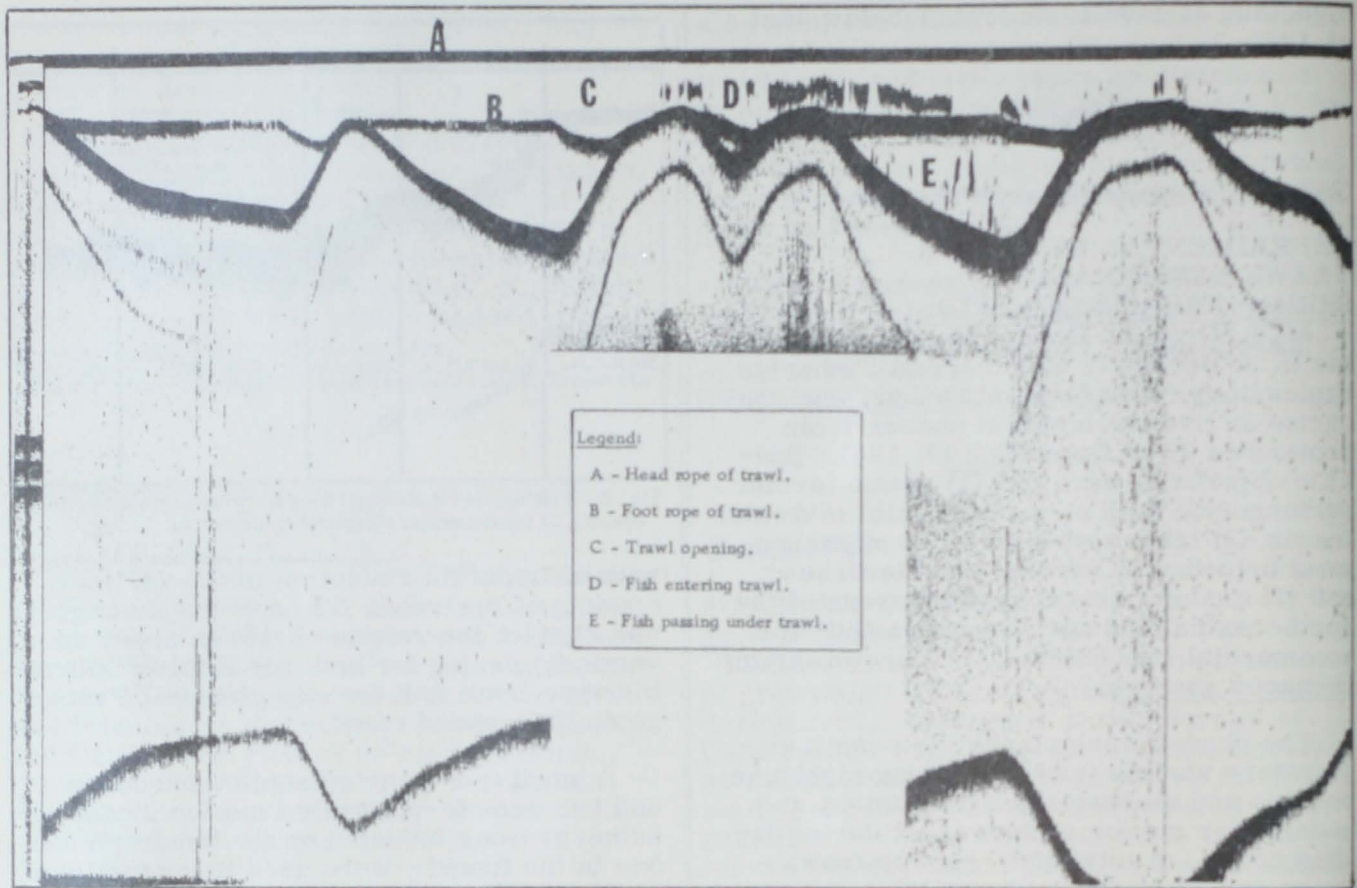


Fig. 3 - Fish entering trawl between head and foot rope of midwater trawl. Apparent uneven bottom contour resulted from variable speeds necessary for positioning trawl to intercept fish schools.



Fig. 4 - M/V Oregon Cruise 76 (Oct. 2 - Dec. 17, 1961).

A total of 90 exploratory drags (85 at night) were completed between the Mississippi Delta and Sabine Pass, Texas, and between the Delta and Pensacola, Florida, in this depth range.

With the exception of three areas which produced marginal commercial catches, no important concentrations of brown shrimp were located. The three areas of marginal production were located: (1) in 18-22 fathoms 20 miles northeast of Pass-a-Loutre whistle buoy #4 (lat. $29^{\circ}33' N.$, long. $88^{\circ}36' W.$), (2) in 40 fathoms 17 miles east by north of Pass-a-Loutre whistle buoy #4 (lat. $29^{\circ}13' N.$, long. $88^{\circ}37' W.$), and (3) in 31 fathoms 43 miles WSW. of Ship Shoal whistle buoy #2 (lat. $28^{\circ}24' N.$, long. $91^{\circ}48' W.$). In these areas drags with a single trawl (40-ft. balloon and 70-ft. flat trawls were used) produced 15-20 count brown shrimp at a rate of 40 to 50 pounds (heads-off) per 3-hour tow. Other areas test-fished produced large brown shrimp at rates of 2 to 5 pounds per one-hour tow.

Extensive areas of foul bottom were found in the 50- to 60-fathom depth range. Most attempts to sample these areas resulted in moderate to severe gear damage. Figure 4 denotes areas of foul bottom and the location of exploratory shrimp drags.

Note: See *Commercial Fisheries Review*, Dec. 1961 p. 31; Nov. 1961 p. 23.



Gulf Fishery Investigations

SEA-WATER LABORATORY DEDICATED:

A new sea-water laboratory, an adjunct to the U. S. Bureau of Commercial Fisheries Biological Laboratory at Galveston, Tex., was dedicated on December 7, 1961. The new facility, together with the recently completed sea water system in the main laboratory, will make it possible to solve many perplexing fishery problems. In the new sea-water laboratory, fish and shellfish will be held in water taken directly from the sea. At the main laboratory the sea water is filtered and recirculated to provide a constant environment. The two systems will enable scientists to set up experiments which will duplicate many conditions in nature.

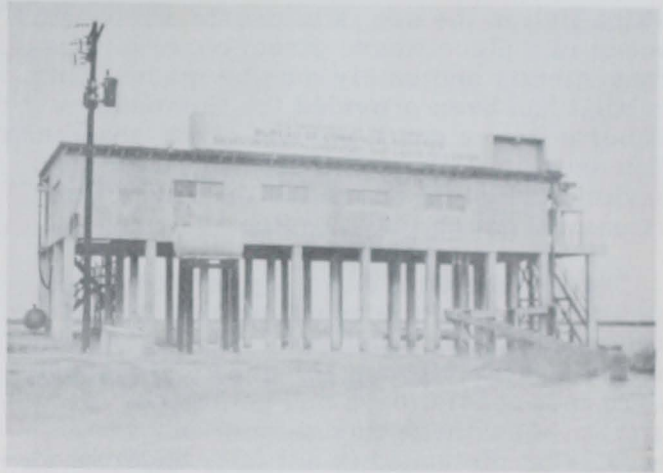


Fig. 1 - Bureau of Commercial Fisheries new sea-water (continuously circulating) laboratory located on East Beach Lagoon, Galveston, Tex.

In an address at the dedication Frank P. Briggs, Assistant Secretary of the Interior for Fish and Wildlife, said: "The ultimate aim of our research here is to discover the biological facts which regulate the survival, growth, movement, and reproduction of shrimp and other estuarine forms. Only through such knowledge can we perceive the means of managing our fisheries for the welfare of the industry and of the Nation..."



Fig. 2 - Inside the new sea-water laboratory showing some of the participants in the dedication ceremonies.

Studies of the sea are extremely difficult. Fish and shrimp are seldom seen near the surface and, therefore, they must be caught by dragging nets blindly across the bottom and bringing them to the surface for observation.

One way to learn more about the species which live in the sea is to create a miniature ocean in a place where direct observations conveniently and safely may be made. This is what has been provided the Galveston Laboratory--a small portion of the sea where fish and shellfish can be kept and their behavior studied to determine the kind of environment which they require.

The Galveston Laboratory is studying shrimp, the most valuable species landed by United States fishermen. Shrimp spawn at sea and their young somehow move shoreward into coastal bays and estuaries. At present, how these tiny shrimp can move such great distances is not fully understood.

This new sea water system will make it possible to rear young shrimp in captivity where they can be studied in minute detail. In this way, it may be possible to determine the effects of tides, currents, and other factors on the movement of young shrimp and to find the clues which will make it possible to solve this mystery.

In other experiments, the Laboratory hopes to improve the methods for marking shrimp and various fish so that their migration can be followed and their survival rates determined.

Construction of this sea-water laboratory is one of the ways in which the Fish and Wildlife Service is participating in the expanded national oceanographic program. Much of the research to be conducted will concern the behavior of fish and shellfish and contribute to our knowledge of these inhabitants of the sea.

Biologists designed this sea-water system with the greatest degree of simplicity to reduce inception and growth of fouling organisms. The sea-water piping is made of strong plastics to prevent metal contamination. The water is first pumped to the 25,000-gallon roof tanks by two 500-gallon-per-minute pumps. Thence, it flows by gravity into the main tank room.

The roof is of prestressed concrete tees to eliminate any pillars in the tank room. Permanent tanks were purposely omitted to provide for maximum flexibility of use, as new experiments require modifications in size and shape of tanks.

The instrument room provides for constant recording of both weather and seawater characteristics so that investigators will be constantly aware of changing conditions, and a continuous record will be available to apprise the biologists of both short- and long-term trends in any of the physical or chemical characteristics.

* * * * *

TWO VESSELS CHARTERED FOR SHRIMP RESEARCH PROGRAM:

Bids for the charter of two fishing vessels with crews were opened on December 20, 1961. The U.S. Bureau of Commercial Fisheries Biological Laboratory, Galveston, Texas, will use the vessels for the expanded Federal shrimp research program under way at the Galveston Laboratory.

The specifications for the vessels were: length 60 feet and maximum over-all length 90 feet. The Government guarantees charter of not less than 35 calendar days for each vessel in each six months of calendar year 1962. Five bids were received.

Contracts were awarded to the two lowest bidders for the charter of the Belle of Texas and the Miss Angela. A previous charter contract was awarded to the Belle of Texas in August 1961.

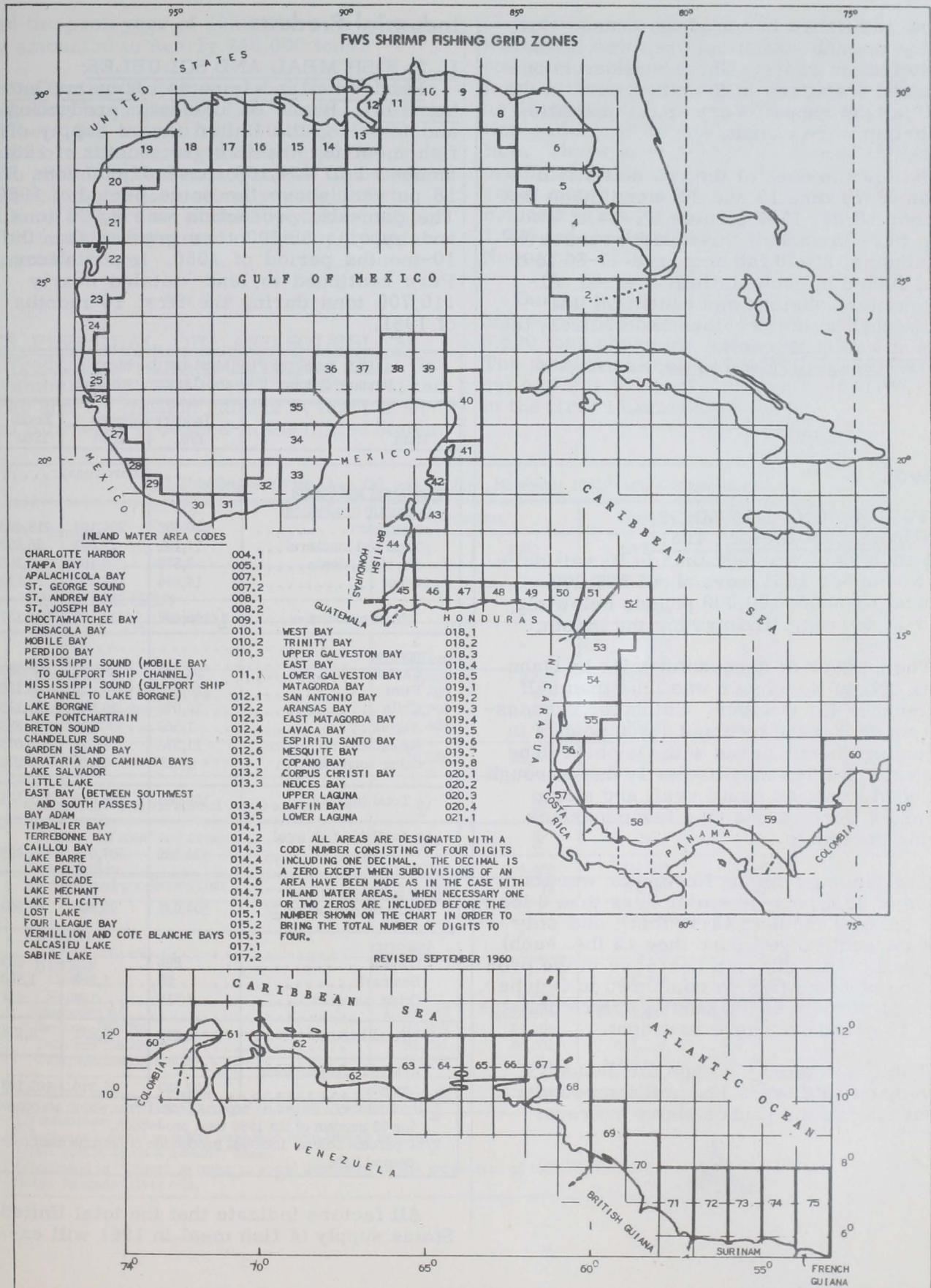
Note: See Commercial Fisheries Review, Oct. 1961 p. 20.

* * * * *

SHRIMP DISTRIBUTION STUDIES:

M/V "Belle of Texas" Cruises BT-12, BT-13, BT-14: Between December 5 and 7, 1961 (cruise BT-12), 6 tows in each of two statistical areas (FWS fishing grid zone 15 and 16) were made with a 45-foot shrimp trawl by the U. S. Bureau of Commercial Fisheries chartered research vessel Belle of Texas. In each statistical area two tows were made in each of three depth ranges--0-20 fathoms, 20-40 fathoms, and 40-60 fathoms. The vessel is operated by the Bureau's Biological Laboratory in Galveston, Tex. The tows yielded only very small quantities of shrimp.

Ten tows were made between December 15 and 17, 1961 (cruise BT-13), with the same type of gear, in two other statistical areas (FWS zone 17 and 18). Due to rough seas only one station in the 40-60 fathom



range was fished in one of the areas. One station in each statistical area was in the 20-40 fathom range. Three stations in one area and 4 stations in the other were in the 0-20 fathom range. Very small quantities of shrimp were caught.

Six tows in each of the two statistical areas (FWS zone 19 and 20) were made December 18-21, 1961 (cruise BT-14). Two tows were in each of three depth ranges (0-20 fathoms, 20-40 fathoms, and 40-60 fathoms) fished in each statistical area. Although more shrimp was caught on this cruise than in the previous two cruises, the amount was still small.

Note: See Commercial Fisheries Review, Jan. 1962 p. 20; Dec. 1961 p. 33.



Hawaii

SKIPJACK TUNA LANDINGS, JANUARY-NOVEMBER 1961:

Landings of skipjack tuna in Hawaii during November 1961 were about 235,000 pounds, or about 100,000 pounds below the 1948-60 average landings for the month.

The number of successful trips by Oahu boats (37) in November was less than half the number for October. Catch per successful trip decreased by about 1,000 pounds in November as compared with October. The decrease in trips may be partly due to rough sea conditions, as small craft and storm warnings were issued on a few occasions during the month.

The landings during November were composed of 35.6 percent small (less than 8 lbs.), 49.6 percent medium (8-15 lbs.), and only 15.1 percent large (more than 15 lbs. each) skipjack. This shows a decrease in the proportion of large fish as compared to October, when 41 percent of the landings were of skipjack 15 pounds or more in weight.

Total estimated landings for January-November 1961 were 11.1 million pounds, about 1.5 million pounds above average.



Industrial Products

U. S. FISH MEAL AND SOLUBLES:

Production and Imports, January-October 1961: Based on domestic production and imports, the United States supply of fish meal for the first 10 months of 1961 amounted to 434,100 tons--67,000 tons or 18 percent above the same period of 1960. The domestic production was 8,300 tons and imports 58,700 tons greater than the 10-months period of 1960. Imports from Peru continued to lead--totaled nearly 110,700 tons during the first 10 months of 1961.

U. S. Supply of Fish Meal and Solubles, January-October 1961 and Comparative Data			
Item	January-October		Total 1960
	1961	1960	
 (Short Tons).....		
<u>Fish Meal and Scrap:</u>			
<u>Domestic production:</u>			
Menhaden	230,486	204,184	218,423
Tuna and mackerel	17,191	22,582	26,499
Herring, Alaska	3,576	6,103	6,103
Other	14,244	24,323	39,112
Total production . . .	<u>1/285,497</u>	<u>1/257,192</u>	290,137
<u>Imports:</u>			
Canada	33,559	28,790	30,982
Peru	110,682	54,570	68,156
Chile	10,078	16,872	21,183
Angola	1,543	360	888
Republic of So. Africa	11,376	6,321	7,073
Other countries	1,327	3,135	3,279
Total imports,	168,565	109,848	131,561
Available fish meal supply	434,062	367,040	421,698
<u>Fish Solubles:</u>			
<u>Domestic production 2/</u>			
	100,021	92,508	98,929
<u>Imports:</u>			
Canada	880	809	869
Denmark	28	1,858	1,858
Other countries	1,710	165	447
Total imports	2,618	2,832	3,174
Available fish solubles supply	102,639	95,340	102,103
1/ Preliminary. Based on reports from firms which accounted for 96 percent of the 1960 total production.			
2/ 50 percent solids. Includes production of homogenized condensed fish.			

All factors indicate that the total United States supply of fish meal in 1961 will ex-

ceeded the peak year of 1959 when the quantity amounted to nearly 440,000 tons.

The United States supply of fish solubles (including homogenized fish) during January-October 1961 totaled 102,600 tons--7,300 tons more than during the same period in 1960. Solubles and homogenized fish manufactured from domestically-caught fish made up 97 percent of the 10 months' supply in 1961, while 3 percent of the supply was imported.

* * * * *

U. S. FISH MEAL, OIL, AND SOLUBLES:

Production, January-November 1961: In November 1961, 10,100 tons of fish meal and scrap and 1.4 million gallons of marine animal oils were produced in the United States.

Compared with the same month of 1960, this was a drop of 1,000 tons (9 percent) in meal and scrap and 248,000 gallons (15 percent) in oil. Menhaden accounted for 6,800 tons or 68 percent of the meal total, and 1.2 million gallons or 90 percent of the oil production. There were 4,200 tons of fish solubles produced in November--750 tons above the same month of 1960. The production of homogenized condensed fish amounted to nearly 1,000 tons--about 900 tons more than in November 1960.

During the first 11 months of 1961, meal and scrap production of 276,000 tons was 5,500 tons above the same period of 1960. The marine animal oil yield of 31.9 million gallons was 5.1 million gallons more than in the first 11 months of 1960.

U. S. Production of Fish Meal, Oil, and Solubles, November 1961 ^{1/} with Comparative Data					
Product	November		January-November		Total
	1961	1960	1961	1960	1960
.....(Short Tons).....					
<u>Fish Meal and Scrap:</u>					
Alewife	-	-	89	1,092	1,092
<u>Herring:</u>					
Alaska	-	-	3,576	6,103	6,103
Maine	99	81	1,149	2,693	2,915
Menhaden 2/	6,800	8,357	237,286	212,541	218,423
Sardine, Pacific	697	603	2,094	2,934	3,508
Tuna and mackerel	1,998	1,381	19,189	23,963	26,499
Unclassified	464	664	12,172	20,680	21,288
Total	10,058	11,086	275,555	270,006	279,828
Shellfish and marine animal meal and scrap .	3/	3/	3/	3/	10,309
Grand total meal and scrap	3/	3/	3/	3/	290,137
Fish solubles	4,203	3,453	93,737	86,564	89,377
Homogenized condensed fish	950	71	11,437	9,468	9,552
.....(Gallons).....					
<u>Oil, body:</u>					
Alewife	-	-	6,900	73,950	73,950
<u>Herring:</u>					
Alaska	-	-	625,786	1,385,218	1,385,218
Maine	4/	2,680	4/	132,973	132,973
Menhaden 2/	1,223,646	1,515,864	29,461,595	23,497,283	24,453,736
Sardine, Pacific	20,923	15,184	58,166	138,611	160,121
Tuna and mackerel	85,091	46,031	671,951	459,877	509,195
Other (including whale)	30,173	28,464	1,057,039	1,108,727	1,137,782
Total oil	1,359,833	1,608,223	31,881,437	26,796,639	27,852,975
^{1/} Preliminary data. ^{2/} Includes a small quantity produced from thread herring. ^{3/} Not available on a monthly basis. ^{4/} Included in "Other" in order to avoid disclosure of the production of individual firms. Note: Excludes liver oils.					

Imports of fish meal during January-October 1961 of 168,900 tons were 54 percent greater than during the same period of 1960. Imports of fish solubles were 200 tons less. Exports of fish oils and fish liver oils during the first 10 months of 1961 amounted to 110.6 million pounds (14.7 million gallons)--2.6 million pounds (350,000 gallons) less than in the same period of 1960.

* * * * *

**MAJOR INDICATORS FOR
U. S. FISH MEAL, SOLUBLES,
AND OIL, DECEMBER 13, 1961:**

Fish Meal Production and Imports				
Item and Period	1961	1960	1959	1958
.....(Short Tons).....				
Production:				
December	1/	9,185	14,381	14,636
November	10,500	8,725	10,797	9,749
January-November 2/	276,000	251,211	261,015	201,536
January-December *	1/	257,969	275,396	226,299
January-December **	1/	290,137	306,551	248,140
Imports:				
December	1/	15,564	5,538	8,490
November	1/	6,149	3,673	6,082
October	9,425	12,515	3,821	5,899
January-October . .	168,565	109,848	123,744	85,780
Jan.-Dec. Totals . .	1/	131,561	132,955	100,352
Fish Solubles Production and Imports				
Item and Period	1961	1960	1959	1958
.....(Short Tons).....				
Production 3/:				
December	1/	2,897	5,430	6,305
November	4,000	3,542	4,628	8,888
January-November .	93,500	96,032	159,929	123,872
Jan.-Dec. Totals . .	1/	98,929	165,359	130,177
Imports:				
December	1/	60	420	5,180
November	1/	282	3,089	867
October	110	-	1,908	2,548
January-October . .	2,618	2,832	23,121	8,520
Jan.-Dec. Totals . .	1/	3,174	26,630	14,567
Fish Oil Production and Exports				
Item and Period	1961	1960	1959	1958
.....(1,000 Gallons).....				
Production:				
December	1/	1,038	1,865	1,839
November	1,346	1,202	1,147	1,028
January-November .	32,000	25,643	22,546	19,786
January-December *	1/	26,690	24,418	21,957
Jan.-Dec. Totals **	1/	27,886	24,978	22,028
Exports:				
December	1/	2,108	2,611	383
November	1/	1,952	813	2,037
October	2,027	591	1,911	3,591
January-October . .	14,744	15,095	15,840	10,119
Jan.-Dec. Totals . .	1/	19,155	19,264	12,539

1/ Not available.
2/ Does not include crab, shrimp, and miscellaneous meals.
3/ Includes homogenized fish.
4/ Represents over 95 percent of the total production.
Note: Data for 1961 are preliminary.
*Totals based on preliminary monthly data.
**Final annual totals.



North Pacific Exploratory Fishery Program

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

M/V "Commando" Cruise 3: The third in a series of cruises designed to monitor deep-water marine fauna at stations established along a track line southwest of the mouth of the Columbia River was completed on December 13, 1961, by the U. S. Bureau of Commercial Fisheries chartered fishing vessel Commando. Inclement weather prevented a systematic survey of the stations from shallow to deep areas as in previous cruises; however, adequate coverage was obtained from 12 otter-trawl hauls made in 50 to 450 fathoms of water.

The cooperative study with the Oregon Fish Commission of Dover sole migrations was continued with release of 70 tagged fish at the 300-fathom station.

Commercial species of fish encountered were the same as those taken in previous cruises, including sablefish (Anoplopoma fimbria), Dover sole (Microstomus pacificus), English sole (Parophrys vetulus), petrale sole (Eopsetta jordani), turbot (Atheresthes stomias), hake (Merluccius productus), and several species of rockfish. Dover sole and sablefish were found throughout the depth range fished. Dover sole was most abundant between 200 and 300 fathoms, while most of the sablefish were taken between 300 and 400 fathoms. Although as much as 1,300 pounds of sablefish per hour tow were caught, a large percentage of the take was under marketable size. The largest catch of ocean perch (Sebastes alutus) was made at 150 fathoms. Very few hake were taken during the survey which is in contrast to the September cruise when large concentrations were found down to a depth of 200 fathoms.

Tanner crabs (Chionoecetes tanneri) appeared in greatest abundance at 375 fathoms where 360 pounds were taken in a one-hour tow. One male tanner crab was caught in 150 fathoms which is 100 fathoms shallower than any of either sex taken in previous cruises.

Invertebrates encountered during the cruise and not in previous cruises were barnacles and a species of crab similar in appearance to a king crab.

Note: See Commercial Fisheries Review, Nov. 1961 p. 26.



Oceanography

ALUMINUM SUBMARINE FOR OCEANIC RESEARCH:

An aluminum research submarine designed to explore the ocean at depths many times beyond the limit of existing subs is being built for Reynolds International, Inc., by General Dynamics Corporation's Electric Boat Division, according to a joint announcement by the two firms.

The Chairman of Reynolds International, Inc., a subsidiary of Reynolds Metals Company, and the Chairman of General Dynamics on September 27, 1961, announced the signing of a \$2-million design and construction contract for the Aluminaut--first submarine ever to be constructed from aluminum.

The Woods Hole Oceanographic Institution (Massachusetts) will operate the sub as part of a research program sponsored by the Office of Naval Research (ONR), United States Navy. Most of the construction costs incurred by Reynolds will be recovered through lease of the craft for oceanographic research.

The Aluminaut is being built at the Electric Boat Division in Groton, Conn., and launching is scheduled for 1963. A pioneer in submarine construction, General Dynamics has built 10 of the Navy's 21 commissioned atomic subs. These include the Nautilus, first nuclear sub, and the George Washington, first of the Polaris subs.

Designed to operate at depths of 15,000 feet--almost three miles down--the Aluminaut will permit man to explore about 60 percent of the world's ocean floor--most of it for the first time.

The Aluminaut is scheduled to be equipped with sonar, television cameras for detailed observation of the ocean floor, and robot hands to obtain specimens.

Displacing 150,000 pounds, the Aluminaut will be slightly over 50 feet long with an 8-foot diameter hull. Separate electrical propulsion systems will give the three-man craft both horizontal and vertical locomotion. Its operating range will be about 80 miles.

The sub's hull is being constructed by bolting together large, one-piece cylindrical sections of high-strength aluminum forgings.

The world's largest aluminum ingot was cast for the first hull section.

Aluminum was chosen because it is three times lighter than steel and has greater strength for its weight than other available metals. This allows fabrication of a hull thick enough to withstand tremendous pressures at great depths, yet light enough to stay afloat without external buoyancy.

The Director of Woods Hole Oceanographic Institution said: "We plan to use the Aluminaut to extend our capabilities for a wide variety of geological, biological, and physical research work on the bottom and in the mid-depths. Among the subjects our scientists will study are the submarine canyons, the edge of the continental shelf, and the daily vertical migration of marine animals."

The Aluminaut is the outgrowth of research which has been carried out for several years by Reynolds Metals Company, Southwest Research Institute, General Dynamics' Electric Boat Division, Woods Hole Oceanographic Institution, and the Office of Naval Research.

* * * * *

NEW EDUCATIONAL FILMSTRIP "DEEP FRONTIER--AN INTRODUCTION TO OCEANOGRAPHY":

A limited number of copies of "Deep Frontier--An Introduction to Oceanography," a narrated color filmstrip designed particularly for high school and university science classes, is being offered by the U. S. Department of the Interior without charge to State education departments and interested institutions of higher learning, the Department announced on December 27, 1961.

The filmstrip was produced recently with technical and financial support from the Fish and Wildlife Service's Bureau of Commercial Fisheries in efforts to influence young people to choose careers in oceanography and marine biology.

"Deep Frontier" explains the importance of oceanography--the study of the last great frontier of our planet--and imaginatively portrays developments that may take place in the future. With only about one thousand oceanographers in the United States, the need for scientists in this field is increasing rapidly.

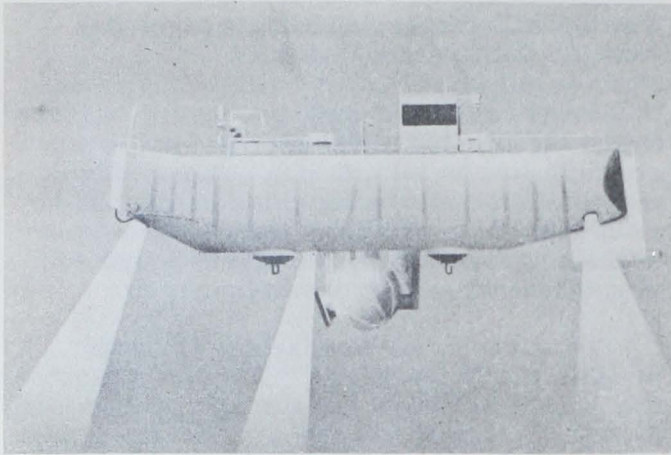


Fig. 1 - For direct explorations of the deeps of the ocean we now have the bathyscaph from which man can study the ocean directly, watch living creatures in their natural environment and collect unusual specimens.

"Oceanography offers a challenging call to those who would venture into the unknown, for, truly, the oceans are the unknown," the filmstrip comments.

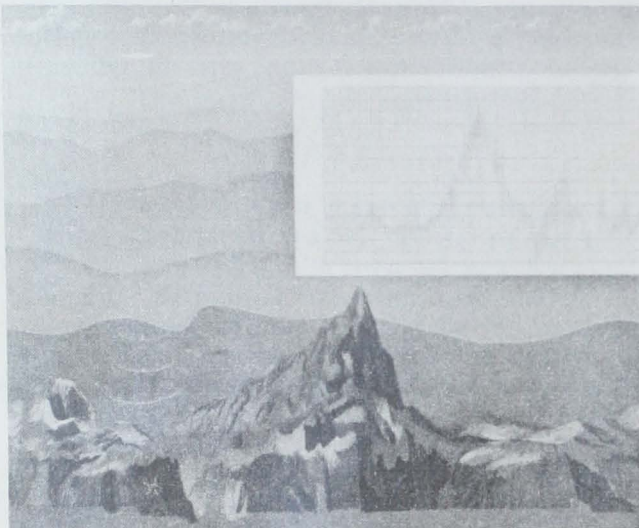


Fig. 2 - Only a few years ago soundings were made by dropping long weighted lines. Now soundings are made from ships by acoustic signals that echo off the bottom. The echo time-interval, and thus the depth, is recorded automatically on moving graph paper.

"Deep Frontier" is recorded either for synchronized projection or manual operations and runs 17 minutes. Interested teachers or schools should arrange with their State education departments' audio-visual instructors for free loan of the filmstrip. Colleges and universities should write to the Fish and Wildlife Service, U. S. Department of the Interior, Washington 25, D. C.



Oregon

FISH COMMISSION HAIR SEAL HUNTING CONTRACT TO BE RENEWED:

"The Oregon Fish Commission's seal control activities in the lower Columbia apparently have been paying off," the State Fisheries Director stated early in January 1962. "Bounty payments to free-lance seal hunters are down from previous seasons," he said, citing the smaller numbers of bounty claims during the past two years as one indication of reduced seal numbers.

"Losses of salmon through the depredations of the common harbor or hair seal are believed to have assumed substantial proportions during some seasons. Fewer seals have been sighted in the river, and reports of losses to the marauding animals of salmon from the nets of commercial fishermen have been less common since a seal hunter was employed two years ago," the Fisheries Director added.

The occasion for the observations was the pending renewal of the seal hunting contract for the lower Columbia River area, let annually to cover the following 12 months. Under terms of the current agreement, the Commission's contract seal hunter must provide all equipment necessary for the job. Compensation is made for each day of actual hunting. During the past two years, a thoroughly qualified hunter of long experience has held the contract. Under terms of the contract, the hunter must be available for seal control work at all times. This fact makes it impractical for a seal hunter to combine fishing with seal control activities.

Funds for the contract control activities, as well as for bounty payments to free-lance seal hunters, are derived from special fees paid by both Columbia River gill-netters and packers. The money is earmarked specifically for Columbia River seal control. During the past seven years, an average of 69 seals has been submitted annually for bounty. The Commission pays a \$25 bounty for each seal carcass turned in to an authorized agent of the Fish Commission and certified as having been killed in the specified Columbia River area.



Oysters

LONG ISLAND SOUND SPAWNING AND SETTING OBSERVATIONS, SUMMER 1961:

Studies in the past summer of 1961 completed a quarter of a century of systematic observations on the spawning and setting of oysters in Long Island Sound by the Milford (Conn.) Biological Laboratory of the U. S. Bureau of Commercial Fisheries. These observations, which began in 1937, probably present the longest uninterrupted study of propagation of the American oyster, *Crassostrea virginica*, and of the ecological factors controlling it. Various aspects of the studies, contributing to the management of shellfisheries, have already been published.

The number and location of the stations (observation and sampling areas) established for these studies in the oyster-producing section of Long Island Sound varied from year to year depending upon the circumstances. In some years the chain of stations extended from the Thimble Islands to the Norwalk Islands, thus covering a distance of about 35 miles along the Connecticut shore. However, during the last 20 years the observations were principally concentrated at ten basic stations. These stations were established at different depths in the New Haven, Milford, and Bridgeport areas where most of the important oyster beds are located.

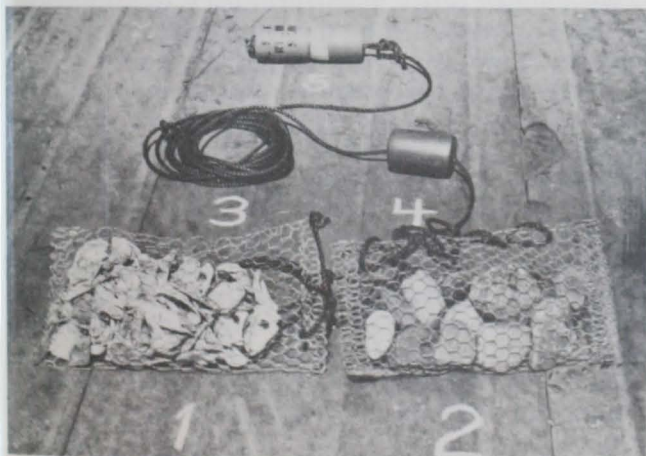


Fig. 1 - Oyster Set Collector Unit: (1) bag made of chicken mesh wire containing approximately 40 clean oyster shells. Newly set oysters are counted only on the inside clean surface of these shells; (2) chicken wire bag filled with rocks to serve as anchor; (3) tarred rope; (4) auxiliary float helps to maintain rope in vertical position; (5) surface float indicating position and number of collector. As a rule, two shell-filled bags (1) are placed at each station where observations on time and intensity are made.

Spat collectors, used to catch and record the set, were usually placed in the water long before setting of oysters was expected to begin. This was done because the same collectors were also used for observations on setting of starfish which, as a rule, begins 2 or 3 weeks prior to the beginning of oyster setting. The collectors were changed twice a week being always replaced by new, unused duplicates. Recovered bags were brought to the laboratory where the shells were examined and the number of set counted under low-power microscopes. The research boat Shang Wheeler was used in these studies, as well as in routine observations on the conditions in Long Island Sound, including examination of cultch (loose shells) planted by oystermen on commercial beds.



Fig. 2 - U. S. Bureau of Commercial fisheries research boat and floating laboratory Shang Wheeler used by Milford Laboratory biologists in their work in Long Island Sound and adjacent waters.

Prior to the beginning of setting the biologists studied the condition of the parent oysters and the degree of ripeness of their gonads. After the beginning of spawning, microscopic forms, present in sea water and called "plankton," were collected at several chosen stations. Oyster larvae, which are minute free-swimming organisms, constitute part of the plankton. The type and number of organisms of the plant and animal groups found in the samples helped the scientists to anticipate the biological events that were to follow. Routine observations on temperature and salinity changes of the water at the collecting stations were also made.

Plankton studies early in the 1961 season indicated that, as demonstrated by the presence of numerous young larvae in the water

samples, spawning of oysters began as usual. However, somewhat later, bivalve larvae at most of the stations became scarce or virtually entirely absent. This phenomenon coincided with a heavy bloom of dinoflagellates, a name given to microscopic forms which cause the so-called "red water." Several years ago, on the basis of laboratory experiments with "red water" organisms, we suggested that the products of their metabolism discharged in the surrounding water unfavorably affect oyster eggs and young larvae. We presume, therefore, that under natural conditions the external metabolites of dinoflagellates, represented last summer principally by *Prorocentrum micans*, certain species of *Gymnodinium*, and related forms, also affected the development of oyster eggs and larvae.

Dinoflagellates were present in extremely large numbers until approximately August 10. After that the water of Long Island Sound became considerably clearer but, because "red water" organisms had been prevalent during a large part of the oyster setting season, they had already caused damage.

The first set was recorded on July 21. At the basic stations setting was first observed on July 29, simultaneously at Stations 2, 4, 5, 6, and 7. This was a very light setting, indicating that only a few larvae managed to survive. During the next two weeks the intensity was even lighter, and during the week of August 12-18 setting was recorded only at Station 6.

Between August 19 and 25 setting of a more general nature was recorded in all three major areas of observation. The peak took place between August 26 and September 1, setting being recorded at all stations except Station 10. After this peak the intensity of setting sharply declined and after September 8 some stations caught no new set whatsoever. The last set of the season found at any of the stations, basic or auxiliary, was recorded on October 7 at Station No. 1.

On a percentage basis, approximately 8 percent of the season's total set took place during the week of July 29-August 4. Setting during the next week constituted about 2 percent of the season's total, and in the following week, only about 0.2 percent. The week of August 26-September 1, representing the peak of setting, accounted for approximately 54 percent of the total set. During the week

of September 2-8 it decreased to 14 percent and the following week, to approximately 2.5 percent. In general, over 80 percent of the season's total set was confined to a three-week period, beginning August 19 and ending September 8, 1961.

A comparison of the intensity of setting at the ten stations showed that Station No. 5, located on the State spawning bed in New Haven Harbor, occupied first place. Station No. 6, also located in New Haven Harbor and not too far from Station No. 5, ranked second, although considerably lower in intensity than Station No. 5. A disappointing feature of the season was that Station No. 10, which for years ranked as the most promising set-producing area, was one of the poorest. Considering the recent history of this station several oyster companies, early in the summer, planted large numbers of shells in its vicinity but, unfortunately, their efforts met with failure.

Considering the combined set of the ten stations as 100 percent, the season's set at Station No. 5 constituted 45.42 percent of the total. Station No. 6 produced 15.14 percent and Station No. 4, 8.53 percent. All these stations are located in New Haven Harbor. Station No. 10, however, received only 1.49 percent of the total set, thus being only slightly higher than the two lowest stations, 3 and 7.

We cannot offer a satisfactory explanation for the variations, or, in some instances, stability from year to year in the relative productivity of the stations in different areas. Many reasons and, of course, speculations can be advanced, most of them unfortunately, unverified. Nevertheless, there is little doubt that the intensity of setting at all stations depends, to a considerable extent, upon the in-shore system of minor water currents. These currents are usually well defined and are of a rather definite pattern but, nevertheless, in some instances, their directions may so change that the larvae will be carried away and metamorphose in other areas.

The second assumption, why setting at Station No. 10 was a failure, is that the oyster bed from which the larvae populating this station normally originated, was destroyed or that spawning there was a failure, and therefore, no larvae, or very few of them reached maturity and set at or near that station.

As already mentioned, the observations on time and intensity of oyster setting in Long Island Sound were carried on for 25 years. During this period settings poorer than in 1961 were recorded only on three occasions, i.e., 1943, 1954, and especially 1957, which was virtually a complete blank. The 1961 set, therefore, contributed very little to the oyster population of Long Island Sound and to the New England oyster industry in general.



Fig. 3 - Biologists of Milford Biological Laboratory counting seed oysters on cultch dredged from oyster beds located in different parts of Long Island Sound. Simultaneously with counting of set, condition of young oysters is noted, as well as presence or absence of their enemies and competitors.

Considering that the oyster reserves prior to the setting of 1961 were extremely low and that the starfish set in the summer of 1961, although not too heavy, survived and grew extremely well, significantly adding to the already existing starfish population, the situation of the Connecticut oyster industry is critical and all possible measures should be taken to save it from total destruction. We strongly believe that the application of hatchery methods for the production of seed oysters, which have been developed and perfected largely at the Milford Laboratory, and use of chemical methods to control oyster enemies as soon as they are approved by the Food and Drug Administration, may be the decisive measures in helping to reverse this critical situation. These measures will help to recreate a new healthy aquatic industry guided by scientific principles and newly acquired knowledge. In other words, the progress of aquaculture should resemble that of agriculture and animal husbandry which is still advancing because of the proper application of scientific discoveries

made in the fields of genetics, pest control, and a better understanding of the physiological and ecological requirements of terrestrial plants and animals.

Note: For a more detailed report, write to Milford Biological Laboratory for a free copy of "Bulletin No. 9."

- V. L. Loosanoff,
Laboratory Director,
Biological Laboratory,
U. S. Bureau of Commercial Fisheries,
Milford, Conn.



Research Grants

FELLOWSHIP GRANTS TO BE AWARDED FOR FISHERIES RESEARCH:

Launching of a new program of fellowship grants in the field of fisheries and oceanographic research was announced on December 22, 1961, by the U. S. Department of the Interior. Invitations to participate in the program were sent early in January 1962 to qualified educational institutions. Approximately 15 two-year fellowships will be awarded in 1962 from appropriated funds totaling \$200,000.

With this program, the Department said, the Fish and Wildlife Service's Bureau of Commercial Fisheries "hopes to attract and assist the scientific manpower necessary to further its objectives for the Nation's welfare and thus aid the advancement of the overall aims of the National Oceanographic Program, particularly in the field of fishery research.

A panel of six representatives of universities and private research institutes met with Department officials to advise on rules, policies, and procedures for making the grants and the scope of research areas to be covered.



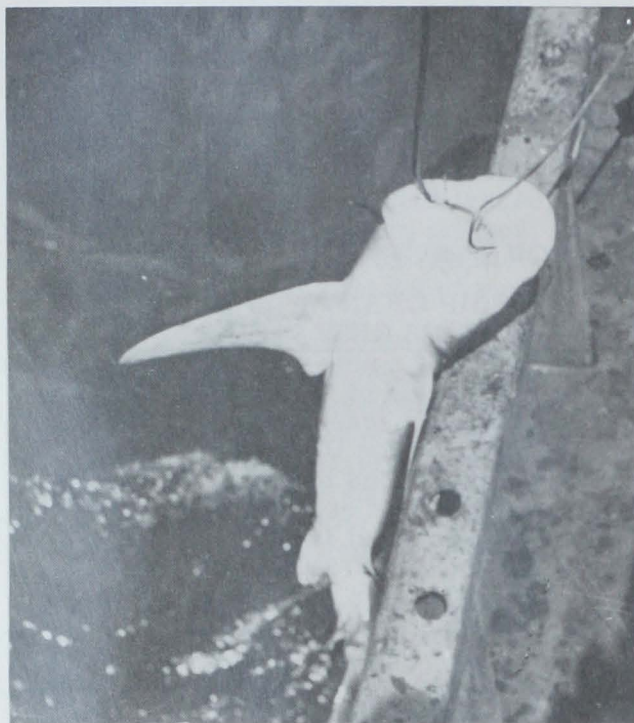
Sharks

INTERIOR DEPARTMENT REPORTS ON ATLANTIC SHARK AND GAME FISH STUDY:

A total of 311 sharks was taken in a recent two-months research project coordinated by the U. S. Fish and Wildlife Service in the Middle Atlantic Bight, the U. S. Department of the Interior reported on December 18, 1961. The study was undertaken to determine the abundance and food habits

of sharks in the area and to serve as a pilot survey extending from Long Island to Cape Henlopen, Del., and seaward to the edge of the Continental Shelf, of oceanic conditions affecting the distribution and abundance of marine game fishes.

Results showed there were more large sharks in the area than anticipated, suggesting that important relationships of sharks to environmental conditions and to sport fishing may exist.



Dusky shark being gaffed aboard a research vessel.

The 311 sharks taken represented 10 species, 7 of which have reputations of being dangerous to man--the great white shark, mako, tiger, sandbar, dusky, and two species of hammerhead. The largest specimen, a 12-foot tiger shark, weighed 1,100 pounds. The smallest shark weighed 1.5 pounds.

Several big game fish were taken: albacore, bluefin, and yellowfin tunas; dolphin, swordfish, and white marlin. The largest was a 247-pound yellowfin.

Examination of the shark stomachs indicated the sluggish species fed upon bottom-dwelling fish, but the swiftly swimming great white shark and the mako fed upon bluefish and other active fish. Garbage, such as fish heads, beef cuttings, and bacon and sausage, was eaten. Even aluminum foil was consumed. Chumming material used to entice sport fish to the vicinity of fishing boats was found, as well as waste which could only have come from ocean-going vessels or from garbage scows.

Eight 3- to 5-day cruises were made between August 13 and October 13. Three types of gear used were long lines, two to 10 miles in length; 1,500-foot gill nets; and 2,000-foot chain gear set for bottom fishing.

Shark catches declined when surface water temperatures went down in late September and early October. Continuous

surface temperature recording was maintained on all cruises and 300 surface-to-bottom temperature profiles were obtained. Over 1,000 surface-drift bottles and bottom-drift indicators were released, and 300 water samples were taken for laboratory examination for salinity and other chemical constituents.

The 1961 research was planned and coordinated by the Sandy Hook (New Jersey) Laboratory of the U. S. Bureau of Sport Fisheries and Wildlife. Agencies cooperating in the project included the U. S. Bureau of Commercial Fisheries; the Delaware Game and Fish Commission; Lamont Geological Observatory of Columbia University; New Jersey Conservation Department; the Aquarium of the New York Zoological Society; and the United States National Museum, Washington, D. C.

It was the first cooperative study of its kind and may serve as a basis for similar studies along the coasts, the Fish and Wildlife Service said.



Shrimp

UNITED STATES SHRIMP SUPPLY INDICATORS AS OF DECEMBER 31, 1961:

Item and Period	1961	1960	1959	1958	1957
(all heads-off)(1,000 Lbs.).....				
<u>Total Landings, S. Atl. & Gulf States:</u>					
December	6,600	7,097	8,716	8,099	6,718
November	9,800	14,454	12,412	12,416	9,302
January	5,688	4,800	4,310	5,254	6,220
January-December .	92,045	141,035	130,659	116,552	116,238
<u>Quantity used for Canning, Gulf States 1/:</u>					
December	800	977	1,278	1,943	882
November	2,300	1,614	2,312	3,424	953
January	199	289	308	146	114
January-December .	15,737	28,594	24,679	26,404	18,386
<u>Frozen Inventories (as of end of each month) 2/:</u>					
December	19,975	40,913	37,886	32,844	21,719
November	20,608	37,264	37,334	30,211	22,326
October	17,811	31,209	33,057	24,620	20,362
January	37,842	34,332	30,858	17,963	15,074
January-December, monthly avg.	23,186	25,954	27,297	18,008	13,627
<u>Imports 3/:</u>					
December	4/	12,411	10,611	10,447	6,865
November	14,852	13,516	10,269	10,617	6,789
October	16,813	14,211	15,340	11,463	9,237
January	12,338	8,596	8,238	5,696	5,679
January-November .	110,840	101,007	95,944	74,946	62,812
January-December .	4/	113,418	106,555	85,394	69,676

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 1961 are preliminary. December 1961 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

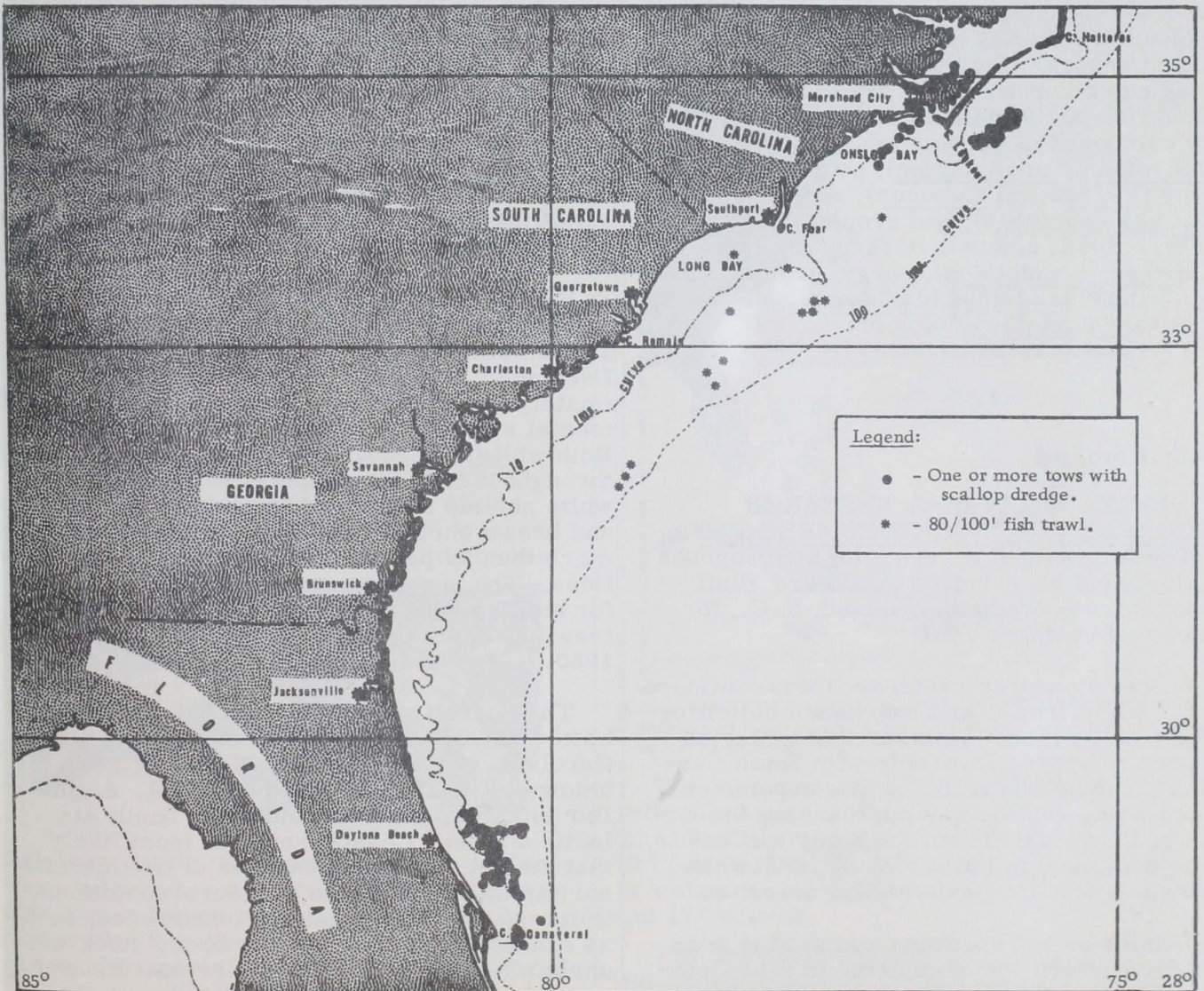
EXPLORATORY FISHING FOR CALICO SCALLOPS AND SNAPPERS:

M/V "Silver Bay" Cruise 35 (November 28-December 15, 1961): Exploratory fishing for calico scallops and snappers was the purpose of Cruise 35 by the M/V Silver Bay of the U. S. Bureau of Commercial Fisheries. The vessel returned to Brunswick, Ga., December 16, 1961, after the 18-day cruise between Cape Canaveral, Fla., and Cape Lookout, N. C.

The first portion of the cruise was devoted to additional calico scallop dredging

on the Cape Canaveral bed, with the majority of the fishing effort taking place in the northern section extending from Cape Canaveral to Daytona Beach. The second portion of the cruise was devoted to bottom trawling explorations between Cape Lookout and Savannah, and scallop explorations in an area near the Core Banks calico scalloped.

Off Daytona Beach catches of calico scallops ranged up to 30 bushels per 30-minute drag using an 8-foot tumbler dredge. In this general area, commercial catches were made consistently for 20 miles from west to east and for 30 miles from south to north in the 13- to 16-fathom depth range. The best catches were made in 14½ fathoms where the scallops were predominantly large (50 to



M/V Silver Bay Cruise 35 (Nov. 28, 1961 to Dec. 15, 1961).

65 mm. in width) and in prime condition. Meats ranged from 80 to 120 count per pound. The largest catches were comprised of less than one percent of trash and sorting was therefore unnecessary.

Twenty-seven drags on the scallop bed off the Core Banks Bed previously defined by the M/V Silver Bay produced catches only as high as 0.8 bushel per 30-minute drag. Shell size was large (60 to 70 mm. in width) and the meats were fair to poor. There was no evidence of a high mortality (large amounts of dead shell) or replacement stock (small seed scallops).

Fourteen drags using an 80/100 roller-rigged fish trawl with funnel flappers were made between Cape Lookout and Savannah. One 1,477-pound catch at 33°15' N., 77°51' W., included 550 pounds of large (16"-18") vermilion snapper (Rhomboplites aurorubens). Other catches ran as high as 2,195 pounds of mixed fish per 90-minute drag and were usually composed of varying amounts of tomtate (Bathystoma aurolineatum), scup (Stenotomus), porgy (Pagrus and Calamus), grey triggerfish (Balistes capriscus), and grouper (Mycteroperca). Small amounts of large croakers (Micropogon undulatus), porgy, grouper, and red snapper (Lutjanus blackfordi) were taken off Savannah in 35-50 fathoms.

Note: See Commercial Fisheries Review, Jan. 1962 p. 29.



South Carolina

FISHERIES BIOLOGICAL RESEARCH PROGRESS, OCTOBER-DECEMBER 1961:

The following is a report on the progress of biological research by the Bears Bluff Laboratories, Wadmalaw Island, S. C., for October-December 1961:

Oyster Research: Research was continued on the use of solite as a substitute cultch for oyster cultivation. Thus far this material has not compared favorably with South Carolina steamed shell. Since this experiment began when spatfall was approaching the bottom of its annual curve, the study will have to be continued in the spring of 1962 when young oysters are again setting on cultch.

Studies on the spawning and setting season for oysters was completed in mid-October. These studies indicated a relatively heavy oyster set during the 1961 season.

A state-wide survey was conducted to determine the degree to which oysters are infested by the sporozoan parasite Nematopsis ostrearum. This pest of oysters is not harmful to man and, actually, seems of little consequence to oysters. From samples taken throughout the State, there seems to be little correlation between the relative abundance of this pest and water temperatures, salinities, or elevation of the oysters in relation to the low-water mark.

In connection with the mapping of oyster beds under lease in South Carolina being carried on as a joint program by Laboratory and the State's Division of Commercial Fisheries, the Laboratory has put special emphasis on locating and mapping subtidal oyster beds. These are extremely rare in South Carolina waters, but appear to have increased in extent in the past few years. This is coincident with an increase in annual rainfall. The resulting lowered salinities had served to hold and check infestation of oysters by boring sponges, one of the most serious pests of oysters in the State. However, a decided lack of rainfall in the past quarter has raised salinities, and the boring sponge is again very prevalent on subtidal beds.

Shrimp Research: Shrimp survey records are now complete through December of 1961. These records show that during October-December 1961, white shrimp were approximately 53 percent less abundant at experimental stations as in that period in 1960. Both white and brown shrimp were very scarce throughout 1961 as compared with 1960, as white shrimp decreased by over 50 percent and brown shrimp declined in abundance by more than 70 percent at shrimp survey stations. The average catch per unit of effort for both species of shrimp in experimental trawling was 59 percent less in 1961 than in 1960.

The scarcity of shrimp in 1961 has also been evident in the commercial catch of South Carolina, which was more than 50 percent below that of 1960 as of November 1. A similar situation exists all along the South Atlantic and Gulf Coasts, and it is most likely that the decrease in abundance of commercial shrimp this year is due to natural conditions. Quite possibly some natural occurrence, such as excessive mortality of the brood stock of shrimp left over from 1960, prevented successful spawning this year. It is known that postlarval shrimp were very scarce in inshore

waters this year, since minimal numbers were taken in plankton tows at experimental stations.

Five new experimental stations were added to the shrimp survey program during the quarter. These stations extend northward from the Laboratory and beyond Charleston. Establishment of these stations expands the area formerly covered by the Laboratory's shrimp survey, and it is felt that experimental work at those locations will provide valuable additional information on the biology of marine life in South Carolina.

Fish: In this quarter the experimental trawl hauls made at the regular established stations in South Carolina showed that the average catch per unit of effort of whiting and croaker was almost identical with that of the same quarter in 1960. Spot, on the other hand, showed a decline of over 50 per cent.

Crabs: Of the blue crabs taken in experimental trawls, the young and immature crabs showed no change during the time of this report, but mature crabs were about 30 percent less abundant as compared with 1960.

Note: See Commercial Fisheries Review, Sept. 1961 p. 45.



Tagging

BRIGHT COLORS AID TAG RECOVERY:

A total of 1,000 7-inch herring were tagged in Eastern Penobscot Bay, Maine, during October. In addition to the fish tagged with the bright yellow tag, equal numbers of



fish tagged with dark green and scarlet tags were released to determine if color had any effect upon tag recovery. To date yellow has proved five times more effective than green. No scarlet tags have been recovered.



Tuna

MIGRATIONS IN NORTH ATLANTIC STUDIED BY R/V "CRAWFORD":

A significant number of tuna were caught in the North Atlantic in April-May 1961 by the research vessel Crawford of the Woods Hole Oceanographic Institution. Important new information on the distribution and spawning of large pelagic fishes was provided by this cruise of the research vessel.

Long lines were used to fish the area from Cape Cod to Jamaica and back between April 19 and June 8, 1961. A total of 38 sets (15,730 hooks) were made, mostly in areas which had not been explored in this manner at that time of year.



Cruise 62 of R/V Crawford, April 19-June 8, 1961, showing location of long-line stations and catches of bluefin tuna and broadbill swordfish only.

The take numbered 60 bluefin tuna, 33 yellowfin tuna, 13 albacore tuna, 3 blackfin tuna, 2 skipjack tuna, 13 broadbill swordfish, 12 blue marlin, 39 white marlin, 6 sailfish, 11 wahoo, 151 dolphin, 57 miscellaneous fish, and 174 sharks.

The most significant results concerned the bluefin tuna (Thunnus thynnus) and the

swordfish (*Ziphius gladius*). Catches of giant bluefin nailed down a migratory route of the fish into the Bimini-Cat Cay area where they appear regularly late each spring; evidence was also obtained of a similar run along the eastern or Atlantic side of the Bahama Islands. Swordfish were taken in an area where their presence had not been suspected--in the Gulf Stream between Charleston, S. C., and Cape Hatteras.

The route by which the giant tuna reach the Bimini-Cat Cay area has long been a subject of speculation. In recent years vessels of the U. S. Fish and Wildlife Service have found concentrations of bluefin in the Windward Passage in late April and in the Gulf of Mexico through the late winter and early spring. In the Crawford cruise strong evidence was found of a migration route from the Windward Passage through the Old Bahama and Santaren Channels to Cat Cay. In fact, the Crawford made a very heavy catch in Santaren Channel on May 22; two days later and 100 miles to the north the Cat Cay Tuna Tournament enjoyed a record catch of 44 fish after several days of very poor fishing.

Rumors of a run of giant tuna along the outside of the Bahamas have been persistent but unsubstantiated. The Crawford caught them in 9 out of 10 sets between San Salvador and the northern end of the group, some close to shore and others up to 100 miles out, confirming their presence in considerable number over a vast area. Negative results in the Crooked Island Passage and west of Great Inagua Island indicated that the runs on the respective sides of the Bahamas are separate.

Detailed long-line studies of both groups, which could be carried out from a smaller vessel working out of a southern port, might clarify the duration, geographical extent, and volume of the migrations.

Some idea of the tuna route north from the Bahamas was obtained in 12 sets made up the coast as far as Hudson Canyon--they were taken only in sets east of the Gulf Stream, not in the stream or west of it. Another group of giant bluefin further out in the Atlantic was suggested by catches at each of three stations west and southwest of Bermuda.

The swordfish catches were an important and unexpected new development. They were

taken at four stations, the most remarkable being a catch of 8 swordfish and 3 yellowfin tuna on an overnight set of only 60 hooks. The concentrations of swordfish provide new distributional data on this important species and point up the exciting possibility of tracing its migration in more detail by long-line fishing from Cuba northward.

A total of 27 tuna and 22 marlin and sailfish were tagged for the study of migration and population. Bathythermograms, hydrographic stations, transparency measurements, dip-netting, and plankton tows were made in conjunction with all the long-line sets. The stomach contents of the catches were examined to study feeding habits and search for juveniles of the large fish. A wealth of material was gathered for laboratory study and many larvae were hatched and preserved along with matching egg samples.

The gonads of the captured fish were examined to determine their condition relative to spawning. Ovaries of bluefin taken east of the Bahamas contained more eggs than any previously examined and were the largest yet encountered, some pairs weighing up to 25 pounds. A fully ripe female white marlin was caught off Walter Cay, adding to our knowledge of the spawning habits of this species. Measurements of body proportions and fins and counts of fin rays and gill rakers were also made.

The cruise was supported by funds from the National Science Foundation and the U. S. Hydrographic Office. The U. S. Bureau of Commercial Fisheries in Gloucester, Mass., furnished long-line gear. Scientists from the Fish and Wildlife Service and Harvard University, the Bingham Oceanographic Institution at Yale, and the American Museum of Natural History took part in the cruise.

It was the second important long-line cruise for the Crawford, a 125-foot converted Coast Guard cutter. In November 1960 the vessel cruised off the continental shelf along the New England coast and pinpointed the whereabouts of the bluefin tuna at that time of year.

Note: Also see p. 1 of this issue.

* * * * *

TAGGED BLUEFIN SWIMS ACROSS NORTH ATLANTIC OCEAN:

A giant bluefin tuna that swam across the North Atlantic Ocean from the Bahamas to

Norway in less than four months was reported by the Woods Hole Oceanographic Institution on November 1, 1961. The fish was tagged off Cat Cay in the Bahamas on June 10, 1961, according to the scientist in charge of the Institution's tagging program. The tag was recovered near Bergen, Norway, on October 6, 1961.

The distance between the two points is more than 4,500 nautical miles. The time between tagging and recovery was 118 days. That means an average speed of at least 33 miles per day, assuming the fish started the day it was tagged, swam steadily in a beeline for Norway, and was caught the day it got there. The cruising speed of the giant bluefin is thought to be about three knots. This fish may have had some help from the Gulf Stream during part of the trip.

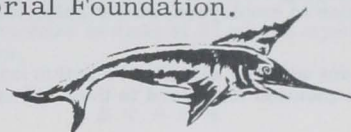
The tag was the first transatlantic recovery from a giant bluefin since the scientist in charge of the Institution's tagging program began the program in 1954. Two much smaller bluefin tagged off Martha's Vineyard, Mass., in July 1954, were recovered by French fishermen in the Bay of Biscay about five years later. In those cases, however, the time lag was too great for any meaningful observations except the fact that they made the ocean crossing.

The scientist noted that the latest recovery was interesting not only because of the short time and long distance involved but because the long migrations of tuna are usually thought to occur in the spring and fall rather than the summer.

The long-distance swimmer was tagged by two sport fishermen participating in the tagging program: the owner, from Wilmington, Del., and the skipper, from Ft. Lauderdale, Fla., of the sportfishing boat Caliban II. Between them they have tagged nearly 100 giant tuna. The one they tagged on June 10 weighed about 350 pounds.

The recovery of the tag was reported by a scientist of the Norwegian Institute of Marine Research in Bergen. He said the tag came from a catch of 192 bluefin brought in by a commercial seiner. It was only by a stroke of great luck that the tag was noticed at all, for it was found lying on the dock after the catch had been unloaded. The tag is a bright yellow streamer attached to the fish with a small barb. Each tag is numbered and bears a legend, in several languages, offering a reward for its return.

The Woods Hole Institution's tagging program is aimed at learning more about the migratory habits and growth patterns of the tuna and other large fish such as marlin and sailfish. So far more than 4,500 fish have been tagged, by scientists and cooperative sportsmen: 30 tags have been recovered. The program is supported by the National Science Foundation and the Charles W. Brown Jr. Memorial Foundation.



U. S. Foreign Trade

"E" AWARDS FOR EXPORT EXPANSION:

Secretary of Commerce Luther H. Hodges on December 19, 1961, called on American industry to engage in friendly competition for President Kennedy's new "E" awards for export expansion. The Secretary said he hoped to be able to announce the winner of the first "E" early in 1962, adding that several hundred inquiries were received from companies, financial institutions, and trade associations following the President's announcement of the new program on December 5.

"American industry has a vital role to play," Secretary Hodges said. Through the expansion of exports, it can make substantial contributions to the raising of living standards throughout the world, to the creation of jobs and profits here at home, to the maintenance of a more favorable balance of payment situation which, in turn, will help our country to continue to meet its commitments.

"It is for such contributions as these that the President's "E" will be awarded. It is our hope that the future of the "E" symbol in peacetime will be as glorious as was her past in wartime."

Expressing the hope that the first "E" winner could be selected from a field of at least 10,000 nominees, Secretary Hodges outlined ground-rules for administration of the program.

The former Army-Navy "E" for wartime production efficiency has been revived for excellence in export expansion and will be administered by the Commerce Department, in cooperation with a number of other government agencies. Nominations for awards may be submitted by any individual or company to the Commerce Department or any of its 34 field offices.

Nomination forms will be available at all Commerce Department offices, and through the Departments of Interior, Agriculture, and the Small Business Administration.

Completed nominations will be referred to appropriate Commerce field offices, and reviewed by the Department's Regional Export Expansion Committees. These are groups of volunteer international businessmen located throughout the United States.

Local committees will recommend approval or rejection of nominations to an Awards Committee composed of representatives of Commerce, Interior, and Agriculture departments, Small Business Administration, and other government agencies which will be consulted in areas of their specialized competence.

"E" flag awards will be conferred upon companies which: (1) Demonstrate a substantial increase in export sales on a sustained basis; (2) Successfully introduce a new product into the United States export trade; (3) Develop a market abroad for an existing product not previously exported; (4) Effect a breakthrough in a foreign market where competitive conditions are extremely

difficult; (5) Open a new trade area previously closed to American competition.

The "E" Certificate of Service will be awarded to such non-exporting individuals and organizations as banks and trade associations for novel and successful solutions to foreign trade problems, and contributions to the expansion of exports through superior marketing, promotion and other efforts.

Winners of the flag awards will be authorized to fly the blue and white banner over their plants and offices, to display the accompanying certificate of commendation, to issue "E" lapel pins to employees, and to refer to the award in advertising.

"E" certificate winners will also be authorized to issue lapel pins and to mention the award in their advertising.

* * * * *

EDIBLE FISHERY PRODUCTS, NOVEMBER 1961:

Imports of edible fresh, frozen, and processed fish and shellfish into the United States during November 1961 rose 7.9 percent in quantity and 6.0 percent in value as compared with October 1961. The increase was due primarily to greater imports of frozen fillets other than groundfish, frozen albacore tuna, canned tuna in brine, fresh and frozen salmon from Canada, and canned sardines in oil and not in oil.

Compared with the same month in 1960, the imports in November 1961 were up 14.9 percent in quantity and up 28.0 percent in value. The increase in value was due to the higher prices for nearly all imported fishery products. The general increase came about because of more imports of all types of frozen fillets, shrimp, oysters, scallops, fresh and frozen salmon, canned tuna, and canned sardines. These increases were offset somewhat by declines in the imports of frozen tuna and canned salmon. The increase in canned sardines was due to the light supplies in the United States because of substantial drops in the packs of Maine and California sardines in 1961.

United States exports of processed fish and shellfish in November 1961 were up 50.6 percent in quantity and 58.3 percent in value as compared with October 1961. Compared with the same month in 1960, the exports in November 1961 were down 21.9 percent in quantity and 17.4 percent in value. The lower exports in the first 11 months of 1961 as compared with the same period in 1960 were due to substantial declines in the exports of canned shrimp, salmon, California sardines, squid, and frozen salmon. United States supplies of all those products towards the end of 1961 were light. The only significant increases were in the exports of canned mackerel and frozen shrimp to Japan. But frozen shrimp exports tapered off sharply after July because United States landings were down sharply.

* * * * *

EDIBLE FISHERY PRODUCTS, OCTOBER 1961:

Imports of edible fresh, frozen and processed fish and shellfish into the United States during October 1961 rose 12.8 percent in quantity and 21.3 percent in value as compared with September 1961. The increase was due primarily to greater imports of frozen fillets other than groundfish, frozen albacore tuna, canned tuna in brine, fresh and frozen salmon from Canada, canned sardines in oil and not in oil, frozen spiny lobster tails, frozen shrimp, and oysters. The increase in value was greater than the increase in quantity because prices were higher and the increase in imports was in the higher-priced products.

Compared with the same month in 1960, the imports in October 1961 were down 4.0 percent in quantity but up 8.1 percent in value. The increase in value was due to the higher prices in 1961 for nearly all imported fishery products. The drop in quantity came about because of smaller imports of frozen tuna, fresh and frozen salmon, canned salmon, and canned oysters. The substantial declines in the products mentioned were not offset by increases in the imports of frozen groundfish and other fillets, canned tuna, canned sardines in oil and not in oil, canned crab meat, shrimp, and Canadian scallops.

United States exports of processed fish and shellfish in October 1961 were up 100 percent in quantity and 71.4 percent in value as compared with September 1961. Compared with the same month in 1960, the exports in

U. S. Imports and Exports of Edible Fishery Products,
November 1961 with Comparisons

Item	Quantity			Value		
	Nov.	Year	Year	Nov.	Year	Year
	1961	1960	1960	1961	1960	1960
	..(Millions of Lbs.)..			..(Millions of \$)..		
Imports:						
Fish & Shellfish: Fresh, frozen & processed ^{1/} . . .	100.9	87.8	1,011.2	33.8	26.4	304.8
Exports:						
Fish & Shellfish: Processed only ^{1/} (excluding fresh & frozen) . . .	3.9	5.0	48.7	1.9	2.3	19.2

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

U. S. Imports of Edible Fishery Products, October 1961 with Comparisons						
Item	Quantity			Value		
	Oct.		Year	Oct.		Year
	1961	1960	1960	1961	1960	1960
..(Millions of Lbs.)..			..(Millions of \$)..			
Imports:						
Fish & Shellfish:						
Fresh, frozen & processed ^{1/} . . .	93.6	97.4	1,011.2	31.9	29.5	304.8
Exports:						
Fish and Shellfish:						
Processed only ^{1/} (excluding fresh & frozen) . . .	2.6	6.1	48.7	1.2	2.8	19.2

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

October 1961 were down 57.4 percent in quantity and 57.1 percent in value. The drop in October 1961 exports as compared with the same month in 1960 was due primarily to lower exports of canned salmon, frozen salmon, canned California sardines, and canned shrimp.

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

The quantity of tuna canned in brine which could be imported into the United States during the calendar year 1961 at the 12½-percent rate of duty was 57,114,714 pounds (about 2,720,000 std. cases of 48 7-oz. cans). Any imports in excess of the quota were dutiable at 25 percent ad valorem.

Imports from January 1-December 2, 1961, amounted to 52,024,510 pounds (about 2,477,000 std. cases), according to data compiled by the Bureau of Customs. Imports for the period were up 11.7 percent as compared with the same period in 1960.

Imports in 1960 for the period January 1-December 3 amounted to 46,563,451 pounds (about 2,217,000 std. cases).

Imports from January 1-December 30, 1961, amounted to 56,252,179 pounds (about 2,678,700 std. cases), according to data compiled by the Bureau of Customs. This was only 862,535 pounds (41,300 cases) less than the quota. Imports for the period were up 11.9 percent as compared with the same period in 1960. However, final data for 1961 may be slightly higher.

Final imports in 1960 amounted to 51,159,003 pounds (about 2,436,100 std.

cases)--2,289,327 pounds (about 109,100 std. cases) less than the quota of 53,448,330 pounds (2,545,200 std. cases). In 1959 the quota of 52,372,574 pounds (2,493,900 std. cases) was reached early in December and final imports for that year of 55,304,542 pounds (2,633,500 cases) exceeded the quota by 2,932,000 pounds or 139,600 cases (this amount was imported at the 25-percent ad valorem rate of duty).

Note: Pounds converted to cases at 21 pounds equal 1 std. case of 48 7-oz. cans.

UNITED STATES EXPORTS AND RE-EXPORTS OF FROZEN SHRIMP TO JAPAN, JANUARY-SEPTEMBER 1961:

With the increase in the prices of frozen shrimp and the light supplies, shipments to Japan slowed up considerably in September 1961. Of the almost 7.4 million pounds of domestic and foreign fresh and frozen shrimp exported and re-exported from the United States during the first 8 months of 1961, 4.9 million pounds were shipped to Japan. A substantial proportion of the shipments to Japan was made from California. A large percentage of the re-exports consisted of shrimp imported into the United States from Mexico.

U. S. Exports and Re-Exports of Fresh and Frozen Shrimp ^{1/} to Japan, January-September 1961				
Type of Product	July	August	Sept.	Jan.-Sept.
 (1,000 Lbs.)			
Domestic	1,211	243	17	1,917
Foreign	1,137	254	40	2,999
Total	2,348	497	57	4,916

^{1/}Although data appear under the "fresh and frozen shrimp" category, it is believed that all of the exports were frozen shrimp.

Exports and re-exports of shrimp to Japan from California were negligible prior to 1961. But due to a short supply of shrimp in Japan during the first part of that year and a strong market, that country purchased substantial quantities of shrimp from the United States. Most of the Japanese purchases consisted of frozen raw headless brown shrimp, 21-25 shrimp to the pound. But some shipments included 26-30 count, 16-20 count, and under 15 count.

Note: See *Commercial Fisheries Review*, Jan. 1962 p. 36, Dec. 1961 p. 52, Nov. 1961 p. 35.



Vessel Mortgage Insurance Program

APPLICATIONS RECEIVED AND APPROVED IN 1961:

During calendar year 1961 a total of 9 applications for mortgage insurance were received by the U. S. Department of the Interior under its program for insuring mortgages on fishing vessels. The mortgages covered by the applications totaled \$1,277,500. The program was started in January 1961 when the application of an Alaska salmon canner was approved for insuring a mortgage of \$75,000 on 10 gill-net vessels built to replace fish traps which have been abolished in Alaska.

Of the 9 applications received in 1961, 5 applications for mortgages totaling \$251,500 were approved by the end of the year. One application for a mortgage of \$534,750 was declined. As of the end of the year, 4 mortgage insurance contracts were outstanding covering mortgages amounting to \$229,500. At the end of the year there were 3 applications pending for mortgage insurance on mortgages amounting to \$491,250.

Under the mortgage insurance program the U. S. Department of the Interior guarantees the lender or mortgage holder the insured amount of the mortgage. Should the borrower fail to pay, the Department pays but has legal recourse to the borrower's assets.

Administered by the Bureau of Commercial Fisheries, authorization for the mortgage and loan insurance program was given the Department in March 1958, when the fishing vessel mortgage program was transferred from the Maritime Administration. In July 1960 the Congress approved a method of financing the program should financing be necessary.

Persons obtaining mortgage insurance pay the Department one percent per year on the average unpaid balance of the loan. The money is deposited in a revolving fund which is available to pay claims.

Note: See Commercial Fisheries Review, April 1961 p. 38.



U. S. Fishing Vessels

DOCUMENTATIONS ISSUED AND CANCELLED, NOVEMBER 1961:

During November 1961, a total of 19 vessels of 5 net tons and over were issued first documents as fishing craft, as compared with 27 in November 1960. The number issued first documents the first 10 months of 1961 was 7 less than in the same period of 1960.

Table 1 - U. S. Fishing Vessels^{1/}--Documentations Issued and Cancelled, by Areas, November 1961 with Comparisons

Area (Home Port)	Nov.		Jan.-Nov.		Total 1960
	1961	1960	1961	1960	
..... (Numbers).....					
Issued first documents^{2/}:					
New England	4	2	32	33	35
Middle Atlantic	-	1	11	18	18
Chesapeake	7	8	68	76	78
South Atlantic	1	2	40	46	47
Gulf	6	5	97	85	90
Pacific	1	5	147	141	146
Great Lakes	-	4	12	17	18
Puerto Rico	-	-	2	-	-
Total	19	27	409	416	432
Removed from documentation^{3/}:					
New England	2	1	18	22	22
Middle Atlantic	7	4	29	15	18
Chesapeake	1	3	27	18	21
South Atlantic	3	5	27	36	38
Gulf	12	8	96	84	90
Pacific	19	15	104	80	87
Great Lakes	1	4	17	12	13
Puerto Rico	-	-	-	1	1
Total	45	40	318	268	290

Note: For footnotes see October 1961 table 2, p. 47.

Table 2 - U. S. Fishing Vessels^{1/}--Documents Issued and Cancelled, by Tonnage Groups, November 1961

Gross Tonnage	Issued ^{2/}		Cancelled ^{3/}	
 (Number).....			
5-9	8			9
10-19	6			17
20-29	2			3
30-39	-			3
40-49	-			4
50-59	-			3
60-69	1			1
70-79	2			1
90-99	-			1
100-109	-			1
140-149	-			1
250-259	-			1
Total	19			45

* * * * *

DOCUMENTATIONS ISSUED AND CANCELLED, OCTOBER 1961:

During October 1961, 28 vessels of 5 net tons and over were issued first documents

Table 1 - U. S. Fishing Vessels ^{1/}--Documentations Issued and Cancelled, by Areas, October 1961 With Comparisons

Area (Home Port)	Oct.		Jan.-Oct.		Total 1960
	1961	1960	1961	1960	
 (Number).....				
Issued first documents ^{2/}:					
New England	1	4	28	31	35
Middle Atlantic	-	2	11	17	18
Chesapeake	14	10	61	68	78
South Atlantic	2	1	39	44	47
Gulf	4	9	91	80	90
Pacific	6	7	146	136	146
Great Lakes	1	-	12	13	18
Puerto Rico	-	-	2	-	-
Total	28	33	390	389	432
Removed from documentation ^{3/}:					
New England	1	2	16	21	22
Middle Atlantic	1	4	22	11	18
Chesapeake	-	-	26	15	21
South Atlantic	4	5	24	31	38
Gulf	7	4	84	76	90
Pacific	15	7	85	65	87
Great Lakes	-	-	16	8	13
Puerto Rico	-	-	-	1	1
Total	28	22	273	228	290

^{1/}For footnotes see table 2.

as fishing craft, as compared with 33 in October 1960. The number issued first documents the first 10 months this year was only 1 more than in the same period last year.

Table 2 - U. S. Fishing Vessels ^{1/}--Documents Issued and Cancelled, by Tonnage Groups, October 1961

Gross Tonnage	Issued ^{2/}	Cancelled ^{3/}
 (Number).....	
5-9	12	3
10-19	10	14
20-29	2	3
30-39	1	1
40-49	1	-
50-59	1	1
60-69	1	-
70-79	-	1
80-89	-	2
160-169	-	1
300-309	-	1
960-969	-	1
Total	28	28

^{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: 29 in 1961, 2 in 1960, 1 in 1959, 1 in 1957, and 7 prior to 1951. 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 to the United States, Bureau of Customs, U. S. Treasury Department.



Water Pollution

CONFERENCE TO EXAMINE PROBLEM OF WATER POLLUTION IN PUGET SOUND, UPPER COLUMBIA RIVER, AND IN MICHIGAN:

The U. S. Department of Health, Education, and Welfare on December 20, 1961, agreed to join with the States of Washington and Michigan in two separate interstate water pollution enforcement actions, applying to United States waters and sources of pollution only.

The waters involved in Washington are Puget Sound, the Strait of Juan de Fuca, and the Upper Columbia River and navigable tributaries within the boundaries of the State. The Michigan waters are the Detroit River and its outflow into Lake Erie.

The two actions are the first to be taken under new provisions of the Federal Water Pollution Control Act, which permit the Secretary to invoke Federal enforcement procedures in intrastate waters when invited to do so by a State Governor. First step in the procedure is a conference, which is then followed where necessary by formal hearings and finally, if still necessary, by action in the Federal courts.

The conference in the Washington State case was to be held in Olympia, Wash., on January 16, 1962. As of mid-December 1961 the Michigan State conference had not been scheduled.

A message was sent by the Department to the Governor of Washington. The message follows:

"I am sending you today official notification that the Department of Health, Education, and Welfare will join the State of Washington on January 16, 1962, in a conference to examine the problem of water pollution in Puget Sound and the Upper Columbia River within the State of Washington and their associated waters. This conference will be the first under the provisions of the Federal Water Pollution Control Amendments of 1961, which permit the Federal Government at the invitation of an individual State to take part in an action involving intrastate pollution.

"You and the State Water Pollution Control Agency have shown great leadership in bringing the State and the Federal Govern-

ments together in this action. Inevitably it will affect the welfare and prosperity of the State of Washington for many years to come and will be a most important factor in preserving the great water resources of the entire Northwest."

A message was also sent by the Department to the Governor of Michigan. The message follows:

"This is in response to your letter of December 6, 1961, requesting action under Section 8 of the Federal Water Pollution Control Act to assist the State of Michigan in correcting sources of pollution coming into the Detroit River and subsequently into Lake Erie.

"We shall be most happy to comply with your request. Our technical staff will be in touch with State representatives to determine with particularity the scope of the problems and investigations required.

"I am sure that a cooperative State-Federal approach will be material value in meeting these water pollution control problems of the State of Michigan."



Wholesale Prices, December 1961

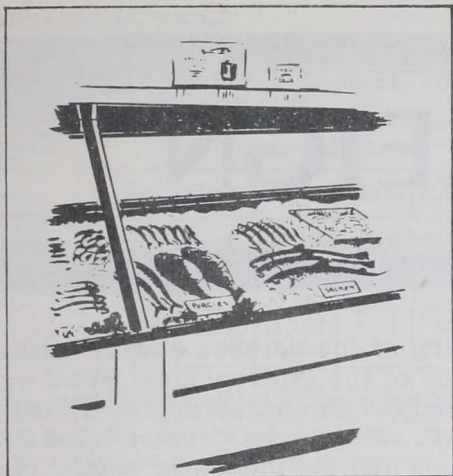
Light supplies of some of the major fishery products were responsible for the increase in wholesale prices from November to December 1961 and from December 1960. Wholesale prices for edible fish and shellfish in December 1961 were up 1.8 percent from the previous month and up 7.8 percent from the same month a year earlier, according to the wholesale price index for edible fishery products (fresh, frozen, canned). There was a steady increase in prices from April through December 1961 except for a slight dip in September.

From November to December 1961, the subgroup index for drawn, dressed, or whole finfish showed the greatest change among the four subgroups included in the index--an increase of 7.1 percent. Light landings of haddock at Boston caused the price of the drawn fresh product to go up 44 percent. Short supplies of yellow pike at New York City raised the prices for that product 33.7 percent. The only

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, December 1961 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices ^{1/} (\$)		Indexes (1947-49=100)			
			Dec. 1961	Nov. 1961	Dec. 1961	Nov. 1961	Oct. 1961	Dec. 1960
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					143.6	141.1	138.1	133.2
<u>Fresh & Frozen Fishery Products:</u>					158.9	154.6	153.0	150.0
<u>Drawn, Dressed, or Whole Finfish:</u>					163.8	153.0	152.5	173.6
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.14	.10	141.8	98.5	107.2	178.0
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.36	.35	109.8	108.3	107.3	92.8
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.86	.85	193.8	191.0	191.0	202.2
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.63	.83	156.2	204.6	171.1	185.9
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.64	.48	148.9	111.4	105.5	117.3
<u>Processed, Fresh (Fish & Shellfish):</u>					161.5	158.8	158.6	146.8
Fillers, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.32	.34	107.2	115.7	108.9	175.2
Shrimp, lge. (26-30 count) headless, fresh	New York	lb.	.92	.88	144.6	138.3	136.7	114.5
Oysters, shucked, standards	Norfolk	gal.	7.88	7.88	194.9	194.9	198.0	185.6
<u>Processed, Frozen (Fish & Shellfish):</u>					133.7	133.9	130.5	115.0
Filets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.39	.39	100.8	100.8	100.8	102.1
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.33	.35	103.6	109.9	103.6	106.7
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.31	.30	124.9	120.8	120.8	118.8
Shrimp, lge. (26-30 count), brown, 5-lb. pk.	Chicago	lb.	.92	.90	141.2	138.1	135.8	106.5
<u>Canned Fishery Products:</u>					121.9	121.8	117.1	109.8
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	28.00	28.00	146.1	146.1	146.1	143.5
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	12.15	12.15	87.6	87.6	84.0	79.3
Sardines, Calif., tom, pack, No. 1 oval (15 oz.), 24 cans/cs.	Los Angeles	cs.	5.00	4.90	116.7	114.4	114.4	89.8
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	12.31	12.31	131.0	131.0	109.7	90.5

^{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.



were up 4.6 percent with supplies still below demand. Fresh shucked oyster prices remained steady. But fresh haddock fillet prices dropped 7.4 percent. From December 1960 to December 1961, the prices for fresh processed fish and shellfish were up 10 percent principally because shrimp prices rose 26.3 percent and shucked oyster prices rose 5.0 percent. A drop of 38.8 percent in fresh haddock fillet prices at Boston prevented the subgroup index from showing a more substantial gain.

As a subgroup, there was practically no change in the index for frozen processed fish and shellfish from November to December 1961. But among the individual products, there were significant changes. While prices of frozen shrimp at Chicago and for frozen ocean perch fillets at Boston rose because of lighter supplies, heavier stocks of frozen haddock fillets caused a price drop for that product of 5.7 percent. However, prices for the subgroup in December 1961 were up 16.3 percent for a year earlier principally because of a 32.6-percent rise in the prices of frozen shrimp at Chicago and to a lesser extent because of an increase of 5.1 percent in frozen ocean perch fillet prices at Boston. Offsetting these increases were slightly lower prices for frozen flounder fillets and haddock fillets at Boston because of more plentiful supplies.

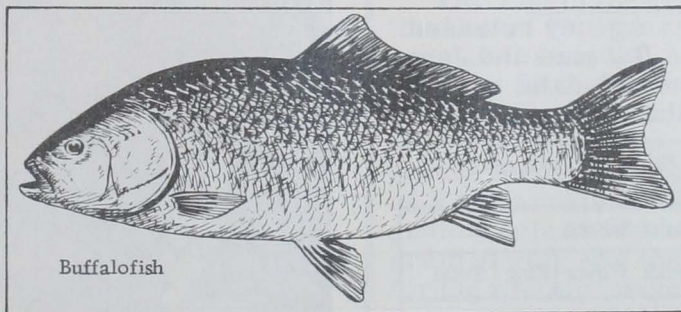
Among the canned fishery products, there was very little change from November to December 1961. There was a very small increase of 2.0 percent in canned California sardine prices because the pack through December was substantially less than in 1960. But canned fishery products prices from December 1960 to December 1961 were up 11 percent because of smaller packs of California sardines and Maine sardines. On the other hand, although the packs of canned tuna and canned salmon in 1961 were greater than in 1960, the demand for those products has more than kept pace with the increased supplies. Canned fish prices were up for all items included--canned pink salmon (up 1.8 percent), canned tuna (up 10.5 percent), California sardines (up 30.0 percent), and Maine sardines (up 44.8 percent).

offsetting decrease occurred in fresh whitefish prices at Chicago which dropped 23.7 percent. Prices for frozen Western halibut at New York City rose 1.4 percent and for frozen king salmon at New York City rose 1.5 percent, in both instances because of good demand. On the other hand prices for this subgroup in December 1961 were down 5.6 percent from the same month in 1960. There were substantial price declines for fresh large haddock at Boston (down 20.3 percent), fresh whitefish at Chicago (down 16.0 percent), and frozen king salmon at New York City (down 4.2 percent). These declines were not quite offset by price increases of 18.3 percent for frozen Western halibut at New York City and 26.9 percent for frozen yellow pike at New York City.

Among the fresh processed products, prices rose 1.7 percent from November to December. Shrimp prices



FISH BIOGRAPHIES



Buffalofish

OTHER NAMES INCLUDE: Winter carp.

CHARACTERISTICS: Lean, firm and flaky, rich flavor.

MARKET SIZE: About 5 to 15 pounds.

MARKET FORM: Whole, drawn, dressed, steaked, filleted, and smoked.