TRENDS AND DEVELOPMENTS

California

SHRIMP STUDY OFF CALIFORNIA COAST CONTINUED:

Airplane Spotting Flight 61-12-Shrimp: The coastline from San Francisco to the Oregon border was surveyed from the air on September 27, 1961, by the California Department of Fish and Game Twin Beechcraft N5614D to locate areas of shrimp trawling.

Although a low lying heat haze was present over the coastal water, visibility was good and the shrimp trawlers were readily identified from the air. The ocean was calm and numerous salmon trollers were seen in the offshore waters. No schools of pelagic fish were seen, nor were any whales or porpoises noted.

Note: Also see Commercial Fisheries Review, Aug. 1961 p. 18.

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INVESTIGATION OF ABALONE RESOURCES CONTINUED:

M/V "N. B. Scofield" and "Mollusk" Cruises 61S4, 61S5, 61M1, 61M2-Abalone: The Channel Islands (Santa Catalina, Santa Barbara, San Clemente, San Nicolas, Santa Cruz, Santa Rosa, San Miguel, and Anacapa) and the area off the mainland at Pt. Loma were surveyed (August 7-20 and August 30-September 10, 1961) by the California Department of Fish and Game research vessels N. B. Scofield and Mollusk. The objectives were (1) to examine areas of commercial abalone diving; (2) to examine established stations; (3) to tag black abalone, Haliotis cracherodii, for growth and movement studies in cooperation with the Santa Barbara Museum; and (4) to collect and photograph species of abalone.

All of the Channel Islands were visited and areas where commercial diving had been conducted were examined. In general, most legal size abalone appeared to have been well harvested. Pink abalone, H. corrugata, on the southwest side of San Clemente Island showed evidence of new and rapid growth. The kelp, Macrocystis, in that area and around the other islands, was quite thick. Recovery of the kelp was still continuing and at San Nicolas Island it has returned in greater concentrations than before the warm-water years.

On the northeast side of Santa Cruz Island the red abalone, H. rufescens, was the dominant species in certain areas. During previous explorations in the same general areas the pink abalone, H. corrugata, was the dominant species.

Red Abalone Shell
(Haliotis rufescens)

Examination of the island stations revealed that considerable changes have been taking place. The most striking was the marked decrease in the numbers of abalone as compared with the last inspection in 1960. At the Catalina stations almost all the abalone have either died (there were great numbers of empty shells of all sizes scattered over the bottom of the station areas) or have disappeared. It is also believed that these areas have been heavily fished for abalone.

In cooperation with the Santa Barbara Museum, approximately 150 black abalone were tagged on Santa Rosa Island for growth, movement, and longevity studies.

Still and moving pictures were taken in black and white and in color of activities of the investigation and of the species of abalone taken.

Note: Also see Commercial Fisheries Review, March 1961 p. 22.

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PELAGIC FISH POPULATION SURVEY CONTINUED:

M/V "Alaska" Cruise 61A6-Pelagic Fish: The coastal waters of central Baja California, Mexico, from Ballenas Bay to Santa Rosalia Bay were surveyed (September 1-16, 1961) by the California Department of Fish and Game research vessel Alaska. The objectives were (1) to survey the sardine population to determine the amount of recruitment from this year's spawning and to measure the population density of older fish; (2) to sample Pacific mackerel, jack mackerel, and anchovies for age and distribution studies; and (3) to make incidental collections requested by other investigations.

Of the 56 night light stations occupied, sardines were present at 11, anchovies at 13, Pacific mackerel at 15, and jack mackerel at 4.

While the vessel was scouting 324 miles between light stations, 327 anchovy, 17 sardine and 3 Pacific mackerel schools were sighted. Many additional anchovy schools were observed during daylight hours while under way and on anchor.

Eight of the 11 samples of sardines appeared to be fish-of-the-year. All fish under 120 mm. were schooled with anchovies. Only one sardine sample of large adults (180-200 mm.) was collected. Most of this sample consisted of fish which were sexually developed for spawning.

All sardine schools sighted were in one small area of Sebastian Vizcaino Bay and appeared to be adults.

Anchovies were observed in unusually large numbers during the 1960 survey. They were distributed over the entire area surveyed, ranging from thin, widely scattered, surface schools to large dense school groups. The dominant size group of anchovies, 70-90 mm. standard length, may have been under-sampled due to their negative phototactic behavior.

Small numbers of Pacific and jack mackerel were taken at light stations, usually with other species.

A sample of white sea bass was collected at Asuncion Bay where they were unusually abundant. The capture of 2 sablefish (Anoplopoma fimbria) in a deep-water free-floating trap off San Benito Islands represents a possible southward range extension.

Sea surface temperatures ranged from 18.2° C. (64.8° F.) at Point San Eugenio to 24.0° C. (75.2° F.) at Ballenas Bay. Fair weather was prevalent during the entire cruise.

Airplane Spotting Flight 61-11-Pelagic Fish: The inshore area from the United States-Mexican Border to Point Reyes, Calif., was surveyed from the air (September 11-14, 1961) by the Department's Cessna "182" 9042T to determine the distribution and abundance of pelagic fish schools.

Except for 1 day in central California weather conditions were unfavorable. Low coastal clouds, fog, and generally poor visibility prevailed over most of the inshore area from Point Arguello to the Mexican Border.

In southern California, fish schools were observed in only 2 places--1 to 2 miles offshore at South Laguna where many small, fragmentary, unidentified spots were being harrassed by a large number of bonito, and near the Seal Beach Ammunition Depot breakwater where there were 8 medium-size anchovy schools.

Many anchovies were in Monterey Bay in a thin, almost continuous band between Capitola and the middle of Fort Ord, in very shallow water. No attempt was made to count the fish because of the lack of school integrity. There were similar anchovy concentrations in Halfmoon Bay and Bolinas Bay, with approximately 25 to 50 schools in each place.

A fairly large school group of fish was present between Gamboa Point and Lopez Point. Although identification was not positive, the 120 schools displayed color and behavior patterns typical of sardines. The schools varied in size from small spots to large, concentrated schools.

Note: Also see Commercial Fisheries Review, Nov. 1961 p. 15.

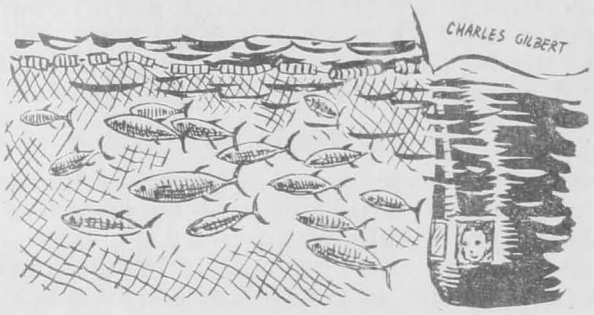
Central Pacific Fisheries Investigations

NEW RESEARCH VESSEL FOR HONOLULU BIOLOGICAL LABORATORY:

Reflecting the growing national interest in exploration of the oceans and development

of aquatic food resources, the U. S. Bureau of Commercial Fisheries received for fiscal year 1962 an appropriation of $1,763,400 for the design and construction of an oceanographic and fisheries research vessel for its Biological Laboratory at Honolulu. Design of the vessel and supervision of its construction will be the responsibility of a firm of naval architects and marine engineers of Seattle, Wash.

While preliminary planning of the new ship has just begun, the general specifications call for a large and versatile vessel with a 10,000-mile cruising range and accommodations for 10 scientists and 20 crewmen. The oceanographic installations will permit collection of water samples and water temperature measurements to any depth and the towing of a variety of plankton nets and midwater trawls for sampling the small marine animals. Tuna and other large fish will be collected for study by means of long lines, gill nets, and trolling gear. The shipboard laboratory will have aquaria for experiments in the hatching and rearing of fish and for holding live specimens for observa-



tion. Underwater glass viewing ports at bow and stern, which were first employed for the study of tuna behavior in the Laboratory's present vessel, the Charles H. Gilbert, will also be a feature of the new ship.

The varied specialized requirements of oceanographic and fishery research vessels are receiving intensive study in many parts of the world, according to the proceedings of the FAO-sponsored conference on research ship design at Tokyo held in 1961.

In the past the Biological Laboratory at Honolulu, like most similar institutions throughout the world, has had to rely to a large extent on adaptations of ordinary commercial fishing boats to meet its seagoing research needs. Of the three vessels with which the Laboratory's scientists have spread a tight network of observations over the expanses of the central Pacific, one was a conventional purse seiner and another was a standard California tuna clipper, neither particularly well suited to oceanographic work. The 118-foot Charles H. Gilbert, the only vessel operated by the Laboratory at present, was built in 1952 specifically for research, but its size imposes limitations on the area that can be covered and the types of observations and studies that can be carried on in the open sea. When the new vessel enters service, probably in 1963, greater scope for observation and collection and a wider range of facilities for study and experimentation will be afforded the Laboratory's scientists.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-AUGUST 1961:

Fresh and Frozen Fishery Products: For the use of the Armed Forces under the Department of Defense, 2.0 million pounds (value $1,082,000) of fresh and frozen fishery products were purchased in August 1961 by the Military Subsistence Supply Agency. This was lower than the quantity purchased in July by 6.2 percent and was 15.9 percent under the amount purchased in August 1960. The value of the purchases in August 1961 was higher by 7.0 percent as compared with July and 9.1 percent less than for August 1960.

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

QUANTITY				VALUE			
August		Jan.-Aug.		August		Jan.-Aug.	
1961	1960	1961	1960	1961	1960	1961	1960
(1,000 Lbs.)				($1,000)			
1,998	2,377	15,001	16,036	1,082	1,190	7,404	8,260

During the first 8 months of 1961 purchases totaled 15.0 million pounds (valued at $7.4 million)--a decrease of 6.5 percent in quantity and 10.4 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 August 1961 averaged 54.2 cents a pound, about 6.8 cents more than the 47.4 cents paid in July and 4.1 cents above the 50.1 cents paid during August 1960.

Canned Fishery Products: Tuna was the principal canned fishery product purchased for the use of the Armed Forces during August this year. In the first 8 months of 1960, purchases of canned tuna were up 95.0 percent and canned sardines were up 16.2 percent as compared with the same period in 1960. Most canned salmon purchases are made at the end of the canning season--usually in September or October.

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

Product	QUANTITY				VALUE			
	August		Jan.-Aug.		August		Jan.-Aug.	
	1961	1960	1961	1960	1961	1960	1961	1960
	. . . (1,000 Lbs.) . . .				. . . . ($1,000)			
Tuna	257	324	4,393	2,254	117	133	1,940	993
Salmon	-	1	2	4	-	1	2	3
Sardine	2	15	115	99	1	6	55	41

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.

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VETERANS ADMINISTRATION AWARDS ON CANNED TUNA AND SALMON:

The following canned fish awards were announced by the Veterans Administration Supply Depot at Hines, Illinois:

Tuna, dietetic--9,940 doz. No. ½ cans at $2.95 per dozen. Awarded to Boston firm, 1½ percent-10 days, f.o.b. Eastport, Maine.

Tuna, light meat, chunk style, in vegetable oil--6,180 doz. 4-lb. cans at $21.15 per dozen. Awarded to San Diego, Calif., canning firm, 1½ percent-20 days, f.o.b. San Diego, Calif.

Salmon, dietetic--10,060 doz. No. ½ cans at $4,995 per doz. and salmon, red or sockeye--21,320 doz. No. 1 cans at $7.8475 per doz., awarded to a Seattle, Wash., firm, 1½ percent-10 days, f.o.b. Seattle, Wash.

Salmon, med. red or coho, with skin and backbone on--2,750 doz. 4-lb. cans at $30.98 per dozen, awarded to another Seattle, Wash., firm, 1 percent-10 days, f.o.b. Seattle, Wash.

Fisheries Loan Fund

LOANS APPROVED, JULY 1-OCTOBER 31, 1961:

From the beginning of the program in 1956 through October 31, 1961, a total of 1,026 applications for $30,363,304 have been received. Of these 536 ($13,267,774) have been approved, 354 ($9,407,216) have been declined or found ineligible, 100 ($5,442,079) have been withdrawn by applicants before being processed, and 36 ($759,330) are pending. Of the applications approved, 208 ($1,486,905) were approved for amounts less than applied for.

The following loans were approved from July 1, 1961, through October 31, 1961:

New England Area: Joseph J. Krawiec, Stonington, Conn., $18,000; Peter Condelli, Medford, Mass., $40,000; Gerald C. McCarthy, South Dartmouth, Mass., $38,000; Leroy A. Cushman, Port Clyde, Maine, $2,500; and George P. Berry, Port Norris, N. J., $4,500.

South Atlantic and Gulf Area: George E. Lipscomb, Magnolia Springs, Ala., $19,000; Waasy T. Franks, Fort Myers, Fla., $13,250; A. I. and C. P. Tormala, Fort Myers, Fla., $15,000; Edgar J. Kirby Construction Corporation, Fort Pierce, Fla., $3,500; E. J. Kirby and Walter Rosslow, Fort Pierce, Fla., $9,000; Clarence W. Hammond, West Palm Beach, Fla., $59,000; Henry and Elizabeth von der Hofen, Galveston, Tex., $16,250; A. B. Allen and James F. White, Brownsville, Tex., $15,350; and Tatum Bros., Brownsville, Tex., $37,200.

California Area: Richard O. Young, Eureka, $28,260; Edward X. Madruga, San Diego, $350,000; Ernest R. Monteiro, San Diego, $113,000; Frank and Cecelia Souza, San Diego, $5,770; and Arnold A. Vidal, San Diego, $120,000.

Great Lakes Area: Melvin M. Erickson, Bayfield, Wis., $2,000.

Hawaii Area: Hajime Yamane, Aiea, $7,540.

Pacific Northwest Area: Glen L. and Kenneth L. Martinson, Oceanlake, Ore., $6,680; and Archie F. Larson, Port Angeles, Wash., $25,000.

Alaska: Patrick D. Robinson, Juneau, $4,975.

Note: See Commercial Fisheries Review, Sept. 1961 p. 23.

Fish Solubles

PATENT ON RECOVERY OF FISH SOLUBLES:

United States Patent No. 2,934,433, dated April 26, 1960, provides for a process for the recovery of fish solubles. A mixture of fish stickwater containing particles of insoluble proteins and dissolved proteins and comminuted raw fish viscera are heated to 170° to 200° F. (76.7° to 93.3° C.) at pH 4 to 8.5 for a time sufficient to peptize and disperse the insoluble proteins. After cooling, the nonprotein solid particles are separated and the remaining liquor is evaporated to a higher solids content.

Florida

FISHERIES RESEARCH, APRIL-JUNE 1961:

Research with funds provided by various sources, including the Florida State Board of Conservation and the U. S. Fish and Wildlife Service is being carried on by the Marine Laboratory of the University of Miami. The research of interest to commercial fisheries which appeared in the Laboratory's June 1961 Salt Water Fisheries Newsletter follows:

Larval Shrimp: Investigation of the seasonal and geographical distribution of the young of the pink shrimp (Penaeus duorarum), the commercial species caught off Key West, has been continued through a contract with the U. S. Fish & Wildlife Service. Collections were made during practically every month and over as wide a geographical area as possible on the Tortugas fishing grounds to give a complete picture of the distribution of pink shrimp larvae there. Specimens were collected from Sanibel Island to south of the Florida Keys, and from the 100-fathom line inshore to 2 fathoms.

Samples obtained during this year revealed centers of abundance of larvae, which are believed to represent a peak of spawning activity on the Tortugas fishing grounds. During the summer peak of spawning, the center of abundance was near the area of maximum fishing effort. In the period November 1960-February 1961, there were fewer larvae at the center of the grounds than in deeper water to the northwest. This suggests that the center of spawning shifted to deeper water. In March and April 1961, the numbers of larvae were greater than in the winter months, and the center of abundance was again in shallower water of from 13-17 fathoms.

Spotted Sea Trout: Specially-designed tagging experiments were carried out on spotted sea trout (Cynoscion nebulosus) in the vicinity of Pine Island, near Fort Myers, during January 1961. The results of the tagging experiments are being analyzed. The preliminary results suggests that mortality due to natural causes, predators, disease, etc. is about five times as high as mortality due to fishing. This result, which will be checked with more information, is not surprising, but it is contrary to the belief held by most fishermen, i.e., that the other fishermen are taking the majority of the fish.

Nonutilized Species Incidental to Shrimp Fishing: The investigations conducted during the past year of utilizing trash fish produced some interesting results.

Economic and mechanical difficulties have discouraged the collection of trash fish from shrimp trawlers in the past, consequently vast quantities of fish have been discarded. The method investigated facilitates the landing and marketing of scrap fish by making possible the storage of fish without refrigeration for extended periods of time.

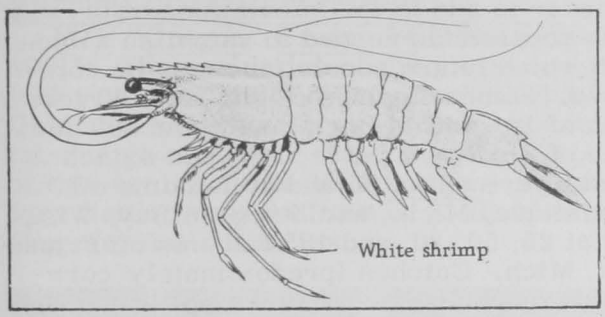
The process consists of an enzymatic hydrolysis or auto-digestion. The fish is digested by its own gastric juices. To prevent bacterial spoilage and the formation of offensive odors, a quantity of acid is added, which also aids the action of the enzymes of the fish.

In the process of hydrolysis the fish becomes liquified, with the formation of two factions: a clear liquid and a semisolid sediment. The liquid contains soluble proteins and fragments of these nutrients; the solids contain undigested fish and minerals.

The "liquid fish" can be used as a starting material for the preparation of fish solubles, fish meal, concentrated pet food, fish hatchery food, or other animal feeds.

If the liquid fish which contains crude protein, can be further hydrolysed and the products refined it can provide food for humans.

Fish Behavior Studies: Experiments on the effects of light upon the pink shrimp (Penaeus duorarum) and the white shrimp (P. setiferus), a project sponsored by the National Science Foundation, are in progress. Preliminary results indicate that under controlled conditions in the laboratory some intensities and wave lengths of light may be more attractive to pink shrimp than food odors. After the shrimp were starved for varying periods, their willingness to cross an electric barrier to obtain food was measured. It was found that a higher voltage was required to prevent them from approaching certain beams of light than to prevent them from approaching the food. These findings have a definite application to shrimp fishing.


White shrimp

A scientist visiting from Japan on a grant from the National Science Foundation has been doing work on the vision of pelagic fish. He has found that certain pelagic fish, for example, the blackfin tuna, do not see clearly things that appear directly ahead of them. The blackfin does focus clearly, however, on objects that are slightly above it. This observation is in keeping with what we know of the swimming and feeding habits of the animal which normally swims at some distance under the surface and feeds on fishes swimming at or near the surface.

Experiments on detection of low-frequency sound by sharks are also in progress. Preliminary results indicate that nurse shark (Ginglymostoma cirratum) and lemon shark (Negaprion brevirostris) are well adapted to experimental procedures and that they learn rapidly in a test situation. This project is sponsored by the office of Naval Research.

Note: See Commercial Fisheries Review, August 1961 p. 25.

Fur Seals

PRICES FOR ALASKA SKINS DROP AT FALL AUCTION:

The autumn 1961 auction sale of the U. S. Government and other foreign-produced fur seal skins was held at St. Louis, Mo., on October 5 and 6, 1961. At this sale, a total of 27,239 seal skins were sold for the account of the U. S. Government at a total value of $2,187,696.

The average price for United States conventionally-processed Alaska seal skins was $86.69 per skin, a decline of 3.8 percent from the spring sale. Average prices received for the various types of skins were; Matara, $81.29 (down 2.6 percent); Black, $91.73 (down 2.0 percent); Kitovi, $84.56 each (down 11.1 percent). The price decline reflects the general decrease in the prices of other high-quality furs.

An encouraging aspect of the sale was the very substantial increase in the price of the sheared female or Lakoda skins. Lakoda skins were first offered for sale in the fall of 1960 when the skins averaged $36.05 each. In the spring of 1961, the price dropped to $11.99. However, at the autumn sale the average price jumped to $41.05 per skin for the 3,805 skins offered for sale, an increase of 242 percent.

Note: See Commercial Fisheries Review, July 1961 p. 18.

Great Lakes Fishery Investigations

LAKE ERIE FISH POPULATION SURVEY CONTINUED:

M/V "Musky II" September 1961: The fish population survey in Lake Erie was continued by the U. S. Bureau of Commercial Fisheries research vessel Musky II. During early September, bottom trawls were towed at 8 stations in the Sandusky, East Harbor, and Island areas. The catches, particularly of yearling and older fish, were lighter than expected. An average of 553 fish was taken per 10-minute tow, of which 75 percent were young-of-the-year (mostly white bass, yellow perch, alewives, gizzard shad, and spot-tail shiners; sheepshead and channel catfish were caught in fair numbers at the Sandusky Bay station, and a total of 9 yellow pike or walleyes, averaging 7.0 inches in length, was taken at 3

stations). Surface water temperatures at the western end of the lake averaged 76° F.

Operations of the Musky II for the remainder of the month were highlighted by a 2-week fishery-limnological cruise to central and eastern Lake Erie and western Lake Ontario. Bottom samples were collected and complete water analyses were made at 9 stations established in Lake Erie by the Cisco in 1957; bathythermograph casts and Secchi-disc readings were made and surface water samples were taken at 7 other localities in the central basin. An overnight gill-net set (300 feet each of 2-, $2\frac{1}{2}$-, and 3-inch mesh) northeast of Long Point at 25 fathoms caught 175 smelt, 3 yellow perch, and 1 cisco.

During a 3-day period in western Lake Ontario, near the mouth of the Niagara River, light-meter readings, bathythermograph casts, and oxygen analyses were made at 2 stations and surface water samples were collected at 18 others. Two-day gill-net sets (300 feet each of 2-, $2\frac{1}{2}$-, and 3-inch mesh) at depths of 25 and 50 fathoms took 90 smelt, 9 alewives, and 8 coregonids or chubs of 4 species (Leucichthys artedii, C. kiyi, C. hoyi, and C. reighardi). Trawling was attempted at several locations with little success. Much of the area was unsuitable for bottom tows and appeared to be rather barren. Species taken (average, 107 fish per tow) were smelt, alewives, and spot-tail shiners (mostly young-of-the-year).

En route to Sandusky on the return trip, trawls were towed at stations previously established in Lake Erie, off Dunkirk, N. Y.; Erie, Pa., and Ashtabula, Fairport, and Cleveland, Ohio. A progressive increase in the catch of fish was apparent as the vessel progressed westward. Smelt, white bass, and yellow perch were taken in varying numbers. Water temperature averaged about 66° F., somewhat cooler than in the western end of the lake.

Note: Also see Commercial Fisheries Review, Nov. 1961 p. 19.

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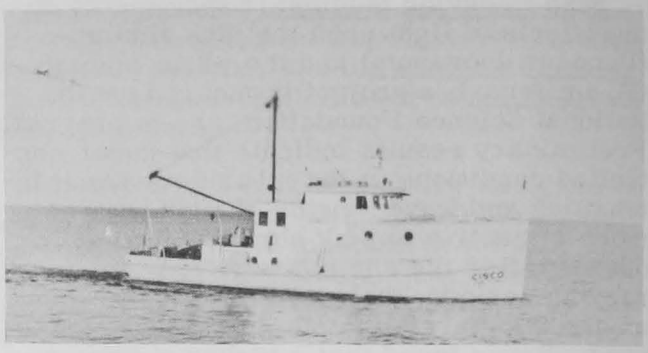
LAKE MICHIGAN FISH POPULATION SURVEY CONTINUED:

M/V "Cisco" Cruise 7: The chub (Leucichthys sp.) population survey in Lake Michigan was continued (September 19-October 3, 1961) by the U. S. Bureau of Commercial Fisheries research vessel Cisco.



Research vessel of the Service's Great Lakes Fisheries Investigations.

Most of the cruise was spent in fishing trawls and nylon gill nets of standard design, in order to add to the information on present chub populations needed to establish a base with which future populations may be compared. Standard gangs of gill nets (50 feet each of $1\frac{1}{4}$- and $1\frac{1}{2}$-inch mesh, and 300 feet each of 2-, $2\frac{3}{8}$-, $2\frac{3}{4}$-, 3-, $3\frac{1}{2}$-, and 4-inch mesh) were set at 25 and 50 fathoms off Manistique, Mich., and Sturgeon Bay, Wis., and at 25, 50, 80, and 135 fathoms off Frankfort, Mich. Catches (predominately coregonids or chubs, Leucichthys sp.) were light in the 80- and 135-fathom sets and moderate in the others.

Six 30-minute bottom tows were made with a 50-foot balloon trawl at 15, 25, 35, and 30 fathoms off Arcadia, Mich. (10 miles south of Frankfort), and at 30 and 50 fathoms off Sturgeon Bay.

The extremely small catches at 35 and 50 fathoms off Arcadia were probably due, at least in part, to a strong current running opposite to the direction of tow, which caused the boat to move appreciably slower than usual at the normal engine speed (strong currents were also noted off Sturgeon Bay). A bathythermograph cast at 35 fathoms indicated that there was an upwelling in the area. The small chub catch at 15 fathoms was to be expected, since water was warm all the way to the bottom at this depth. Some alewives were taken in every tow; the maximum amount caught was 126 pounds, at 15 fathoms off Arcadia. Deep-water sculpins (up to 8 pounds), a few slimy sculpins and smelt, and a single longnose sucker were the only other species caught in the trawls.

Regular hydrographic stations were visited at 40 fathoms off Frankfort, Charlevoix, and

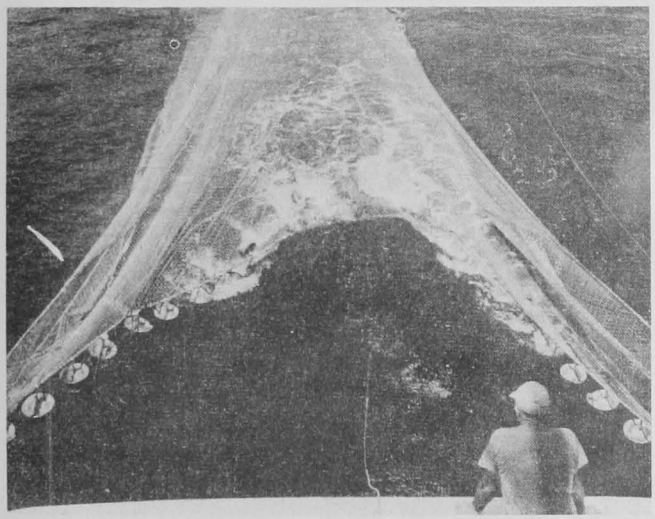
Sturgeon Bay, and at 142 fathoms in midlake between Frankfort and Sturgeon Bay. The surface water, which was cooling during the cruise, ranged from 10.0° to 19.0° C. (50.0° to 66.2° F.). The epilimnion was deepening under the influence of almost constant strong winds, and in places there was complete mixing down to a depth of nearly 25 fathoms.

Note: Also see Commercial Fisheries Review, Nov. 1961 p. 20.

Gulf Exploratory Fishery Program

EXPERIMENTAL MIDWATER TRAWL TESTED AND COMPARED WITH BRITISH COLUMBIA TYPE:

M/V "Oregon" Cruise 74 (March-April 1961): The evaluation of the gross mechanical performance of a "standard" British Columbia midwater trawl and an experimental-design midwater trawl was the purpose of this cruise of the M/V Oregon, exploratory fishing vessel of the U. S. Bureau of Commercial Fisheries.



Setting mid-water trawl showing head rope transducers and camera mount.

The standard trawl (82-foot headrope, 56-foot maximum designed opening) fished on 6- x 3-foot doors was found to spread from 24 to 54 feet vertically and from 12½ to 25½ feet horizontally, depending upon vessel speed. A direct relationship between horizontal spread and increased speed was found in all tests as was an inverse relationship between the vertical spread and increased speed.

A departure from normal trawl construction involving fitting the trawl longitudinally to riblines of precalculated length (in this case 86.6 percent of the stretched mesh measure, since the headrope, footrope, and breastlines were hung in 50 percent of stretched mesh width) was also tested. These tests did not indicate any increase of spread or towing speed over the same net without riblines. Tests of the experimental trawl were not completed due to early termination of the cruise.

Preliminary field tests were conducted with a newly-designed remote control 16 mm. movie camera system designed to obtain a photographic record of gear performance under conditions not suitable for diver observations and to study fish-escapement behavior with respect to the gear. Also, initial experiments were made with a headrope-mounted sonic transducer.

The movie camera (400-foot film capacity) performed as designed. Remote control of the drive motor permits operation of the unit when desired, for example, when fish are observed via the headrope-mounted sonic transducer. Approximately 200 feet of intelligible film taken at a depth of 23 fathoms was obtained on this initial trial.

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EXPLORATORY SHRIMP FISHING IN SELECTED AREAS OF NORTH-CENTRAL GULF OF MEXICO:

M/V "Oregon" Cruise 76A (October 2-8, 1961): To test-fish for shrimp in selected areas in the 25-70 fathom depth range in selected areas of the north-central Gulf of Mexico where exploratory trawling in previous years revealed small, unfished concentrations of brown shrimp (Penaeus aztecus) was the objective of this cruise of the M/V Oregon. This exploratory fishing vessel of the U. S. Bureau of Commercial Fisheries made a total of 27 nighttime tows with 40-, 60-, and 70-foot shrimp trawls in the following areas: I-40 to 72 fathoms southeast of Pensacola, Fla.; II-20 to 56 fathoms south of Gulf Shore, Ala.; III-30 to 52 fathoms east of North Pass (Delta); IV-20 to 48 fathoms south of Southwest Pass (Delta).

Shrimp catches were very poor in all areas. Highest catch rates were obtained in area III in 33 fathoms. There a 70-foot trawl

produced 15 pounds (heads off) of brown shrimp per hour-tow. The few shrimp encountered beyond the 30-fathom curve averaged 12-15 count (heads off).

Six trawl tear-ups resulted from mud bogging in the Delta area.

Three drags of 2-3 hours duration were made in royal-red shrimp depths of 220-240 fathoms. Catches ranged from 60 to 230 pounds of heads-on royal reds. Heads-off count averaged 26-30 shrimp per pound.

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SHRIMP TRAWL OPERATIONAL STUDIES CONTINUED:

M/V "George M. Bowers" Cruise 33: Mechanical studies and underwater photography of Gulf of Mexico shrimp trawls under actual fishing conditions were continued by the M/V George M. Bowers, exploratory fishing vessel of the U. S. Bureau of Commercial Fisheries. Operations were conducted July 20-September 5, 1961, in Ft. Pierce and Panama City, Fla., areas.

The Service's exploratory fishing vessel George M. Bowers.

Trawls photographed were the 40-foot flat, the 40-foot semiballoon, and the 40-foot balloon. One-half scale models of the three 40-foot designs were also photographed. A total of 4,500 feet of underwater film was obtained.

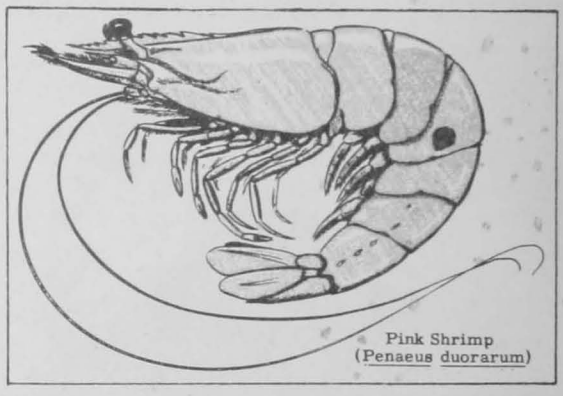
Preliminary field tests of a remote-reading strain gauge system were conducted. Modifications to the sensing elements and readout circuitry were found to be necessary.

A two-way sea sled-to-towing vessel voice communication system was used during all diving operations expediting this phase of the work considerably.

* * * * *

SHRIMP TAGGING NEAR DRY TORTUGAS:

M/V "George M. Bowers" Cruise 34 (September 14-26, 1961): Pink shrimp (Penaeus duorarum) were caught, stained, and released in the immediate vicinity of the Dry Tortugas commercial shrimp grounds by the exploratory fishing vessel George M. Bowers. This trip was in cooperation with the Bureau's Galveston Biological Laboratory. About 2,100 individual pink shrimp of an 86-mm. (±2 mm.) size group were stained with trypan blue and released. Recoveries of these shrimp will provide information regarding growth rate, migration pattern, and mortality of that species.



Pink Shrimp
(Penaeus duorarum)

Originally it was intended also to stain 10,000 shrimp of all sizes with fast green FCF. It was necessary to forego this objective due to the high rate of mortality (75-80 percent) encountered in the holding tanks. Presumably this was the result of the high surface water temperatures during this summer.

Gulf Fishery Investigations

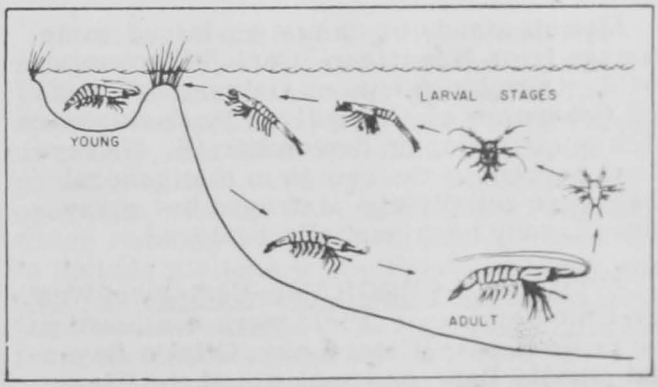
Some of the highlights of studies conducted by the Galveston Biological Laboratory of the U. S. Bureau of Commercial Fisheries during July-September 1961:

SHRIMP FISHERY PROGRAM: Migrations of Pink Shrimp: The final tally disclosed that commercial fishermen turned in 60 and 154 recaptures, respectively, of shrimp stained and released as juveniles at Bottle Key (13,309) in November and Lower Pine Island Sound (32,913) in December 1960. Of the Bottle Key recaptures, 10 came from Florida Bay within 6 miles of the release site and 50 from the Tortugas grounds about 120 miles to the west. Early Pine Island Sound recaptures were all made in the large Sanibel shrimping area west and northwest of Naples. Later ones came from a small section of the Sanibel grounds due west of Redfish Pass. Shrimp in both experiments were still being recaptured 6 months after release. The 50 recoveries from Bottle Key on the Tortugas grounds establish the affiliation between nursery areas in extreme northeast Florida Bay and the Tortugas shrimp stocks.

Mortality and Growth of Pink Shrimp: A dual-purpose study to determine (1) fishing mortality in the fished portion of a pink shrimp population and (2) growth in pink shrimp making the transition from pre-commercial to commercial size, began near the end of the quarter. The study's first phase, execution of two simultaneous mark-recapture experiments, was initiated during the week of September 17, 1961, on the lower edge of the Tortugas fishing grounds. Use of the Bureau's M/V George M. Bowers facilitated this operation. Original plans called for the release of approximately 10,000 shrimp representing all commercial sizes and marked with fast green dye and 1,000 to 2,000 precommercial but uniformly-sized shrimp marked with Trypan blue. Because high water-surface and air temperatures resulted in the larger shrimp suffering excessive mortality during marking operations and prerelease holding periods, the first (or mortality) experiment had to be postponed to a period of more favorable conditions. The second experiment got under way, however, with 2,100 shrimp (84.0 to 87.9 mm. total length) being marked with Trypan blue and released at scattered points on the grounds. As of October 6, 126 had already been recaptured. The underwater shrimp release box designed for this study functioned as expected, and underwater still and motion pictures were made of it in action.

Injecting dye into a shrimp for marking to determine migrations and abundance.

Shrimp Spawning Populations: During the quarter the chartered trawler Belle of Texas made four cruises in the survey area between Freeport and Cameron. Of about 10,000 shrimp caught during those cruises, 36 percent were brown shrimp and 42 percent were rock shrimp, Sicyonia brevirostris. Ovary samples from each of 1,050 females (seven species) were fixed, sectioned, stained, and mounted. Study of these ovary sections is proceeding and will reveal the seasonal reproductive status of the various populations.



Life cycle of shrimp. Spawned in the ocean, the larvae (here greatly magnified) migrate to inshore nursery areas. As the shrimp grow, they return to sea where they support the most valuable of our commercial fisheries.

A cursory check of brown shrimp modal lengths tabulated according to cruise period, sex, and sample depth reveals that: (1) there is distinct sexual dimorphism, (2) size and depth of capture are directly proportional, and (3) recruitment to the offshore stocks begins in June.

This project acquired new dimensions recently when the survey area was expanded to include all waters west of the Mississippi River. Station transects have been positioned within each Bureau of Commercial Fisheries statistical area in order that information obtained with research vessels can be correlated with commercial landing data. Biological data consist of abundance estimates, species composition, length measurements, plankton collections, and ovary samples. Temperature, salinity, and current direction and velocity profiles are determined concurrently. Additional current studies utilizing drift bottles and bottom drifters are anticipated.

Implementing the expanded portion of this project in early September, the M/V Oregon trawled at 40 stations in depths of 30-60 fathoms between the Mississippi Delta and Galveston, and the M/V Belle of Texas at 21 stations between Galveston and Brownsville.

Bait Shrimp Fishery: Bait shrimp production in the Galveston Bay area during July and August dropped measurably below that for the same period in 1960. On the other hand, bait fishing effort showed a corresponding increase, all of which reflects a reduced survival to postlarval and juvenile stages this year. Comparatively poor production in offshore waters has also been a consequence.

All bait stands or camps sustained some damage from Hurricane "Carla" (September 9-13). Only six camps on Galveston Island and two camps on the Bolivar Peninsula were back in operation on September 18. Ninety-three percent of the camps in this general area were completely destroyed but many have already been partially restored.

ESTUARINE PROGRAM: Ecology of Western Gulf Estuaries: Field work continued in the three areas--Clear Lake, Offat's Bayou, and Trinity Bay--and analysis of the Clear Lake data for 1959, 1960, and through June of 1961 has been accelerated.

Plans for expansion of the project in the Galveston Bay system were made. These plans involve remodeling the 40-foot vessel Tommy Box which was obtained on surplus from the Border Patrol in Brownsville, Texas. Remodeling will include the installation of a new Diesel motor and changes to the after-deck and cabin to accommodate instruments and trawling gear. Sampling stations are planned for both upper and lower Galveston Bay as well as East and West Bays. "Deep-water," bay stations; shore stations; and shallow, lake or bayou stations are to be set up.

Effects of Engineering Projects: A total of 56 appraisals were made of engineering projects affecting marine fishery resources. Of this number, only three did not involve Texas waters. The majority resulted from the more than 80 Corps of Engineers public notices screened during the quarter to determine which projects could materially affect marine and estuarine fishery resources. Marine fishery sections of 13 Bureau of Sport Fisheries and Wildlife draft reports on water development projects were reviewed for concurrence or recommendations.

Weekly sampling at 12 stations in Trinity Bay was continued, when conditions permitted, in connection with a study of the effects on Trinity Bay fauna of the Wallisville and Livingston Dam Projects (U. S. Army Corps of Engineers). Sampling at each station includes top and bottom salinity and temperature measurements, surface Secchi disc readings to provide a turbidity index, and a trawl haul for biological specimens. Data from 22 September samples are now being analyzed. This analysis will be of particular interest due to the passage of Hurricane "Carla" through this area on September 9-12, 1961.

Ecology of Eastern Gulf Estuaries: An ecological study of Tampa Bay was inaugurated to study the productive potential of the waters of Tampa Bay as nursery grounds for commercially important species of fish, crustaceans, and mollusks. Samples are being collected weekly from 29 locations distributed throughout Tampa Bay and up to 10 miles offshore. Collections of biological specimens are made with a 15-foot trawl, beach seine, and 1-meter plankton net. Hydrological data obtained concurrently consist of temperature, light penetration, pH, and salinity. Total phosphate-phosphorus and total organic and inorganic nitrogen will be taken at a few stations.

Already 25 families and 38 species of fish have been identified. Most numerous were Anchoa mitchilli, Galeichthys felis, Eucinostomus gula, Orthopristis chrysopterus, Bairdiella chrysura, Leiostomus xanthurus, and Lagodon rhomboides. The first observations indicate presence of high numbers (62-101) of fish in the trawls from the grass bottom areas off Egmont Key, in Terra Ceia Bay, and in Old Tampa Bay. Trawls over muddy bottom in the upper Hillsborough Bay produced relatively high numbers (84) of Galeichthys felis while trawls over sandy bottom were generally poor in fish.

Squids were abundant. Shrimps were the most abundant crustacea. Crabs, pelecypods, and echinoderms were also taken in smaller numbers.

INDUSTRIAL FISHERY PROGRAM: During the quarter an average of nine species comprised landings coming from west of the Mississippi River Delta (West Gulf), specifically in depths of $3\frac{1}{2}$ to 11 fathoms off Wine Island, Timbalier Island, Grand Isle, and West Bay (all in Louisiana). The average catch per tow for this area was 6,153 pounds. East of the Mississippi River Delta (East Gulf) an average of 16 species was present in catches made in 3 to 11 fathoms off Horn Island, Miss.; Petit Island, Miss.; Dauphin Island, Ala.; and Gulf Shores, Ala. The average catch per tow in the East Gulf was 3,702 pounds.

Atlantic croaker continued to be the dominant species in both fishing areas. Atlantic cutlassfish accounted for a significantly greater percentage of over-all landings. A twofold increase for this species was noted in East Gulf catches. Atlantic croaker also increased on both fishing grounds but was apparently more abundant in the East Gulf area. The spot was the only major species which showed a decline in either area.

The two species of sea trout commonly present in industrial catches were not separated until August. Cynoscion nothus, or silver sea trout, nearly always has 27 vertebrae, rarely 26; soft anal rays are predominantly 9; the eye is conspicuously larger in comparison with other sea trout; and the tongue is pigmented over most of its surface. In contrast, Cynoscion arenarius, or sand sea trout, has 25 vertebrae; 10 to 12 soft anal rays; and the tongue is pigmented only at the periphery.

Both species occurred in catches from the East Gulf at depths of 3 to 11 fathoms. In the West Gulf both species were taken from depths of 4 to 6 fathoms. Sand sea trout were six times more abundant in the East Gulf and 1.5 times more abundant in the West Gulf. On East Gulf grounds silver sea trout appeared most abundant in water 8 to 11 fathoms deep.

Silver sea trout evidently do not attain the size of sand sea trout on either the East or West Gulf grounds. The largest silver sea trout and sand sea trout measured 252 and 403 mm. (total length), respectively. In late August fish of both species with translucent ova were found in 9 fathoms at the entrance to Mobile Ship Channel. At the same time, fish of both species containing opaque ova were taken in 4 to 5 fathoms off Wine Island, La.

Examination of scales from silver and sand sea trout disclosed the presence of rings whose structure and distribution suggest them to be annuli. If this be the case, then 3-year classes appear to be present in the silver sea trout, while 4- and possibly 6-year classes represent the sand sea trout. The first- and second-year classes would be interpreted as dominating catches of both species.

Additional sea trout samples are being obtained from offshore stations by the Bureau's M/V Oregon. Life history samples of Atlantic croaker and spot are also being taken from industrial catches. Scales of these species are being examined for legibility and possible use in determining year class composition.

During the quarter 214 five-pound fish samples taken with trawls off the coasts of Texas and Louisiana were processed for species composition, length and weight measurements, and determinations of sex and gonad condition. All were obtained in cooperation with the Shrimp Fishery Program which recently extended its cruise schedule to include stations in the Freeport to Brownsville and Cameron to Mississippi River areas. One 5-pound sample is being randomly drawn from the unsorted catches of 1-hour hauls made once every 3 weeks at each new station. Some 45 stations now make up the cruise pattern.

Data thus far analyzed indicate that the longspine porgy, Stenotomus caprinus, pre-

dominates over the sampling area. Its contribution to the total catch (accumulated since January) was 53 and 40 percent by number and weight, respectively. Other important species included the silver sea trout, Cynoscion nothus, shoal flounder, Syacium gunteri; Atlantic croaker, Micropogon undulatus; rock sea bass, Centropristes philadelphicus; and lizardfish, Synodus foetens.

Longspine porgies examined to date have fallen within the total length range of 60 to 195 mm., their average length varying with sampling depth. Ripe or spent females have only been taken during the period January through May at depths of 25 to 45 fathoms. A study to explore the feasibility of using porgy scales to determine population age composition was begun at the close of the quarter.

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

Gulf of Mexico Fishing Industry

HURRICANE "CARLA" INFLICTS HEAVY DAMAGE:

Hurricane "Carla" struck the Texas coast on September 11, 1961. The storm's greatest impact was in the Matagorda Bay area. Many segments of the fishing industry in the area were damaged. Considering the intensity of the storm, vessel losses were light. But there were a number of total losses and a number of vessels that suffered major damage. Shore plants and other facilities, especially at Port O'Connor, Port Lavaca, Palacios, Freeport, and over a sizable portion of the Texas coast, were damaged more or less substantially. There was some damage to fishery shore plants by flooding in the Louisiana coastal area. But because of ample warnings by the U. S. Weather Bureau, losses were somewhat less than expected.

Fig. 1 - Before Hurricane "Carla," on this site in Texas were located a State biological laboratory, a crab plant, and several other small buildings.

U. S. Bureau of Commercial Fisheries laboratory facilities at Galveston, which received the full force of the storm, were damaged to some extent but not severely. None of the other Bureau facilities in other Gulf Coast areas were damaged.

Shrimp landings on the upper Texas Coast were light after the storm, but landings on the lower Texas Coast were heavy early in October for a few days. However, the rate of catch was not maintained and landings became light again after the short spurt of good fishing.

Hurricane "Carla" developed as a tropical storm in the Caribbean off Nicaragua on September 4. It moved northward and developed full hurricane strength after striking the north end of Yucatan Peninsula on September 7. It moved due north for most of the following day during which a hurricane watch was maintained and the Weather Bureau issued warnings that "Carla" was the most dangerous hurricane in the history of the Weather Bureau. It was reported to have an eye 50 miles in diameter with winds of 150 miles an hour at its center. "Carla" ultimately struck the coast, with the center of the storm at Matagorda Bay, on the morning of September 11.

The shrimp industry, generally centered on the Texas coast in September, suffered heavy damage from Hurricane "Carla." The storm damage created a particularly difficult situation in the Gulf Coast commercial fisheries, having followed a very poor shrimp production season.

The damage to fishery facilities on the Gulf Coast from east to west appeared to be as follows:

Louisiana: Extremely high tides in southern Louisiana resulted in some damage to shore plants. Machinery in canning plants in Terrebonne Parish was damaged.

Port Arthur-Sabine: There was minor water damage to shore plants in that area, and there may be some loss to fish meal as a result of flooding. These plants, however, are back in operation.

Galveston: Shore installations handling fishery products in Galveston suffered only minor damage and the fleet escaped serious loss. Some vessels that sought refuge in

the Houston Ship Channel were deposited on shore or docks when the 17-foot water level subsided.

Freeport: Shore plant installations at Freeport were heavily damaged, and two shore plants were completely destroyed. Twelve shrimp vessels at Freeport were known to be aground and 5 were sunk. Others were reported to have sought refuge up the river where they were trapped by debris. Much of Freeport after the storm was under water.

Fig. 2 - After Hurricane "Carla," this is what remained of a crab-picking plant located on this bulkhead in Palacios, Tex.

Port O'Connor, Palacios, and Port Lavaca: All in Matagorda Bay and directly in the path of the storm suffered severe damage. In Port O'Connor shore plant installations, docks, and boats were all gone, and only three houses in the town were left intact. At Palacios all shore installations were destroyed and vessels were carried inland and apparently were extensively damaged. At Port Lavaca shore plant installations were severely damaged.

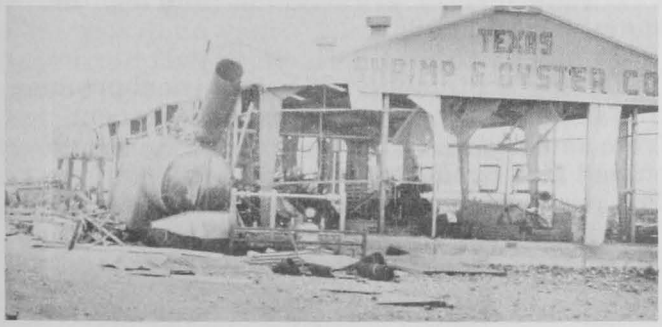


Fig. 3 - Damage inflicted by Hurricane "Carla" to a shrimp and oyster plant at Palacios, Tex.

Seadrift: Shore plant installations and a new crab picking and oyster shucking plant, scheduled to open in September, were completely destroyed. Boat sheds and other buildings were also destroyed.

Rockport: Damage was less extensive, but many shrimp boats were left high and dry by receding tides, and two vessels were reported missing. Repairs to shore plant installations were expected to be completed in a relatively short time.

Fig. 4 - These shrimp vessels, which rode out Hurricane "Carla" in the new boat basin at Rockport, Tex., were beached by receding tides. Damage was not serious for these vessels.

Aransas Pass and Corpus Christi: Damage to shore plants and vessels in that area was relatively minor. Two vessels were reported lost and one was sunk at its mooring, but may be salvaged.

Brownsville: Brownsville experienced winds not exceeding 40 miles an hour. Little or no damage occurred in that area and business was normal.

Hawaii

COMMERCIAL FISHERY LANDINGS, JULY 1960-JUNE 1961:

Commercial fisheries landings of sea and pond fish in the State of Hawaii during the fiscal year July 1960-June 1961 amounted to 13.7 million pounds valued at $2.9 million ex-vessel, according to the Hawaiian Division of Fish and Game. Landings of tuna made up 84.7 percent of the quantity and 65.5 percent of the value of all fishery landings. Skipjack tuna was the most important species landed.

Table 1 - Hawaiian Commercial Fishery Landings and Ex-Vessel Value, July 1960-June 1961

Species		Quantity	Value
English Name	Hawaiian Name	1,000 Lbs.	$1,000
Ocean Catch:			
Amberjack	Kahala	80	25
Big-eyed scad	Akule	301	205
Dolphin	Mahimahi	108	48
Goatfish	Weke-ula, Weke, Moelua, Moano Kumu, Malu	152	83
Crevalles	Ulua Omilu	82	39

(Table continued on next page.)

Table 1 - Hawaiian Commercial Fishery Landings and Ex-Vessel Value, July 1960-June 1961 (Contd.)

Species		Quantity	Value
English Name	Hawaiian Name	1,000 Lbs.	$1,000
Mackerel	Opelu	214	89
Snappers:			
Gray	Uku	42	19
Pink	Opakapaka, Kalekale	99	50
Red	Ulaula koae, ehu or Ulaula	54	47
Swordfishes, sailfishes spearfishes, & marlins	A'u & A'u lepe	618	170
Tuna & tunalike fish:			
Albacore	Ahipalaha (tonbo)	8	2
Big-eyed		982	492
Yellowfin	Ahi	416	171
Skipjack	Aku	10,194	1,271
Bonito or little tuna	Kawakawa	1	1/
Shellfish:			
Crabs	Kuahohu, Kona, Papai, Samoan, Moala	20	12
Limpet	Opihi	10	4
Lobster, spiny	Ula	13	9
Octopus	Hee	4	2
Squid	Muhee	5	2
Other fish & shellfish		267	110
Total Ocean Catch		13,670	2,850
Pond Catch		61	48
Grand Total		13,731	2,898

1/Less than $500.

The Island of Oahu accounted for 10.7 million pounds (valued at about $2.3 million) or 78.1 percent of the quantity and 78.5 percent of the total value of all landings of sea and pondfish and shellfish in the fiscal year ending June 30, 1961. The Island of Hawaii was the second most important center of Hawaii's fishing industry and accounted for 11.7 percent of the total landings, and 12.6 percent of the total value. Landings of commercial fish and shellfish in the Islands of Maui, Lanai, Molokai, Kauai were quite light.

Table 2 - Hawaiian Commercial Fishery Landings by Islands, July 1960-June 1961

Island	Sea Catch		Pond Catch		Total Catch	
	Quantity	Value	Quantity	Value	Quantity	Value
	1,000 Lbs.	$1,000	1,000 Lbs.	$1,000	1,000 Lbs.	$1,000
Hawaii	1,602	366	1	1/	1,603	366
Maui	1,201	164	-	-	1,201	164
Lanai	14	5	-	-	14	5
Molokai	25	12	1	1	26	13
Oahu	10,660	2,229	59	47	10,719	2,276
Kauai	168	74	-	-	168	74
Total	13,670	2,850	61	48	13,731	2,898

1/Less than $500.

Landings of commercial fish and shellfish in the Hawaiian Islands during July 1960-June 1961 by months were heaviest during the summer and early fall months. The July-September 1960 period and the May-June 1961 period accounted for 63.2 percent of the total landings. June 1961 alone accounted for 22.7 percent of the total landings. Landings of commercial fish and shellfish in the Hawaiian Islands are dominated by the seasonal availability of skipjack tuna. The fishery for tuna is the most important fishery in the Islands.

Table 3 - Hawaiian Commercial Fishery Landings by Months, July 1960-June 1961

Month	Sea Catch		Pond Catch		Total Catch	
	Quantity	Value	Quantity	Value	Quantity	Value
	1,000 Lbs.	$1,000	1,000 Lbs.	$1,000	1,000 Lbs.	$1,000
1960						
July	1,726	305	2	1	1,728	306
August	1,637	276	2	2	1,639	278
September	944	208	5	4	949	212
October	754	205	4	3	758	208
November	554	199	5	4	559	203
December	780	257	6	5	786	262
1961						
January	667	169	11	10	678	179
February	440	150	9	7	449	157
March	902	226	3	1	905	227
April	911	208	4	3	915	211
May	1,240	218	6	5	1,246	223
June	3,115	429	4	3	3,119	432
Total	13,670	2,850	61	48	13,731	2,898

Note: See Commercial Fisheries Review, November 1960 p. 36.

Industrial Products

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

Production, January-September 1961: Although the production of meal, oil, and solubles during September was less, the quantity processed January-September 1961 was significantly greater than during the same period in 1960.

During September 1961, fish meal production amounted to 29,000 tons--87 percent from menhaden. Fish solubles and homogenized fish produced totaled 11,400 tons. The production of marine-animal oils totaled

Fully loaded menhaden vessel approaching a reduction plant in Empire, La.

U. S. Production of Fish Meal, Oil, and Solubles, September 1961 1/ with Comparative Data

Product	September 1961	September 1960	January-September 1961	January-September 1960	Total 1960
	(Short Tons)				
Fish Meal and Scrap:					
Alewife	-	-	89	1,092	1,092
Herring:					
Alaska	296	1,857	3,576	6,103	6,103
Maine	101	290	984	2,486	2,915
Menhaden 2/	24,930	32,244	216,834	183,849	218,423
Sardine, Pacific	688	1,102	688	1,222	3,301
Tuna and mackerel	1,958	1,348	15,416	20,705	26,325
Unclassified	669	1,748	11,058	17,643	21,279
Total	28,642	38,589	248,645	233,100	279,438
Shellfish and marine-animal meal and scrap	3/	3/	3/	3/	10,309
Grand total meal and scrap	3/	3/	3/	3/	289,747
Fish solubles	10,485	11,442	82,071	76,564	89,377
Homogenized condensed fish	930	1,131	9,532	8,752	9,552
	(Gallons)				
Oil, body:					
Alewife	-	-	6,900	66,121	66,121
Herring:					
Alaska	51,786	415,086	625,786	1,385,218	1,385,218
Maine	4/	27,395	4/	129,795	132,973
Menhaden 2/	2,971,984	3,557,583	26,523,074	19,099,274	24,453,736
Sardine, Pacific	22,851	62,760	22,851	73,896	143,654
Tuna and mackerel	109,968	48,907	485,145	369,113	507,180
Other (including whale)	67,635	243,174	956,689	1,041,062	1,137,527
Total oil	3,224,224	4,354,905	28,620,445	22,164,479	27,826,409

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.

3.2 million gallons--92 percent from menhaden. Compared with August 1960, production was down 26 percent for fish meal, 9 percent for fish solubles and homogenized fish, and 26 percent for marine-animal oils.

Fish meal processed during the first nine months of 1961 amounted to 248,600 tons--15,500 tons greater than in the same period of the previous year. Fish solubles and homogenized fish production totaled 10,500 tons--1,000 tons greater than in the same period in 1960. The first nine-months production of marine animal oil amounted to 3.2 million gallons--1.1 million gallons less than during the same period in 1960.

* * * * *

Production and Imports, January-August 1961: The total United States supply of fish meal for the first 8 months of 1961 amounted to 365,800 tons--83,400 tons above the same period of 1960. The domestic production accounted for 60 percent and imports 40 percent of the total for the first 8 months of 1961.


Menhaden Plant

U. S. Supply of Fish Meal and Solubles, January-August 1961 and Comparative Data

Item	January-August 1961	January-August 1960	Total 1960
	(Short Tons)		
Fish Meal and Scrap:			
Domestic production:			
Menhaden	192,460	151,605	218,423
Tuna and mackerel	13,458	19,357	26,325
Herring, Alaska	3,280	4,246	6,103
Other	11,361	19,303	38,896
Total production	1/220,559	1/194,511	289,747
Imports:			
Canada	29,590	26,459	30,982
Peru	93,370	44,164	68,156
Chile	9,743	11,019	21,183
Angola	1,543	360	888
Republic of South Africa	9,756	5,509	7,073
Other countries	1,197	335	3,279
Total imports	145,199	87,846	131,561
Available fish meal supply	365,758	282,357	421,308
Fish Solubles:			
Domestic production 2/	80,188	72,743	98,929
Imports:			
Canada	819	771	869
Denmark	28	1,858	1,858
Other countries	1,398	165	447
Total imports	2,245	2,279	3,174
Available fish solubles supply	82,433	75,537	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.

Fish meal produced by United States firms during January-August 1961 totaled 220,600 tons. Fish meal processed from menhaden accounted for 87 percent of that total. Fish

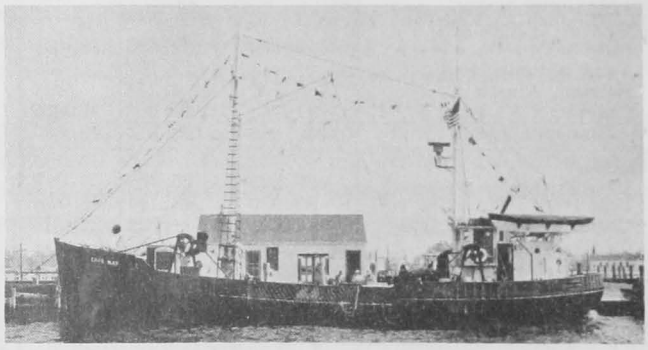
meal imports from foreign countries during January-August 1961 amounted to 145,200 tons--up 57,400 tons from the same period in 1960. Imports from Peru made up 64 percent and those from Canada accounted for 20 percent of the imports in the first 8 months of 1961.

The United States supply of fish solubles (including homogenized condensed fish) during January-August 1961 was 6,900 tons above the supply for the same period in 1960. The domestic production amounted to 80,200 tons, while imports totaled 2,200 tons.

Marine Game Fish

RESEARCH AIDED BY LOAN OF VESSEL:

A large New Jersey fish reduction firm has offered, and the U. S. Bureau of Sport Fisheries and Wildlife has accepted, use of its research vessel Cape May for two months in the Middle Atlantic area. The ship is fully equipped with navigational, communication, and safety equipment and manned with deck and engineering officers and cook; fuel and maintenance and vessel and crew insurance will be furnished.



M/V Cape May, belonging to a New Jersey fish-reduction firm, will be used to extend shore-bound marine game fish research between Fire Island, N. Y., and Delaware Bay.

The offer is made because of concern about the abundance and danger of sharks in waters off the New Jersey resorts (two persons were attacked last season). This offer gives vessel time worth as much as $1,000 a day to the Bureau and the opportunity for extending its shore-bound marine game fish research into the coastal waters between Fire Island, N. Y., and Delaware Bay.

Use of the vessel has been fully coordinated with the U. S. Bureau of Commercial Fisheries and the New Jersey Division of Fish and Game. A Bureau of Commercial Fisheries biologist has been assigned full time to the vessel for the two-month period; other units of the Bureau have loaned special gear; and a New Jersey biologist will take part in the 10 planned cruises. Around-the-clock fishing and plankton sampling will add to knowledge about shark predation on game fish as well as on game fish abundance, species, distribution in space and time, useful data on environmental conditions, and on spawning of game fish as revealed through examination of the plankton for eggs and larvae.

Marketing

EDIBLE FISHERY PRODUCTS PROSPECTS, WINTER 1961/62:

During the next several months per capita consumption of food fishery products by civilians in the United States is expected to be close to the year-earlier rate. Supplies of important commercially-processed fish and shellfish are expected to be about equal to the level of the previous year. Retail prices of food fishery products are likely to remain at least moderately higher this season than last.

About as much food fishery products are expected through the winter months this year as last. Stocks of frozen fish were noticeably lower at the beginning of the fall than at the same time last year, and the seasonal decline in production will continue through February 1962. However, imports, particularly of the fresh and frozen items, are likely to continue greater than a year ago. Supplies of canned salmon will be much larger this season than last and those of tuna about as large. Declines are indicated for canned sardines--both the California and the Maine products. The catch of Maine sardines through mid-October has been only one-third of the year-earlier catch.

Exports of edible fishery products in the coming months may total no larger than a year earlier. The outmovement of canned salmon may be up a little but decreases are expected in canned California pilchards and mackerel.

This analysis appeared in a report prepared by the Agricultural Marketing Service, U. S. Department of Agriculture, in cooperation with the Bureau of Commercial Fisheries, U. S. Department of the Interior, and published in the former agency's November 1961 issue of The National Food Situation (NFS-98).

North Atlantic Fisheries Exploration and Gear Research

MIDWATER TRAWLING OPERATIONS COMPLETED FOR 1961:

M/V "Delaware" Cruise 61-18: The fourth in a series of cruises devoted to definition of the potential fishery resources of the midwater zone over the Continental Shelf off the Northeastern United States was carried out (October 10-18, 1961) by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware.

Hauling back 85-foot nylon midwater trawl aboard the M/V Delaware.

Scouting was carried on over broad areas of the Gulf of Maine, Georges Bank and adjacent waters. Sonic equipment was used continuously in an effort to locate shoals of fish for fishing tests with midwater trawl nets. No significant aggregations of fish were found in the mid-depths.

A midwater trawl net was set only six times during the 9-day cruise; the small catches made included the following species: haddock, silver hake (whiting), butterfish, herring, and dogfish.

The completion of this cruise terminated the Delaware's activity in midwater trawling operations for 1961. This work will continue on an intermittent basis aboard the 65-foot research vessel T-476 through the winter season.

Note: Also see Commercial Fisheries Review, Nov. 1961 p. 25.

North Atlantic Fisheries Investigations

GROUNDFISH SURVEY OFF NEW ENGLAND:

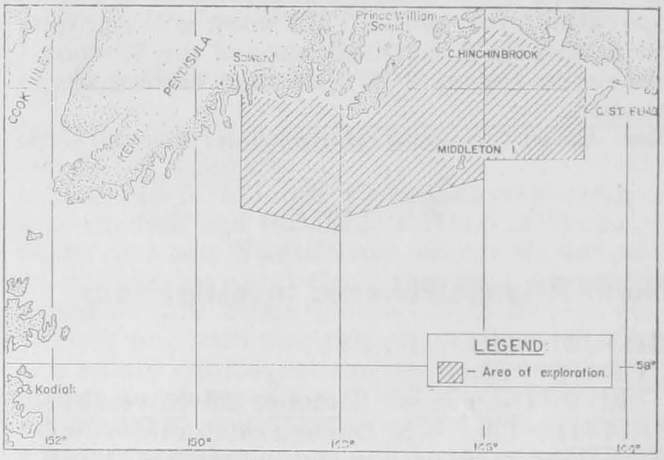
M/V "Delaware" (October 25-November 6, 1961): The U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware completed on November 6, 1961, the first part of an extensive groundfish survey which includes sampling the fish populations from the Gulf of Maine, Browns Bank off Nova Scotia, Georges Bank, and southward to Hudson Canyon.

The vessel fished at selected stations in the Gulf of Maine, Browns Bank, the northern edge of Georges Bank, and the Great South Channel. Biological information collected included blood samples from several of the important commercial species; age and growth material from haddock, cod, longfin hake, and argentines; and whiting stomachs. A sample of the invertebrates caught at each station was preserved and returned to the laboratory. Special collections of young haddock, ocean perch, dogfish, and cunners were made for further study. Hydrographic observations were made throughout the cruise.

North Pacific Exploratory Fishery Program

EXPLORATORY TRAWLING FOR BOTTOM FISH IN GULF OF ALASKA:

M/V "John N. Cobb" Cruise 52: Primary objectives of an 8-week cruise (ended October 27, 1961) by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb were to (1) assess the magnitude of latent bottom fish populations in the Gulf of Alaska, and (2) obtain information on the age and size composition of bottom fish encountered. The survey was undertaken in cooperation with the Alaska Region of the Bureau.



Exploratory fishing vessel M/V John N. Cobb Cruise 52 (Sept.-Oct. 1961).

The area of exploration extended from Cape St. Elias to Cape Resurrection. A commercial-size otter-trawl net was used to sample bottom fish populations within the region. Catch information obtained during the exploration is now being analyzed by the Bureau.

Otoliths ("ear bones") and scales were removed from sablefish, true cod, flatfish, and several species of rockfish to provide information on their age and growth.

Adverse weather conditions seriously hampered exploratory fishing operations during much of the cruise.

Note: Also see Commercial Fisheries Review, October 1961 p. 24.

Oysters

DELAWARE BAY SURVIVAL IMPROVED:

A decided improvement in survival of oysters in Delaware Bay in 1961 was reported in October 1961. The usual late summer kill by MSX did not occur in native or imported oysters, according to a news release from the Virginia Fisheries Laboratory at Gloucester Point, Va. The Director of the Shellfish Laboratory of Rutgers University reported to the Shallow Water Conference in Baltimore, Md., that Delaware oystermen planted approximately 160,000 bushels of large oysters from up-Bay seed beds in May 1961. This fall they are marketing these oysters and survival has been excellent. The seed oysters were large because none had been taken from the seed beds since 1958. Therefore, only a short period of growth and fattening was needed before marketing. It ought to be emphasized that it is not clear what damage MSX would do in Delaware beds if oysters were held the full 2- or 3-year term usually needed to produce market oysters.

Planters in MSX-infected areas of Chesapeake Bay should be encouraged by events in Delaware Bay. The beginning of the epidemic in Chesapeake Bay was almost exactly two years behind the onset in Delaware Bay. Nevertheless scientists at the Virginia laboratory are urging oystermen to continue making trial plantings to detect any improvement in survival of oysters. The laboratory is also monitoring major growing areas but cannot follow conditions in all minor tributaries.

Improved survival can lead to short-term plantings and if successful to longer-term plantings later. One danger is that MSX will wait until beds are heavily planted before giving rise to another serious epidemic.

Recent tests of Virginia oysters indicate no further spread of MSX. In fact, above Urbanna in the Rappahannock River, MSX was found higher in the river in 1959 than in 1961. This suggests that MSX has reached its limit in low salinity waters. Some fluctuations from wet to dry years can be expected however.

* * * * *

USE OF GROUNDS IN LOW-SALINITY WATER URGED:

Oystermen in Virginia are re-appraising their farming operations to meet the demand for market oysters resulting from or following the destruction of large plantings by the protozoan parasite MSX. As has been pointed out by scientists of the Virginia Institute of

Marine Science at Gloucester Point, MSX apparently is checked by low-salinity water. Oysters tolerate a larger range of saltiness than most of their enemies and pests, and grow well in salty ocean water, brackish water of creeks, and in all degrees of saltiness in between.

The Virginia scientists at Gloucester Point have pinpointed areas infested by this microparasite, and are now urging full use of grounds in low-salinity waters. Favorable areas should be the York River above Clay Bank, the Rappahannock above Urbanna and Towles Point, and those small rivers and creeks on the above named rivers, the Potomac, and waters of the Bayside of Eastern Shore where salinities are low in spring and not too high in late summer.

Oystermen can judge where it is safe to plant by the presence or absence of mortality in late 1961. If heavy unexplained losses which follow the pattern of MSX kills have occurred, there are strong reasons to suspect that MSX is active.

Undoubtedly many fine oysters can be grown in the numerous low-salinity creeks in Virginia. Big planters have avoided creeks because the oyster beds there must necessarily be small and small beds do not lend themselves to the use of large boats and heavy dredges.

High prices now being paid for market oysters should encourage operators to farm small acreages, using small boats and light equipment, and making the best use of present knowledge of oyster culture. Plants with small acreages can carry out such practices in waters near their homes.

More planters should attempt to collect their own seed oysters, where it is possible. For years oystermen have known that seed oysters produced near the grounds where they are to be planted survive best.

The use of shells in wire bags for culch is increasing each season. Shells in wire bags catch more spat than loose shells and often provide adequate strikes of young oysters in otherwise marginal setting areas.

The increased value of oysters may make it profitable to prepare soft bottoms for planting by stiffening them with shells. Perhaps tray culture will become profitable in spite of high costs of operation.

Pacific Coast

FIELD HEARINGS HELD ON FISHERY PROBLEMS:

A series of field hearings were held on the Pacific Coast and in Alaska, to seek some answers to fishery problems. Senator Warren G. Magnuson (D. Wash.) Chairman of the Merchant Marine and Fisheries Subcommittee of the Senate Committee on Commerce, announced the hearings on September 20, 1961. The first of the hearings was held in San Rafael, Calif., on October 4, with Senator Clair Engle of California as hearing Chairman.

On October 12, 1961, Senator Warren G. Magnuson (Wash.), Chairman of the Merchant Marine and Fisheries Subcommittee of the Senate Committee on Commerce, conducted a hearing on fishery problems. Senator E. L. Bartlett (Alaska), also scheduled a series of hearings in Alaska: October 17, Dillingham; October 18, Naknek; October 19, Kodiak; October 23 and 24, Anchorage; October 25, Ketchikan; October 26 and 27, Juneau. The hearings at Anchorage covered other subjects than fisheries.

State fish and game authorities of the Pacific Coast states participated in the hearings, together with Federal agency officials, representatives of commercial and sport fishery groups, biologists, and oceanographers.

Stepped-up fishery research efforts and application of research findings towards solution of the problems of the industry were a major objective of the Committee's overall study. More active cooperation of State, Federal, and industry officials also must be achieved, Senator Magnuson stated, so that every possible source may be tapped that might help in any way towards rehabilitation of this most important economic resource.

Pacific Ocean

DISCOVERY OF 34 SEAMOUNTS UNDER PACIFIC REPORTED:

A long chain of mountains hitherto unknown to man has been discovered under the North Pacific Ocean by the U. S. Department of Commerce Coast and Geodetic Survey Ship Pioneer, the Secretary of Commerce reported on October 14, 1961.

The seamounts, 34 of them rising 3,000 to 6,000 feet and extending over a 1,000-mile area, are only the first of many

new discoveries expected from "the first methodical oceanwide survey in modern history" begun in April by the Pioneer. The ship will eventually comb 3 million square miles of ocean between the Hawaiian Islands and Aleutian Islands. The newly discovered mountains lie in the area just south of Alaska and the Aleutians, extending about half the distance from Alaska to the Hawaiian Islands.

In this extensive program of oceanographic, weather, and geologic studies, the Pioneer is following closely spaced courses in a north-south direction between Oahu and the Aleutian trench. Although seamounts of 3,000 to 6,000 feet are not uncommon in the Pacific Basin, the discovery of the 34 mountains in this particular area gives oceanographers a different picture of the bottom topography than hitherto suspected.

Actually, only the gross features of shape and structure are known of 90 percent of the ocean floor that lies beyond the Continental Shelf. The 34 seamounts discovered by the Pioneer lie in an area where existing charts only sparsely define the true depths and bottom configuration.

The discovery of the seamounts is one of the many surprises that have been encountered in our efforts to learn more about the ocean floor. To open many new oceanographic frontiers, the Pioneer, equipped with the latest scientific devices, has been assigned its new and novel mission.

Until now, oceanwide investigations have been only incidental byproducts of more specific coastal missions. Survey ships, for example, have been mapping the Gulf of Alaska for years on their way to and from their coastal working areas, but this deep-sea reconnaissance work has been economically carried out by the Bureau with a minimum effort. It has, however, provided valuable data on some features of the ocean bottom such as disclosing submarine trenches, the Continental Shelf, and undersea mountains.

Fig. 1 - Nansen bottle used with oceanographic winch to obtain water samples and temperatures at any depths aboard a Coast and Geodetic survey ship.

Systematic oceanwide surveys, such as that now underway by the Pioneer, have been made possible by advances in new techniques of echo-sounding and positioning of ships.

Determination of the depths of the water and the accurate location of the spot at which the depth is determined are required in such surveying. The Pioneer is equipped with the most modern echo-sounding equipment and a long range control system known as Loran C. The recent construction of Loran C stations in Hawaii and Alaska have extended reliable radio signals for positioning ships thousands of miles into the North Pacific Ocean.

Echo-sounding determines depths indirectly by the measurement of time interval required for a sound wave to travel from the survey vessel to the bottom of the ocean, and to return as an echo to the ship. Early in the Twentieth Century, depths were measured by dropping a sinker to the bottom on piano wire. It sometimes required hours to accomplish a single sounding at great depths in this manner.

The 34 seamounts were discovered in a period of only five months by the Pioneer. Extending between the 35th and 50th parallels North, the seamounts contrast sharply in height with the depths shown on existing charts. One seamount 6,270 feet high was located where present charts show almost a flat bottom. The top of this mountain is 11,580 feet below the surface of the water.

A seamount is defined as an isolated elevation of the deep-sea floor of about 3,000 feet or more and circular or elliptical in form. Scores of important seamounts have been discovered by Coast and Geodetic Survey vessels in the Gulf of Alaska--some 11,000 feet in height. The Kodiak Seamount Chain is featured by a line of great seamounts extending for 650 miles across the Gulf of Alaska without evidence of intervening sea-floor topography that would normally be expected in a fault zone. Possibly, the same complex sea-

Fig. 2 - Sea bottom sampler snapper used aboard a Coast and Geodetic survey ship.

floor topography will be found in the area presently being surveyed by the Pioneer.

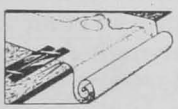
The 311-foot Pioneer carries a complement of 12 officers and 80 crewmen. In addition to hydrography, the ship is equipped with an oceanographic laboratory for processing water samples, bottom cores, biological specimens, and other data. A running log is maintained by the ship regarding current set and drift, changes of water color, areas of phosphorescence, schools of fish, and unique flotsam. Bathythermogram observations are made every two hours at 450-foot depths, and supplemental water temperatures are taken at 900-foot depths every 4 hours.

An observer from Commerce's Weather Bureau releases weather balloons daily, and transmits this information to stations ashore at six-hour intervals. Geologic and gravity studies are also part of this comprehensive survey. A proton magnetometer is towed about 97-percent of the time.

As the Pioneer's systematic surveys progress westward in the seasons to come, oceanographers will begin piecing together the general pattern of sea-floor topography for the North Central Pacific. West of the W. 165th Meridian existing data on the depth and character of the sea floor become even more fragmentary.

In addition to the knowledge gained on sea-floor topography, oceanwide surveys will contribute towards a better understanding of marine meteorology, organic matter in the oceans, the fields of submarine and surface navigation, the utilization of mineral as well as fisheries resources, and the discovery of new concepts which will inevitably come from the accumulated information supplied by a thorough survey program.

The discovery of the seamounts is only a teaser in man's hungry quest for knowledge of the ocean frontier--a frontier comprising two-thirds of the earth's surface about which he is grossly ignorant.



Pollution

MARITIME ADMINISTRATION ATTACKS OIL POLLUTION OF THE SEAS:

Oil is seriously troubling the coastal waters of the United States, Canada, and other nations. Resorters frequently find their beaches fouled by oily water, birds find their coastal feeding grounds ruined by oil and die of starvation, and fish are poisoned by oil. This oil is discharged by merchant ships, and the damage is the penalty paid for progress in substituting fuel oil for wind or coal to drive the world's commercial vessels.

But the U.S. Department of Commerce's Maritime Administration is taking a major step toward greatly decreasing sea pollution by oil in launching a research and development project to develop an effective oil-water separator.

Most of the current oil pollution is the result of ships pumping out their ballast before entering port. The majority of ships today, at least in the U. S. Merchant Marine, are steam-turbine-driven vessels using oil-fired boilers. The oil is a residual oil from the petroleum refining process known as "Bunker C," which has a specific gravity which enables it to mix with sea water.

The fuel is stored in tanks which form the bottom of the ship, and as the fuel is used from individual tanks these tanks must be filled with seawater to maintain stability and safety of the ship on the ocean. About fifty miles out of port, the ships pump out their sea-water ballast. But oil residue in the tanks has mixed with the water and also is pumped into the sea.

Although the volume of fuel oil thus discharged by a single ship is only about 100 gallons, there are thousands of ships discharging this oil each year off the U. S. coasts.

The damage caused by this vast total amount of oil to present and potential recreational areas and private property is extensive, the Maritime Administration reports. Even when ballast water is discharged beyond the 50-mile limit, some floats ashore. The tides bring oil to many non-shipping areas, killing many edible forms of marine life and thousands of wild birds each year.

The problem is world-wide, as was recognized in London in 1954 when the International Convention for the Prevention of Pollution of the Seas by Oil was drafted. This Convention forbids ships to discharge persistent oil or oily residue within certain sea areas, or to discharge water which contains more than 100 parts per million of oil.

In addition, some ships are equipped with "single gravity type" oil-water separators, but this equipment is not effective in separating oil from water when both have essentially the same specific gravity, as is the usual case with Bunker C oil.

The Maritime Administration's research contract calls for the development of a unit capable of effective and continuous separa-

tion of Bunker C oil from water. The device must be simple in design, fully automatic in its operation, and so constructed as to require minimum maintenance and attention.

The process should be able to treat an oil-water mixture whose oil concentration may vary from 0 to 100 percent at any one time, while the water mixture may be either fresh or salt with a temperature range of about 40° F. to 80° F. Separation is to be at a rate of not less than 600 gallons per minute, and the water discharge should contain less than 20 parts per million of oil. The over-all design considerations are based on the requirements contained in "Circular of Requirements" issued by the Maritime Administration.

Successful development of the separator will go a long way toward fulfilling Maritime's obligation to pursue research as an active member of the U. S. National Committee for the Prevention of Pollution of the Seas by Fuel Oil, Maritime Administration officials believe.

Shrimp

UNITED STATES LANDINGS AND STOCKS DOWN:

South Atlantic and Gulf shrimp landings of 62.0 million pounds during January through September 1961 were 35.8 million pounds or 37 percent less than in the same period of 1960. Landings in that area represent over 95 percent of the total amount landed in the United States.

During August and September (the normal heavy producing months) only 20.5 million pounds were landed, or slightly more than half of the 39.2 million pounds landed in the same two months in 1960. Preliminary reports indicated that the trend of sharply decreased shrimp landings in the Gulf continued through most of October. In September 1961, after hurricane "Carla" hit the Gulf Coast, there was a short spurt of landings of brown shrimp from the western Gulf area, but landings dropped off to a low level again in a week.

The United States cold-storage holdings of raw headless shrimp as of September 30, 1961, of 13.4 million pounds were 10.2 million pounds or 43 percent below the September 30, 1960, holdings of 23.6 million pounds. The September 1961 holdings of other frozen shrimp (breaded, peeled and deveined, etc.) of 7.4 million pounds were 4.3 million pounds or 37 percent below those of a year earlier. A sizable amount of the stocks in storage were committed and were not actually on the market.

Shrimp trawler docked at Biloxi, Miss.

While United States fresh and frozen shrimp imports through August this year of 70.7 million pounds were 5.6 million pounds or 9 percent above 1960 imports for the same period, the increase did not offset the drop in domestic production nor change the over-all tight supply situation.

Although wholesale prices were higher than a year ago, the demand continued to exceed the supply. The market for shrimp was strong with supplies very limited.

* * * * *

UNITED STATES SHRIMP SUPPLY INDICATORS AS OF NOVEMBER 2, 1961:

Item and Period	1961	1960	1959	1958	1957
	..... (1,000 Lbs., Heads-Off)				
Total landings, S. Atl. & Gulf States:					
November	1/	14,454	12,412	12,416	9,302
October	12,700	21,690	19,602	16,461	14,256
September	9,534	18,832	18,330	15,847	13,673
January-October ..	74,744	119,484	109,531	96,037	100,218
January-December .	1/	141,035	130,659	116,552	116,238

(Table continued on next page.)

United States Shrimp Supply Indicators as of November 2, 1961 (Contd.)

Item and Period	1961	1960	1959	1958	1957
	. . . . (1,000 Lbs., Heads-Off) . . .				
Quantity used for canning, Gulf States 2/:					
November	1/	1,614	2,312	3,424	953
October	1,485	2,567	2,531	3,489	1,616
September	630	2,236	2,108	2,825	1,506
January-October . .	11,862	26,003	21,089	21,037	16,551
January-December .	1/	28,594	24,679	26,404	18,386
Frozen inventory (as of end of each month)--raw headless only 3/:					
November	1/	37,264	37,334	30,211	22,326
October	1/	31,209	33,057	24,620	20,362
September	13,361	24,492	26,169	18,079	16,896
August	12,728	20,171	23,780	15,274	10,867
January-December monthly avg.	1/	25,954	27,297	18,008	13,627
Imports 4/:					
November	1/	13,516	10,269	10,617	6,789
October	1/	14,211	15,340	11,463	9,237
September	1/	8,190	7,541	7,620	7,471
August	6,743	6,407	5,107	6,628	4,959
January-August . .	70,546	65,091	62,794	45,246	39,315
January-December .	1/	113,419	106,555	85,393	69,677

1/Not available.
2/Pounds of headless shrimp determined by multiplying the number of standard cases by 33.
3/Shrimp products other than raw headless not included.
4/Includes fresh, frozen, canned, dried, and other shrimp products as reported by U. S. Bureau of the Census.
Note: Data for 1961 are preliminary. October 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

FISH AND SHELLFISH EXPLORATION OFF GEORGIA AND FLORIDA CONTINUED:

M/V "Silver Bay" Cruise 33: On October 6, 1961, the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Silver Bay completed an 18-day exploratory fishing cruise off Georgia and the east coast of Florida. The first portion of the cruise was devoted to additional scallop dredging on the Cape Canaveral, Fla., bed and the second portion was devoted to offshore pelagic fish explorations.

Commercial concentrations of optimum size (50-55 mm.) calico scallops were found to exist over approximately a 40-square-mile area near Bethel Shoal in the 20-25 fathom depth range. Catches within this area (bounded by the latitudes 27° 36' N. to 27° 56' N.) ranged from 2½ bushels per 15-minute drag to a high of 20 bushels per 5-minute drag. Actual fishing time (170 minutes) with an eight-foot tumbler dredge at one location (27°53.5' N., 80°08' W.) produced 143 bushels of scallops. Meat condition was excellent--yielding 5 to 5½ pints per 72-pound bushel, and counting 76 to 80 individual meats per pound.

An extensive concentration of small (20-40 mm.), presumably "young-of-the-year," scallops was located off Cape Canaveral in the 15- to 25-fathom depth range. Within this area (bounded by the latitudes 28°02' N. to 28°27' N.) individual catches of small scallops ranged as high as 25 bushels (estimated 62,000 individuals) per 15-minute tow. Previous observations made aboard the Silver Bay indicate that the scallops should reach a commercial size within 3 to 5 months.

Dredging north of Cape Canaveral, in the 18- to 50-fathom depth range, produced generally negative results, but one 15-minute drag near 29°18' N., 80°15' W., in 35-fathoms, resulted in a 5-bushel catch of optimum size scallops.

Scallop samples and specimens were provided for industry and Bureau technologists and biologists.

Midwater trawling and tuna long-line explorations were initiated in the offshore waters of northern Florida. Long-line sets on the 500 and 1,000 fathom isobaths resulted in small catches of yellowfin tuna (Thunnus albacares), albacore (T. alalunga), and big-eyed tuna (T. obesus).

Note: Also see Commercial Fisheries Review, Oct. 1961 p. 28.

Sport Fishery

PACIFIC MARINE SPORT FISHERY RESEARCH:

Vacant buildings in a deactivated naval submarine net depot on San Francisco Bay are destined to become a research center for the Pacific Coast marine sport fishery, the Department of the Interior announced on October 25, 1961. The site will be known as the Tiburon Marine Research Laboratory. At the outset it will occupy two buildings.

The Department's Fish and Wildlife Service said several reasons underlie the establishment of the laboratory in the San Francisco region: A million and a half sport fishermen seek salt-water fish on the West Coast each year and commercial fishing is of extreme importance to the area.

Assignment of the Tiburon structures to the Fish and Wildlife Service was made possible through an agreement between the Service and the Department of the Navy. Other buildings may be acquired as needed.

Tiburon is in Marin County, just north of San Francisco, and is ideally located as to geography and environment. At its door are the ocean, bays, estuaries, and coastal rivers. Geographically it fills a gap in the Federal fishery research program which has long-established investigations for tuna and other fisheries in southern California waters and the big Columbia River research and development program to the north. It is close to transportation facilities, to numerous educational institutions doing considerable research, and is near the headquarters of the California Academy of Sciences. Excellent docks are available to serve the Federal laboratory.

Plans for the new Tiburon Marine Research Laboratory still are being formulated. The center is intended to serve Pacific Coast needs similarly to those provided for the Atlantic Coast by the Sandy Hook Marine Laboratory in New Jersey.

The Sandy Hook Laboratory has been operating a year and has seven biologists and other staff members. One biologist is at Tiburon during the formative period. Like the Sandy Hook Research Laboratory, the Tiburon Laboratory will be under the jurisdiction of the Bureau of Sport Fisheries and Wildlife.

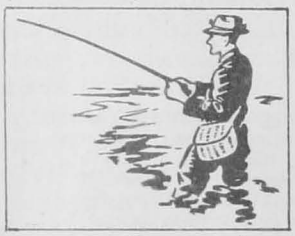
Bureau officials emphasized that when the Pacific marine sport fishery research program is fully operational its work will have been carefully coordinated with private and public research activities seeking answers in the same field.

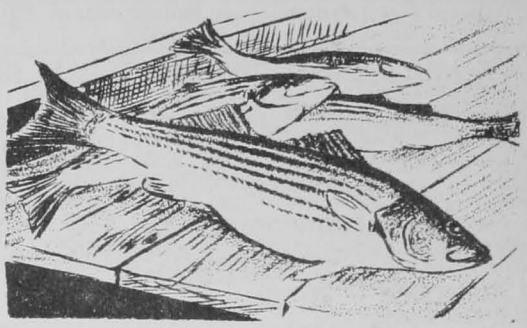
Striped Bass

CHESAPEAKE BAY FIVE-YEAR MIGRATION STUDY:

News of a five-year study on striped bass movements was made public on October 30, 1961, by the Natural Resources Institute of the University of Maryland. This study was designed to develop new techniques of tagging and, at the same time, supply much needed information about age, growth, availability, and abundance of striped bass in the Chesapeake Bay areas of fishing.

According to the study, the striped bass (rockfish) remained in local waters in various parts of Chesapeake Bay while young. Later, when older, they may leave the Bay for Atlantic Coast points as far away as northern New England. This species contributes extensive angling pleasure and financial return from sportsmen to many tidewater communities. Also, during 1959 the Chesapeake Bay commercial catch totaled 6.14 million pounds valued at $1.1 million ex-vessel.





The first results of a combined effort by Maryland's Chesapeake Biological Laboratory, the Virginia Institute of Marine Science, and the U. S. Fish and Wildlife Service Beaufort Biological Laboratory, indicate that pan-size striped bass stay close to the area of tagging in the Chesapeake Bay area. Over 3,500 fish were tagged in the study, which indicated that most two-year-old striped bass under 12 inches remained in the river where they were first tagged. After reaching the 12-inch size, the fish may travel greater distances, but rarely out of the Bay. Some of the larger fish in the older year-classes moved out of the Bay as far north as Maine, but they were surprisingly few in number.

Research has been progressing in the Potomac River which supports the largest striped bass fishery in the Bay area. Research is also planned for other major tributaries and the Bay proper with goals of determining the natural death rate, numbers available to fisheries, the existence and locations of subpopulations, and the contribution these stocks make to other coastal areas.

Tuna

CALIFORNIA EX-VESSEL PRICES ADVANCE FOR THE THIRD TIME IN 1961:

Effective October 2, 1961, a $10-per ton ex-vessel price increase was announced by Southern California canners for bluefin, skipjack, and yellowfin tuna. The new prices per ton are: bluefin $270, skipjack $230, and yellowfin $280. Previous increases of $10 per ton were made this year on July 1 for bluefin and yellowfin tuna, and on August 25

by $10 per ton for all 3 species. Current ex-vessel prices are $30 per ton more than a year ago for bluefin and yellowfin, and $20 per ton above the 1960 skipjack tuna price.

Current ex-vessel tuna prices are still far below the peak year of 1954, when canners paid $340 for bluefin, $310 for skipjack, and $350 for yellowfin, a range of $70 to $80 per ton above the current prices for those species.

* * * * *

CALIFORNIA EX-VESSEL PRICES ADVANCE FOR THE FOURTH TIME IN 1961:

Effective October 30, 1961, another $10-per-ton ex-vessel price increase (the fourth this year) was announced by Southern California canners for skipjack and yellowfin tuna. The new prices per ton are: skipjack $240 and yellowfin $290. Bluefin remains at $270 per ton.

The first increase this year of $10 per ton was made on July 1 for bluefin and yellowfin tuna. The second increase of $10 a ton was made on August 25 and applied to bluefin, skipjack, and yellowfin. The third increase, also $10 a ton, was announced on October 2, and applied to the same three species as the second increase.

Current ex-vessel prices are $30 per ton more than a year ago for bluefin and skipjack, and $40 per ton for yellowfin tuna.

Ex-vessel tuna prices at present are at a 6-year high, but are still far below the peak year of 1954 when canners paid $340 for bluefin, $310 for skipjack, and $350 for yellowfin.

* * * * *

CALIFORNIA BLUEFIN EX-VESSEL PRICE ALSO ADVANCED:

Although not involved in the California ex-vessel price dispute for an increase in skipjack and yellowfin tuna prices, the bluefin tuna price was also increased $10 per ton to $280, effective October 30, 1961. This is the fourth price increase for this species since June 1961--the previous ones were announced on July 1, August 25, and October 2; each increase was $10 per ton.

Although the bluefin tuna season normally starts in the spring months in California, the advance was made to retain the previous price differential between the various tuna species.

* * * * *

CALIFORNIA CANNED TUNA WHOLESALE PRICES INCREASE:

On October 31, 1961, California packers of canned tuna announced general price increases ranging from $0.50 to $1.00 per case at the wholesale level for most styles of their canned tuna packs. This was the third round of price increases since September 1, and followed the increase in raw tuna prices which advanced about $40 per ton (15 percent) since June 1961.

Imported frozen tuna prices have also increased considerably since the first of the year, due to demand exceeding supplies, which in turn firmed up prices for domestic-caught tuna.

The November 1, 1961, Bureau of Labor Statistics average price for the wholesale index on canned chunk style light meat tuna of $12.15 a case of 48 halves represented an increase of $1.15 (10 percent) from the August 1961 average. However, the price was still only 91.6 percent of the 1947-49 base price, while other selected canned fishery products were well over 100 percent of the base price.

* * * * *

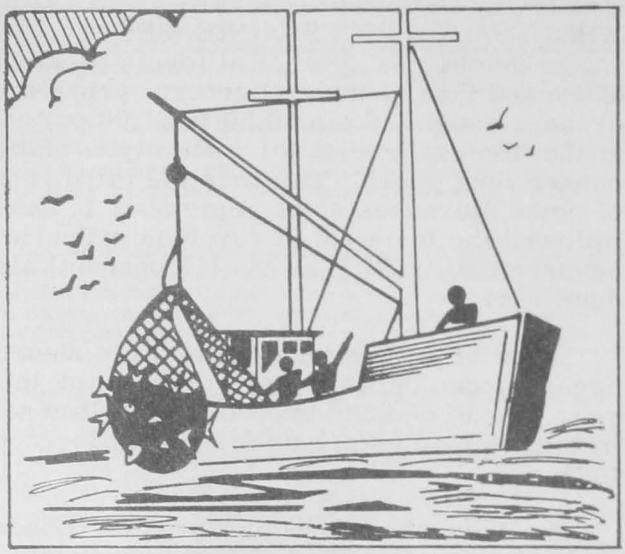
TWO ADDITIONAL CANNED PRODUCTS INTRODUCED:

A large California tuna canner announced on October 26, 1961, the introduction of 2 additional styles of pack for canned tuna. This is part of the canning company's program of expansion.

One variety is packed in corn oil, in place of the commonly-used soya oil. The other style of pack is without oil, and is packed in a clear vegetable broth.

U. S. Fishery Landings, January-August 1961

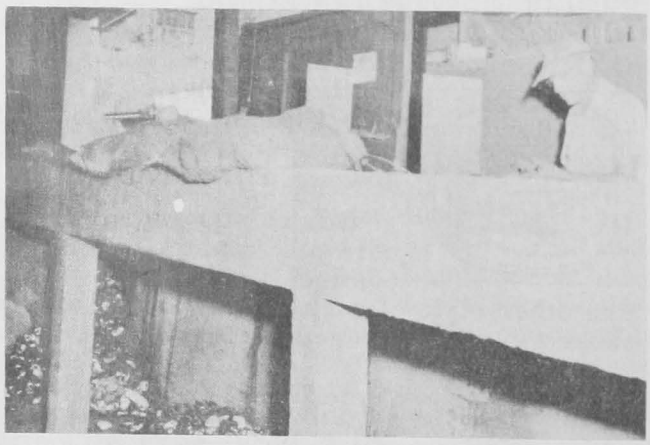
Total Landings: Landings of fish and shellfish in the United States during the first 8 months of 1961 were up about 358 million pounds, or 11 percent more than during the comparable period of 1960.



Salmon: On the basis of the reported pack of canned salmon, it was estimated that the Alaska catch for the year of about 262 million pounds was up 55 million pounds over a year ago.

Shrimp: The South Atlantic and Gulf States landings through August 1961 (88 million pounds) were down 45 million pounds--a drop of 34 percent from the same period in 1960.

Menhaden: Landings during the first 9 months of 1961 amounted to about 2,020 million pounds--an increase of 325 million pounds over the previous year. It appears that the 1961 catch of menhaden will exceed the record 1959 landings of 2,203 million pounds.



Heavy cement shucking bench in New Orleans oyster plant. Burlap bags of oysters on the bench ready for shucking. Shells are dropped through apertures in the bench top to the floor below.

United States Commercial Fishery Landings of Certain Species for Periods Shown, 1961 and 1960

Species	Period	1961 1/	1960	Total 1960
		.....(1,000 Lbs.).....		
Anchovies, Calif. 2/	8 mos.	4,100	2,198	3,304
Cod:				
Maine	7 mos.	1,700	2,265	2,897
Boston 3/	8 "	14,600	11,088	15,548
Gloucester 3/	8 "	1,800	2,216	3,199
Total cod		18,100	15,569	21,644
Crab, king, Alaska	8 mos.	32,000	20,400	28,570
Haddock:				
Maine	7 mos.	1,500	2,093	3,834
Boston 3/	8 "	59,200	54,600	76,695
Gloucester 3/	8 "	9,800	9,498	12,107
Total haddock		70,500	66,191	92,636
Halibut: 4/				
Alaska	8 mos.	23,200	19,294	21,351
Wash. & Oreg.	8 "	13,200	15,332	16,802
Total halibut		36,400	34,626	38,153
Herring:				
Maine	7 mos.	11,700	73,024	152,327
Alaska	to Sept. 9	38,700	50,278	77,913
Industrial Fish, Maine & Mass. 5/	8 mos.	35,500	30,915	43,733
Mackerel:				
Jack	8 mos.	33,600	43,630	74,945
Pacific	8 "	23,200	14,100	36,808
Menhaden	9 mos.	2,019,651	1,695,098	1,999,000
Ocean Perch:				
Maine	7 mos.	47,700	46,433	78,258
Boston	8 "	400	719	1,481
Gloucester	8 "	41,200	47,600	61,673
Total ocean perch		89,300	94,752	141,412
Salmon, Alaska	Year	262,500	207,101	207,101
Sardines, Calif.	thru Oct. 5	20,500	28,703	57,513
Scallops, Sea, New Bedford (meats).	8 mos.	14,200	13,008	19,353
Shrimp (heads-on), So. Atlantic & Gulf States	8 mos.	88,100	132,644	236,938
Squid, Calif. 2/	8 mos.	1,100	608	646
Tuna, Calif.	9 mos.	258,700	225,986	283,060
Whiting:				
Maine	7 mos.	9,000	7,615	11,123
Boston	8 "	70	161	754
Gloucester	8 "	36,400	40,340	63,112
Total whiting		45,470	48,116	74,989
Total all above items		3,103,321	2,796,945	3,590,045
Others not listed		449,479	397,708	1,339,955
Grand Total		3,552,800	3,194,653	4,930,000

1/Preliminary.
2/Cannery receipts.
3/Landed weight.
4/Dressed weight.
5/Excludes menhaden.
Note: Data for mollusks represent the weight of meats only. Data of other fish and shellfish represent weight as landed.

Tuna: Landings in California (including transshipments of United States-caught fish from South America) totaled almost 259 million pounds to September 30, 1961--up nearly 33 million pounds from the same period in 1960.

Haddock: The 8-months 1961 landings of 70.5 million pounds were about 4 million pounds greater than during the same period in 1960.

Halibut: The Alaska, Washington, and Oregon catch through August of 36 million pounds was 2 million pounds more than in the same period in 1960.

Scallops: New Bedford landings of meats during the first 8 months of 1961 of over 14 million pounds exceeded the 1960 catch for the period by over a million pounds.

Mackerel: Landings of Pacific mackerel (23 million pounds) through August 1961 were 9 million pounds more than those in the previous year, while jack mackerel landings (33.6 million pounds) declined 10 million pounds.

Whiting: During the first 8 months of 1961, landings at Gloucester (36 million pounds) were down 4 million pounds compared with the previous year.

U. S. Fishing Vessels

DOCUMENTS ISSUED AND CANCELLED, AUGUST 1961:

During August 1961, 41 vessels of 5 net tons and over were issued first documents as fishing craft, as compared with 50 in August 1960. The number issued first documents the first 8 months this year was 7 more than in the same period last year.

Table 2 - U. S. Fishing Vessels--Documents Issued and Cancelled, by Tonnage Groups, August 1961

Gross Tonnage	Issued 2/	Cancelled 3/
	(Number)	
5-9	6	6
10-19	14	8
20-29	2	1
30-39	7	3
40-49	2	1
50-59	1	1
60-69	2	1
70-79	3	3
80-89	1	-
100-109	-	2
230-239	1	-
480-489	1	-
810-819	1	-
Total	41	26

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: 28 in 1961, 1 in 1956, 11 prior to 1951, and 1 unknown. Assigned to areas on the basis of their home ports.
3/Includes vessels reported lost, abandoned, forfeited, sold alien, etc.
Source: Monthly Supplement to Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.

Table 1 - U. S. Fishing Vessels 1/ --Documents Issued and Cancelled, by Areas, August 1961 with Comparisons

Area (home port)	August		Jan.-Aug.		Total
	1961	1960	1961	1960	1960
	(Number)				
Issued first documents 2/:					
New England	5	6	26	26	35
Middle Atlantic	4	2	9	15	18
Chesapeake	2	7	42	50	78
South Atlantic	5	6	31	42	47
Gulf	10	11	83	64	90
Pacific	13	14	136	123	146
Great Lakes	2	4	11	13	18
Puerto Rico	-	-	2	-	-
Total	41	50	340	333	432
Removed from documentation 3/:					
New England	2	2	13	17	22
Middle Atlantic	1	-	17	6	18
Chesapeake	5	3	25	13	21
South Atlantic	1	2	18	22	38
Gulf	10	4	70	68	90
Pacific	3	9	62	51	87
Great Lakes	4	1	15	7	13
Puerto Rico	-	-	-	1	1
Total	26	21	220	185	290

See footnotes in table 2.

U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, AUGUST 1961:

Imports of edible fresh, frozen, and processed fish and shellfish into the United States during August 1961 rose 3.6 percent in quantity and 7.9 percent in value as compared with July 1961. The increase was due primarily to greater imports of frozen albacore tuna (up 1.6 million pounds), frozen ocean perch fillets (up 1.2 million pounds), canned albacore tuna (up 1.5 million pounds), canned light meat tuna (up 1.1 million pounds), and fresh swordfish from Canada (up 1.8 million pounds). These gains were somewhat offset by a decline in the imports of all types of frozen fillets except ocean perch, frozen tuna other than albacore, canned salmon, and frozen and canned spiny lobsters.

Compared with August 1960, imports in August 1961 were down 10.0 percent in quantity, but up 4.7 percent in value. The increase in value was due to higher prices this year for nearly all imported fishery products. The drop in quantity came about because of a 12.9-million-pound drop in frozen tuna other than albacore and smaller declines in the imports of groundfish fillets (down 3.6 million pounds) and fresh and frozen salmon (down 1.0 million pounds). These declines were only partially offset by increases in fillets other than groundfish, canned white meat tuna, canned salmon, frozen spiny lobsters, and frozen scallops.

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

Item	Quantity			Value		
	August		Year	August		Year
	1961	1960	1960	1961	1960	1960
	(Millions of Lbs.)			(Millions of $)		
Imports:						
Fish & Shellfish: Fresh, frozen & processed 1/	88.2	98.0	1,011.2	28.8	27.5	304.8
Exports:						
Fish & Shellfish: Processed only 1/ (excluding fresh & frozen)	1.7	2.3	48.7	0.9	1.5	19.2

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

United States exports of processed fish and shellfish in August 1961 were up 13.3 percent in quantity and 12.5 percent in value as compared with July 1961. Compared with the same month in 1960, the exports in August 1961 were down 26.1 percent in quantity and 40.0 percent in value. The lower exports in August 1961 were due to a drop in the exports of canned shrimp, salmon, and California sardines.

* * * * *

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

Of the almost 6.2 million pounds of domestic and foreign fresh and frozen shrimp exported and re-exported from the United States during the first seven months of 1961, almost 4.4 million pounds were shipped to Japan. A substantial proportion of the shipments to Japan was made from California. Most 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, Jan.-July 1961

Type of Product	July	Jan.-July
	(1,000 Lbs.)	
Domestic	1,211	1,657
Foreign	1,137	2,705
Total	2,348	4,362

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 this year and a strong market, that country has 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.

* * * * *

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1961 at the $12\frac{1}{2}$ percent rate of duty is 57,114,714 pounds (about 2,720,000 std. cases). Any imports in excess of the quota are dutiable at 25 percent ad valorem.

Imports from January 1-September 30, 1961, amounted to 40,664,702 pounds (about 1,936,500 std. cases), according to data compiled by the Bureau of Customs.

Imports in 1960 for the period January 1-October 1 amounted to 37,708,987 pounds (about 1,795,700 std. cases).

U. S. Production of Fish Sticks and Portions, July-September 1961

United States production of fish sticks during the third quarter of 1961 amounted to 15.7 million pounds and the production of fish portions totaled 14.6 million pounds. This was a gain of 11 percent in fish sticks and 21 percent in portions as compared with the same period of 1960. Most of the increase in fish sticks occurred in the cooked product (up 1.7 million pounds). The increase in portions was attributed to a greater production of raw breaded portions (up 2.2 million pounds).

Table 1 - U. S. Production of Fish Sticks by Months and Type, July-September 1961

Month	Cooked	Raw	Total
	(1,000 Lbs.)		
July	3,328	271	3,509
August	6,347	593	6,940
September	4,932	346	5,278
Total 3rd quarter 1961 1/	14,517	1,210	15,727
Total 3rd quarter 1960 2/	12,787	1,320	14,107
Total 1st 9 months 1961 1/	48,130	3,421	51,551
Total 1st 9 months 1960 2/	43,390	3,519	46,909

1/Preliminary data.
2/Revised.

Table 2 - U. S. Production of Fish Sticks by Areas, July-September 1961

Area	1961 1/		1960 2/	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States	21	12,607	23	11,503
Inland and Gulf States	4	1,650	4	1,309
Pacific Coast States	9	1,470	8	1,295
Total	34	15,727	35	14,107

1/Preliminary data.
2/Revised.

Cooked fish sticks (14.7 million pounds) made up 92 percent of the fish stick total. The remaining 8 percent consisted of raw fish sticks. A total of 14.3 million pounds of breaded fish portions (of which 11.6 million pounds were raw) and 343,000 pounds of unbreaded portions was processed during the third quarter of 1961.

The Atlantic Coast led in the production of fish sticks and portions with a total of 21.3 million pounds. The remaining 9 million pounds of sticks and portions were from the inland, Gulf, and Pacific Coast states.

Table 3 - U. S. Production of Fish Sticks by Months, 1957-1961

Month	1961 1/	1960 2/	1959	1958	1957
			(1,000 Lbs.)		
January	6,066	5,504	6,277	5,471	4,261
February	7,059	6,535	6,352	5,925	5,246
March	7,178	7,837	5,604	5,526	5,147
April	5,605	4,864	4,717	4,855	4,492
May	5,084	3,700	4,407	4,229	3,380
June	4,832	4,362	4,583	4,702	3,522
July	3,509	3,684	3,790	4,574	3,821
August	6,940	5,006	3,879	4,358	4,643
September	5,278	5,417	5,353	5,328	4,861
October	-	6,554	5,842	5,485	5,162
November	-	6,274	4,831	5,091	4,579
December	-	5,322	4,743	5,467	4,014
Total	-	65,059	60,378	61,011	53,128

1/Preliminary data.
2/Revised.

Table 4 - U. S. Production of Fish Portions by Months, July-September 1961

Month	Breaded			Unbreaded	Total
	Cooked	Raw	Total		
			(1,000 Lbs.)		
July	702	3,146	3,848	84	3,932
August	586	4,244	4,830	102	4,932
September	1,366	4,260	5,626	157	5,783
Total 3rd quarter 1961 1/	2,654	11,650	14,304	343	14,647
Total 3rd quarter 1960 2/	2,036	9,440	11,476	583	12,059
Total 1st 9 months 1961 1/	7,614	33,175	40,789	1,246	42,035
Total 1st 9 months 1960 2/	5,421	27,352	32,773	1,410	34,183

1/Preliminary data.
2/Revised.

Table 5 - U. S. Production of Fish Portions by Areas, July-September 1961

Area	1961 1/		1960 2/	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States	23	8,765	21	7,420
Inland and Gulf States	7	5,535	6	4,441
Pacific Coast States	7	347	4	198
Total	37	14,647	31	12,059

1/Preliminary data.
2/Revised.

Table 6 - U. S. Production of Fish Portions by Months, 1958-1961

Month	1961 1/	1960 2/	1959	1958
		(1,000 Lbs.)		
January	4,259	3,604	2,692	1,973
February	4,865	3,434	3,025	1,254
March	5,805	4,594	3,225	1,471
April	4,515	3,399	2,634	2,268
May	3,899	3,171	2,684	1,478
June	4,045	3,922	3,247	1,504
July	3,932	4,020	2,227	2,161
August	4,932	3,496	2,796	1,516
September	5,783	4,543	3,558	1,566
October	-	5,148	4,314	2,560
November	-	4,642	3,483	1,979
December	-	4,327	3,262	2,060
Total	-	48,300	37,147	21,790

1/Preliminary data.
2/Revised.

During the first 9 months of 1961, 51.6 million pounds of fish sticks were produced--an increase of 10 percent as compared with the same period of 1960. Fish portions (42 million pounds) were 23 percent greater than in the first 9 months of 1960.

Wholesale Prices, October 1961

There was a slight increase in prices of fishery products during October 1961, according to the wholesale price index for edible fishery products (fresh, frozen, and canned). The October index at 138.1 percent of the 1947-49 average was 1.2 percent higher than for September, and indicated a return to the trend of rising prices (prices had increased steadily from April through August 1961).

Prices for drawn, dressed, or whole finfish products were mixed. From September to October 1961, prices rose for fresh large haddock (ex-vessel price at Boston up 2 cents per pound, or 13 percent), fresh Lake Superior whitefish (wholesale price at Chicago up 31 percent), and fresh or frozen king salmon at New York City. But prices dropped for dressed western halibut (wholesale price at New York City down 11 percent) and fresh round yellow pike (wholesale price at New York City down 25 percent). The lower halibut prices in October were due to the use of

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

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1947-49=100)			
			Oct. 1961	Sept. 1961	Oct. 1961	Sept. 1961	Aug. 1961	Oct. 1960
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					138.1	136.9	137.1	129.4
Fresh & Frozen Fishery Products:					153.0	151.4	153.5	143.7
Drawn, Dressed, or Whole Finfish:					152.5	150.0	162.4	166.4
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.11	.09	107.2	95.2	128.2	141.5
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.35	.39	107.3	120.7	117.6	94.4
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.85	.84	191.0	188.2	196.6	202.2
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.69	.53	171.1	130.2	158.7	183.5
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.45	.60	105.5	140.7	129.0	134.8
Processed, Fresh (Fish & Shellfish):					158.6	155.7	158.2	135.3
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.32	.31	108.9	105.5	103.8	103.8
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.87	.89	136.7	140.6	136.7	102.7
Oysters, shucked, standards	Norfolk	gal.	8.00	7.50	198.0	185.6	198.0	185.6
Processed, Frozen (Fish & Shellfish):					130.5	130.9	124.0	115.7
Fillets: 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	.33	103.6	103.6	102.0	91.0
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.30	.30	120.8	120.8	114.8	112.8
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	.88	.89	135.8	136.6	125.8	114.2
Canned Fishery Products:					117.1	116.4	114.1	109.6
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	28.00	28.00	146.1	146.1	146.1	140.9
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.65	11.50	84.0	82.9	79.3	80.0
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 24 cans/cs.	Los Angeles	cs.	4.90	4.75	114.4	110.9	105.0	91.0
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	10.31	10.31	109.7	109.7	109.7	93.1

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.

frozen fish because the season for fresh halibut ended in September.

Among the processed fresh fishery products, prices for shucked oysters (standards) at Norfolk rose 50 cents a gallon to the former high of $8.00. A lighter than expected supply in October along with an active demand brought the price back to about double the base period price.

Fresh and frozen shrimp prices dropped slightly from September to October 1961 at Chicago and New York City because of a short spurt in Gulf landings in late September. However, the available supplies in October were still only about one-half of a year earlier. Total shrimp (raw headless, breaded, peeled and deveined, and other types) cold-storage holdings on October 31, 1961, of 26.1 million pounds were 17.6 million pounds or 40 percent below a year earlier. A sharp drop in the October domestic shrimp production also contributed to the limited shrimp supplies. The shrimp supply situation, however, improved somewhat in October with an increase in the stocks of 5.4 million pounds from the end of September to the end of October because of increased imports of 2.3 million pounds from Mexico into Arizona and California.

A continued firming up of canned tuna prices was reported in October, with an average advance in mid-October of 15 cents per case over the September average. However, another sharp price increase for California canned tuna was announced on October 30 of up to $1.00 per case for most species and styles of pack. If the price remains steady at that level, the November 1961 average price will be $12.15 per case, or 50 cents above the October 15 average price.

The October 1961 California sardine fishery landings showed no improvement over the previous month. Due to limited supplies, California canned sardine prices in October again rose by 3 percent over September, or an increase of 9 percent over the August 1961 index.

With canned Maine sardine stocks in October at less than one-third of a year earlier, the wholesale price advanced by $2.00 a case or 19 percent during the last week of October 1961 which will make the November price $12.31 per case if no further increases take place.

Compared with a year earlier, the over-all index for edible fishery products in October 1961 was up 6.7 percent. A number of products in the index were priced substantially higher in October 1961 than a year earlier. Among these were frozen western halibut at New York City (up 13.6 percent), fresh shrimp at New York City (up 33.1 percent), and frozen shrimp at Chicago (up 18.9 percent). The canned fish subgroup index for October 1961 rose 6.8 percent as compared with October 1960. Most fresh fish items in the index were priced substantially lower, with fresh haddock at Boston down 24.2 percent because of heavier landings in October 1961.

LETHAL EFFECTS OF VISIBLE LIGHT ON FISH EGGS AND EMBRYOS

Experiments conducted at a New York State hatchery showed that an unusually heavy mortality (90 percent) of brook trout eggs in troughs was due to overhead 40-watt cool-white fluorescent bulbs. Reporting in the April 7 issue of Science, the author, Dr. Alfred Perlmutter, hypothesizes that visible light could kill the eggs and embryos of all aquatic animals.

He cites research on rainbow trout by Handorf (Physiologie, 1960) which indicates that violet and blue bands of white light are highly lethal. Green, yellow, and orange bands were progressively much less lethal. Greater resistance was shown by intensely colored yellow eggs than by paler eggs.

The author theorizes that if visible light is potentially lethal, all natural adaptations of egg and embryo tend to minimize the lethal effects, but do not give complete protection. The degree of mortality caused by exposure would vary with environmental changes. He concludes: "Years in which the spawning season extended over a period with clear, sunny weather comparatively free of wind and rain might result in unusually clear water, greater penetration of lethal visible light, and poor survival of the progeny of many aquatic forms. Year-class fluctuations in aquatic organisms have been attributed to changes in a wide variety of biological and physico-chemical conditions such as food, predation, disease, temperature, salinity, and currents. Yet frequently such fluctuations have shown either no relationship to, or a poor correlation with, these factors. It is suggested that in these instances visible light intensity might have been the unknown factor influencing year-class fluctuation."