

TRENDS AND DEVELOPMENTS

Animal Foods

MANUFACTURERS ORGANIZED: The American Pet Food Manufacturers, a division of American Feed Manufacturers Association, was organized during a meeting in Chicago in September 1956. This organization is of special interest to the fishing industry since it acts as a spokesman for the pet-food manufacturers, and supplies technical advice to its members.

The Pet Food Research Committee consists of chairman Dr. John W. Bernotavicz, Gaines Division, General Foods Corporation, Kankakee, Ill.; vice chairman H. C. Schaefer, Ralston Purina Co., St. Louis; Dr. Paul R. Record, Security Mills, Knoxville, Tenn.; Dr. Victor Heiman, Kasco Mills, Inc., Waverly, N. Y.; Dr. J. E. Hunter, Allied Mills, Inc., Libertyville, Ill.; Dr. E. M. Gildow, Carnation Milk Farms, Carnation, Wash.; Dr. John A. Pinkos, the Quaker Oats Co., Rockford, Ill.; and Dr. W. J. Monson, the Borden Co., Elgin, Ill.

The Research Committee aids in interpretation and distributing to its members and the general public the data obtained from industry-sponsored research conducted at the University of Wisconsin, Madison. It also evaluates and publishes abstracts of scientific articles on dog nutrition as published in a number of technical journals.

The Research Committee is an excellent contact for dependable information by the members of the fishing industry which are interested in finding new outlets for raw, semiprocessed, or processed fishery products in pet foods.



Cans--Shipments for Fishery Products, January-September 1956



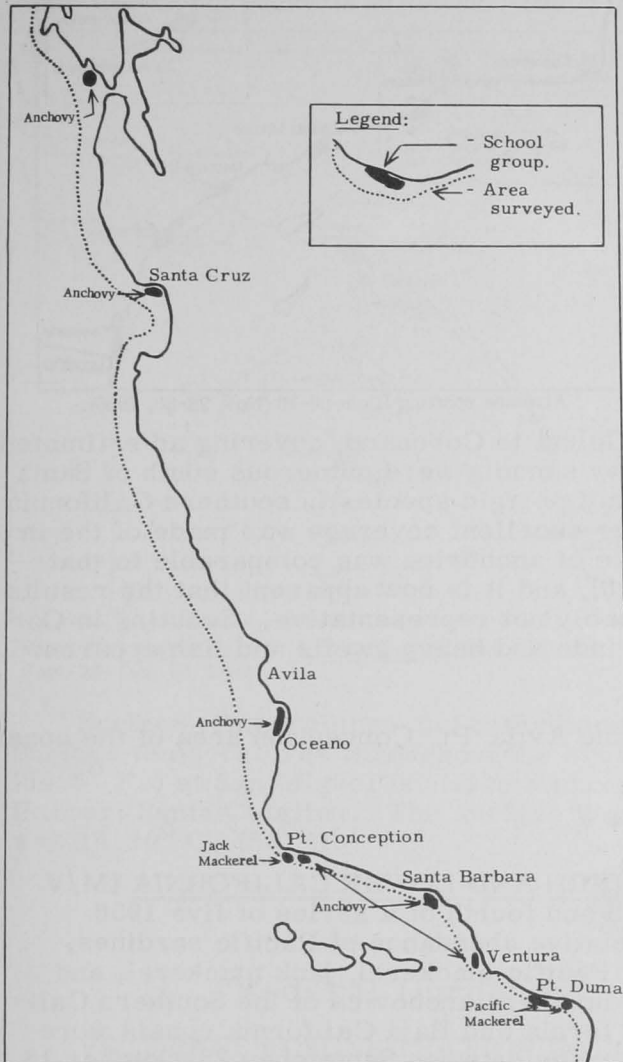
Total shipments of metal cans during January-September 1956 amounted to 86,019 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 74,848 tons in the same period of 1955. The peak season for packing some important fishery products usually ends on or before September. The 1956 pack of important items such as Maine sardines, Pacific salmon, and tuna will exceed those for 1955.

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



California

PELAGIC FISH DISTRIBUTION, ABUNDANCE, AND BEHAVIOR STUDIED BETWEEN BODEGA BAY AND SAN DIEGO (Airplane Spotting Flight 56-9): In order to study pelagic fish distribution, abundance, and behavior off Southern California,



an airplane spotting flight was made by the California Department of Fish and Game Cessna (1359D) airplane between October 27-29 1956. This flight followed immediately upon a period of stormy weather. As heavy swells and winds were encountered over most of the area north of Pt. Vicente, the observations made north of this point may not be true indications of the amount of fish present. It is known that fish schools tend to disappear during windy periods, especially the mackerels.

Sardines continued scarce but Pacific mackerel continued more abundant than in the previous season. Anchovies were much less abundant than in September throughout the entire coastal area.

Anchovy: The large concentration of anchovies observed off Avila and Oceano in September remains the largest school group in central California. Over 100 schools were seen in this area in September but only 18 schools were seen during this flight. This decrease in abundance may be due in part to stormy seas but it may also be due to the seasonal fluctuation in abundance as exhibited by anchovies in the past. Over the past three seasons there has been a build-up of anchovy stocks in the inshore area in early spring with a peak of abundance from May-August followed by a breaking up of concentrations in October and November.

Airplane spotting flight 56-9 (Oct. 27-28, 1956).

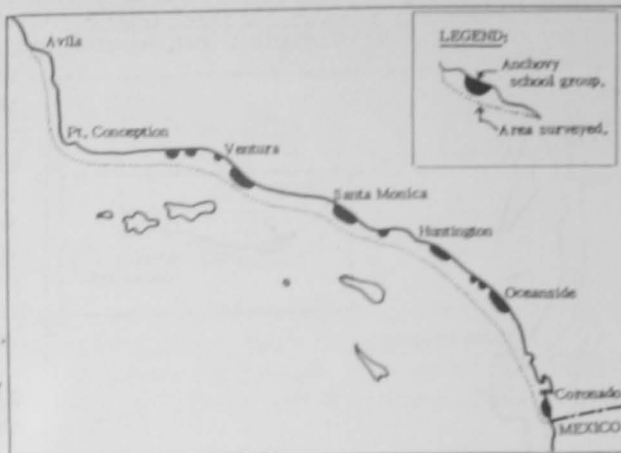
A tally indicates that 114 anchovy schools and 462,000 square feet of total area of fish were tallied in each 10-mile section of the coast from San Francisco to La Jolla in which anchovies were found.

Sardine and Pacific Mackerel: No schools of pure sardines were seen during this flight. Commercial aerial spotters found sardine schools at the surface at night but failed to find any during the daytime. Pacific mackerel schools were visible in the daytime and commercial catch sampling revealed that many of the Pacific mackerel schools contained varying amounts of sardines. Pacific mackerel schools were less in abundance during this flight than in September but then continue to be well scattered along the coast and in fair numbers.

Jack Mackerel: Three large schools of jack mackerel were seen near Pt. Conception. It was reported that a large concentration of mixed jack mackerel and Pacific mackerel were near Pt. Mugu but these were not observed, due possibly to the strong winds blowing in this area when scouted.

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AIR SURVEY OF PELAGIC FISH DISTRIBUTION (Flight 56-10): Anchovy schools were found to be plentiful by the California Department of Fish and Game during flights by its Cessna 1359D (November 28-30, 1956) over the inshore area between Avila and San Diego. Schools of sardine and both Pacific and jack mackerel, observable from the air-plane, were absent from this area during the period of the flight. However, it was known from other sources that schools of these three species were present off the Southern California coast at the time of the flight and it is assumed that these schools were below the surface during the daytime flights or outside the range of the survey area. Five schools of unidentified small fish were observed about two miles north of Avila.



Airplane spotting flight 56-10 (Nov. 28-30, 1956).

During the course of the flights 630 schools of anchovies were observed from Goleta to Coronado, covering an estimated 8.5 million square feet of surface. Anchovy schools were numerous south of Santa Barbara and continue to be the most abundant pelagic species in southern California. Due to exceptionally calm and clear weather excellent coverage was made of the inshore area. The distribution and abundance of anchovies was comparable to that observed on the September 1956 flight (56-8), and it is now apparent that the results of the October 1956 flight (56-9) were probably not representative. Scouting in October was done during a period of strong winds and heavy swells and fish apparently school deeper during this weather.

No anchovy schools were observed in the Avila-Pt. Conception area of the coast on this flight.

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PELAGIC FISH SURVEYS OFF SOUTHERN AND LOWER CALIFORNIA (M/V N. B. Scofield, Cruises 6 and 7): The third and fourth of a series of five 1956 cruises for the purpose of assessing the relative abundance of Pacific sardines,



Pelagic fish survey by M/V N. B. Scofield (Cruise 56-S-7, Oct. 25-Nov. 12, 1956).

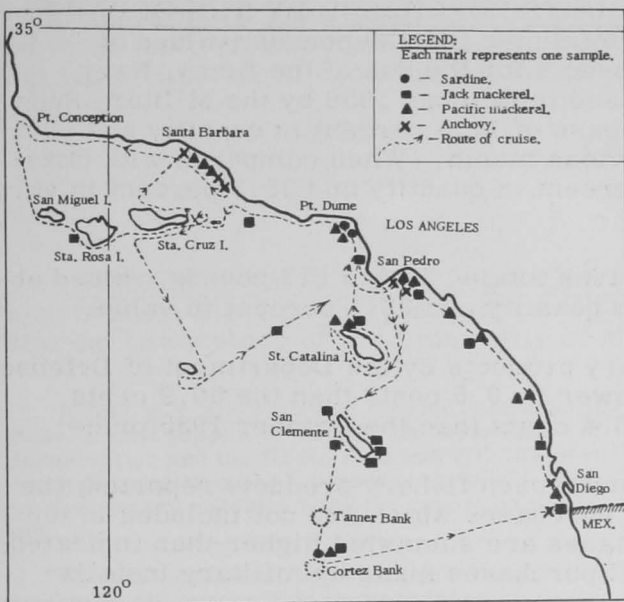
Pacific mackerel, jack mackerel, and northern anchovies of the Southern California and Baja California coasts were made between September 25-October 13, 1956 (cruise 6) and October 25-November 12, 1956 (cruise 7) by the California Department of Fish and Game research vessel M/V N. B. Scofield.

Results of Cruise 6: A total of 96 light stations were occupied. Sardines were taken under the light at 3 stations, Pacific mackerel at 16, jack mackerel at 15, and anchovies at 7. In addition to the samples collected, Pacific mackerel were observed under the light but could not be taken at 3 stations, jack mackerel at 5, and anchovies at 1.

The vessel traveled 530 miles scouting for fish; 67 schools of sardines were

observed, 82 Pacific mackerel, 12 anchovy, and 13 schools of sauries. A total of 116 unidentified schools were observed. Of those it was felt that the majority were jack or Pacific mackerel.

Sea surface temperatures during the cruise ranged from 13.12°C . (55.6°F .) near Pt. Conception to 20.74°C . (69.3°F .) at Del Mar. Sardines were taken in waters with a temperature range of 16.89°C . (62.4°F .) to 17.72°C . (63.9°F .)



Pelagic fish survey by M/V N. B. Scofield (Cruise 56-5-6, Sept. 25- Oct. 12, 1956).

Surface temperatures and bathythermograph casts were taken at all stations. Surface temperatures throughout the cruise ranged from a minimum of 12.50°C . (54.5°F .) at San Miguel Island to a maximum of 16.68°C . (62.1°F .) at Avalon Harbor, Santa Catalina. The surface temperature at which sardines were sampled was 14.50°C . (58°F .)



Federal Purchases of Fishery Products

VETERANS ADMINISTRATION INCREASES USE OF FROZEN FISH FILLETS: Veterans Administration will increase the use of frozen fish fillets in its 173 hospitals in the nation by 330,000 pounds a year at an estimated cost of \$132,000 that Agency's Area Medical Director at Boston reported in mid-December. Only domestically-produced fillets will be bought.

The extra usage is expected to result from more frequent offerings of fillets on selective menus which give hospital patients a choice of food.

Last year (fiscal 1956), nearly three million pounds of fish and other sea foods costing more than \$1,000,000 were consumed by VA's average daily patient load of about 110,000 veterans. Supply officers in VA hospitals purchase all fish locally on an open-market purchase.

It is estimated that about 60 percent of last year's consumption was fresh and frozen fish, mostly the latter.

Results of Cruise 7: A total of 66 light stations were occupied, of which 1 yielded sardines, 6 northern anchovies, 3 Pacific mackerel, and 3 jack mackerel.

The vessel scouted 392 nautical miles, 98 schools of fish were visually observed, of which 15 were sardine, 36 northern anchovy, 4 mackerel, and 43 unidentified. The sardines were most abundant in Santa Monica Bay and the Santa Cruz Island area.

Rockfish specimens were taken by hook and line at Anacapa Island, Santa Cruz Island, Catalina Island, San Clemente Island, La Jolla, and Cortez Banks. A total of 113 specimens representing 16 species were taken.

The extended use of selective menus is changing food patterns, in that foods formerly considered unpopular with a majority of the patients frequently are chosen when offered as an alternate to traditionally popular items.

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FRESH AND FROZEN FISHERY PRODUCTS PURCHASED BY THE DEPARTMENT OF DEFENSE, OCTOBER 1956: A total of 2,182,329 pounds (valued at \$1,097,720) of fresh and frozen fishery products for the use of the Army, Navy, Marine Corps, and Air Force were purchased in October 1956 by the Military Subsistence Supply Agency. This was an increase of 11.5 percent in quantity and 10.1 percent in value as compared with the previous month. When compared with October 1955, purchases were higher by 9.3 percent in quantity and 25.3 percent in value.

For the first 10 months of 1956 purchases totaled 22,416,612 pounds, valued at \$11,202,529--an increase of 5.5 percent in quantity and 22.1 percent in value.

Prices paid for fresh and frozen fishery products by the Department of Defense in October averaged 50.3 cents a pound, lower by 0.6 cents than the 50.9 cents paid in the previous month, but higher by 6.4 cents than the October 1955 price.

In addition to the purchases of fresh and frozen fishery products reported, the Armed Forces generally make some local purchases which are not included in the data given above. Therefore, actual purchases are somewhat higher than indicated, but it is not possible to obtain data on local purchases made by military installations throughout the country.



Fisheries Loan Fund

APPROVAL OF FIRST LOANS ANNOUNCED: The first five loans to be granted from the new Fisheries Loan Fund have been approved by the United States Fish and Wildlife Service, the Secretary of the Interior announced on December 28, 1956.

One of these loans is to an applicant in Massachusetts, two are to California applicants, and two to Alaska fishermen. The loans will be "official" when the applicants sign the terms set forth in the loan agreement. The loans will be closed and serviced for the Department of the Interior by the Small Business Administration.

The total of the five loans is \$41,500. Other applications are in the final stages of processing. On file and being handled as rapidly as possible are approximately 70 other valid applications totaling \$2,300,000.

The Fisheries Loan Fund was established by the Fish and Wildlife Act of 1956, approved by the President on August 8, "to make loans for financing and refinancing of operations, maintenance, replacement or repair of fishing gear and vessels, and for research into the basic problems of fisheries." Applications for shore installations or needs other than those set forth above are not eligible.

The loan applications are well distributed over the country. From New England have come applications for \$919,500; from the West Coast there are requests for \$960,000. Gulf fishermen are seeking \$274,000; those of the Middle and South Atlantic \$48,000; Alaskans are requesting \$72,500; and Great Lakes fishermen are asking \$40,300.

The broad objective of the fisheries loan fund is to provide financial assistance which will aid the commercial fishing industry to bring about a general upgrading of the condition of both vessels and fishing gear in order to produce more efficient and profitable fishing operations.

The initial \$10 million provided by the 1956 act is a revolving fund. The rate of interest on all loans granted is at present fixed at five percent a year. The period of maturity of any loan shall be determined and fixed according to circumstances, but in no case can it exceed a period of 10 years.



Florida

FISHERIES RESEARCH, JULY-SEPTEMBER 1956: The following are some excerpts from the Quarterly Report on Fisheries Research, September 1956, of the Marine Laboratory of the University of Miami.

Mullet Marketing Survey: The mullet marketing study, a joint project of the Florida State Board of Conservation and the U. S. Fish and Wildlife Service, was completed and a report submitted. The brief summary accompanying the report points out:

"Recommendations presented in this report involve active cooperation between industry, state, and Federal governments. No direct subsidies are recommended at either the Federal or state level, but legislative action in certain fields is recommended at the state level, and assistance in the form of technological and marketing aid is recommended to the industry from the state and Federal governments.

"The depressed condition of certain segments of the Florida fishing industry was found to be intimately associated with the fortunes of the mullet fishery, which therefore received the major attention in this study.

"It was found that the source of a great part of the United States supply of edible food fish has shifted since World War II. So have the methods of preparation and the methods of marketing. These technological advances and marketing innovations have been the answer of the fishing industry to the demands of an increasing population and greater national prosperity. It is believed that the Florida fisheries have not gone as far as others in this progress and that their markets have suffered as a consequence."

Small Shrimp Studies: During July, August, and September 1956, trips were made on the M/V Manboy to the Tortugas shrimp fishing grounds and the regular sampling of the escapement of small shrimp through the cod end of varying mesh sizes was continued. The September trip concluded the contract with this vessel and data have now been gathered throughout one year. These are being processed and a report is being prepared covering this project. A recommendation was made to the State Board of Conservation that if regulations are imposed to restrict the capture of small shrimp, the best regulation at present seems to be a minimum mesh size of $2\frac{1}{4}$ ".

The U. S. Fish and Wildlife Service took two scientists of the Marine Laboratory aboard its M/V George M. Bowers to make observations on catches from the Tortugas fishery. During this cruise a study was made on the effect on small pink shrimp of passing through the meshes of a trawl. A tank on the vessel's deck supplied with fresh sea water made it possible to observe the shrimp for an extended period of time. It is already possible to report that it appears likely that nearly all shrimp survive the passage through the net, thus removing a possible flaw in this type of regulation.

An analysis of the Tortugas pink shrimp fishery has been commenced. This analysis should provide information on the trends in abundance from the beginning of the fishery in 1950 to the present, upon which intelligent regulations can be based to provide maximum sustained yield.

Spoilage Control in Shrimp: Studies were begun to determine the preservative action on shrimp of aureomycin ices prepared with three different stabilizers. Results from the tests indicate that carrageenin is the best stabilizer used in conjunction with aureomycin.

Studies of carrageenin-aureomycin ices are continuing and tests are currently under way to determine the effect on black spot development of aureomycin ice when prepared with a low calcium content carrageenin.

Fish Rancidity and Pigmentation Studies: Further tests were continued on the application of seven different antioxidants and sequestering agents to breaded mullet in the control of rancidity. Results from the tests run on mullet which had been frozen for a period of four months indicate that combinations of ionol with citric acid and carboxy-methyl-cellulose has a definite effect on the controlling of rancidity which would ordinarily have developed.

Taste panel scores on an experiment designed to determine the retarding effect of ionol on the development of rancidity when applied to fresh mackerel, in almost all cases indicated that the onset of rancidity had been retarded when compared to a

control of non-treated mackerel stored for the same length of time.

A series of tests were run using ionol to control the bleaching of defrosted or thawed red snappers.

These tests have shown that the characteristic red pigment can be retained in samples treated with ionol after as long as a six months storage period. The controls, which had not been treated, showed bleaching.



Food Irradiation Sterilization Site Chosen

The selection of Sharpe General Depot at Stockton, Calif., as the site of the U. S. Army Ionizing Radiation Center was announced jointly on November 9 by the Department of Defense and the Atomic Energy Commission. The center will investigate the use of ionizing radiation in the preservation of food.

The Army's Quartermaster Research and Development Command at Natick, Mass., will direct operations of the center. Work is expected to begin during the 1957 fiscal year and the center is expected to be in operation late in 1958.

"Initially," it was announced, "the center will have as its primary mission the development of methods of utilizing ionizing radiation to preserve foods and to determine the economic feasibility of such a process. The processing area will be designed so that a large variety of products may be handled and so that major modifications in processing lines may be effected.

"This aspect of the center's activities will be performed in conjunction with the Quartermaster Food and Container Institute, Chicago, which is conducting the overall Quartermaster Corps research and development program."

Note: See Commercial Fisheries Review, August 1956, p. 30.



Great Lakes Fishery Investigations

BIOLOGICAL STUDIES OF FISH POPULATIONS IN SAGINAW BAY AND SOUTHERN LAKE HURON (M/V "Cisco," Cruise 8): The primary purpose of cruise 8 by the Service's M/V Cisco (October 23-November 5, 1956) was to investigate the fall distribution and spawning condition of fish populations in Saginaw Bay in southern Lake Huron. Gill nets (1-, 1½-, 2-, 2¼-, 2½-, 2¾-, 3-, and 4-inch) were set on the bottom off Sand Point, Charity Island, and Fish Point in Saginaw Bay, and in 25 fathoms and 50 fathoms in southern Lake Huron between Harbor Beach and Goderich. Oblique gill-net sets were made off East Tawas in 13 and 26 fathoms and a bull net (300 feet long, 120 meshes deep) was set in 26 fathoms off East Tawas.

Bloaters (Leucichthys hoyi) made up a considerably larger percentage of the catch of the 50-fathom set in Lake Huron than was the case during the summer. The bloaters were for the most part small. Long jaws (L. alpenae), L. kiyi, and a few L. reighardi were also taken in this set. The bulk of the fall-spawning longjaws and L. kiyi were still not ripe, although a very few of the longjaws had completed their spawning. The catch in the 25-fathom set was larger than that of the deeper set and was predominately bloaters (366 of this species). There were also 6 L. reighardi; 1 lake herring (L. artedi) and 68 smelt (Osmerus mordax). This latter species appears to move out into deeper water in late summer and fall.

The catches in Saginaw Bay were generally light, although a large catch of small perch (Perca flavescens) was made in the small mesh off Fish Point. Four walleyes (Stizostedion vitreum vitreum) were caught off Sand Point, 27 off Charity Island, and one off Fish Point. Sixteen of them were tagged and released. Other species taken in the bottom sets were herring, white suckers (Catostomus commersoni), white

bass (Lepibema chrysops), carp (Cyprinus carpio), stonecat (Noturus flavus), sauger (Stitzostedion canalense), and smelt. Only one smelt was caught. Apparently there are relatively few adult smelt in the Bay at the present time.

The 13-fathom oblique nets took only one fish, a herring, and the oblique set in 26 fathoms caught several bloaters, longjaws, smelt, and 2 herring. The herring were near the surface, while the other fish were scattered from 13 fathoms beneath the surface to the bottom. The bull net, which was set so that its float line was 110 feet beneath the surface, caught 9 herring, 13 longjaws, 54 bloaters, 2 L. kiyi, and 55 smelt. Although the gill net catches indicate that the herring have begun to move into Saginaw Bay for spawning, none of them was found to be in a spawning condition.

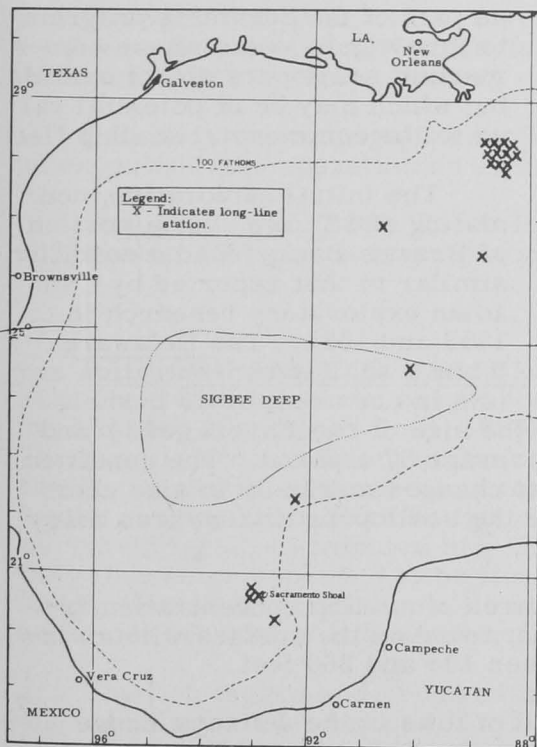
Trawling tows were made off East Tawas in from 7 to 10 fathoms. The catches were practically all smelt fry and alewife (Pomolobus pseudoharengus) fry. Approximately 10,000 alewives ranging in size from 2 to $3\frac{1}{2}$ inches were taken in one 12-minute tow at 7 fathoms.

Hydrographic transects were run from Bay City to East Tawas, East Tawas to Harbor Beach, Harbor Beach to Goderich, East Tawas to Oak Point, and Hat Point to Au Sable Point. The latter two transects were made as part of a synoptic study that was carried out in cooperation with the Michigan Conservation Department.

Due to continued unseasonably warm weather, surface water temperatures showed practically no decline during the cruise. Temperatures were mostly 11-12° C. (51.8-53.6° F.), with extremes ranging from 7.0° C. (44.6° F.) to about 13° C. (55.4° F.), except near the mouth of the Saginaw River where the water was considerably warmer.



Gulf Exploratory Fishery Program



M/V Oregon cruise 41 (Nov. 16-Dec. 13, 1956).

GOOD CATCH OF YELLOWFIN TUNA MADE IN GULF (M/V Oregon, Cruise 41):

Thirty-five tons of yellowfin tuna were caught in the Gulf of Mexico on 20 sets of long-line gear, during cruise 41 of the Service's exploratory fishing vessel Oregon (November 4-December 13, 1956). The sets averaged 67 baskets (670 hooks) each.

The cruise was divided into two sections. From November 16-30, 10 sets were made between the Mississippi Delta and the Gulf of Campeche. Highest catch rates were found in the Mississippi Delta area (6.6 yellowfin/100 hooks) and west of Sacramento Shoal in the Gulf of Campeche (3.7 to 8.6 yellowfin/100 hooks). Through the central Gulf, catch rates varied from 0.2 to 1.3 yellowfin tuna/100 hooks. The average weight of yellowfin in the Campeche area was 76 pounds, compared to an average weight of 123 pounds in the northern Gulf.

During December 3-13, 10 sets were made in an area 30 to 40 miles southeast of South Pass. Catch rates varied from 3.7 to 8.6

yellowfin/100 hooks, and during the first seven days over 25 tons were landed.

The yellowfin tuna ranged in weight from 15 to 185 pounds, and averaged 116 pounds each for the entire trip; 12 percent of the 603 yellowfin caught were damaged to some extent by sharks. The remaining whole yellowfin weighed 61,844 pounds.

In addition, 9 broadbill swordfish (1,330 pounds), 11 white skipjack, 7 blackfin tuna, 35 white marlin, 4 blue marlin, 14 wahoo, and 107 sharks (5 species) were caught on the long lines. Three white marlin and two blue marlin were tagged and released.

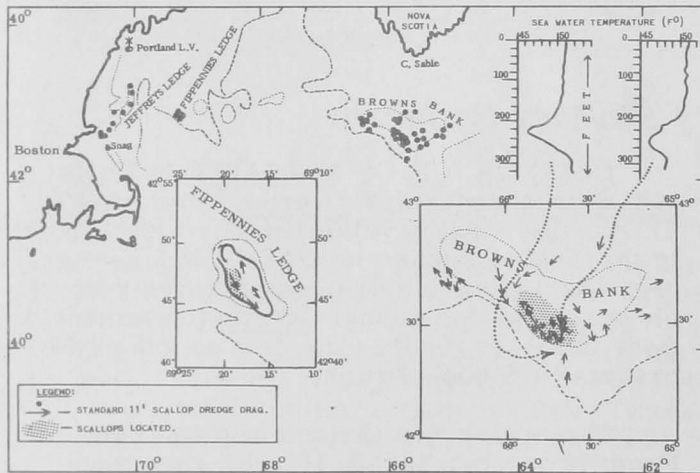
Menhaden and croakers were used as bait. Catch rates on the menhaden were 4.4 yellowfin/100 hooks, compared to 1.7/100 hooks for croakers.

Large surface schools of mixed blackfin tuna and white skipjack were observed daily throughout the cruise. During the early morning hours of December 11, large surface schools of spawning mullet were observed under the dip-netting lights, at lat. 28° 25' N., long. 88° 44' W. in over 750 fathoms.



North Atlantic Fisheries Exploration and Gear Research

SCALLOP BEDS FOUND ON BROWNS BANK (M/V Delaware, Cruise 28): The first exploratory cruise for new scallop grounds was made by the Service's research trawler Delaware during a trip to Browns Bank that ended November 27, 1956. It was discovered that Brown's Bank supported a sizable population of small sea scallops. The cruise was made as part of the Service's program to investigate areas where commercial scallopers do not operate, but which may be of potential value to the commercial scallop fleet.



M/V Delaware cruise 28, Nov. 13-21 and Nov. 23-27, 1956

The initial exploration, consisting of 38 tows over a portion of Browns Bank, found a condition similar to that reported by Canadian exploratory research in 1953 and 1954. The Delaware found a scallop concentration exists in one area, as 15 bushels were taken during one 40-minute tow. However, the size of shell averaged $3\frac{3}{4}$ " and the yield of scallop "eyes" (meats) was found to average 57 a pound. The condition of the scallop stocks in this area evidently has not changed markedly in size composition during the past two years. Tows outside the scallop-producing area many times resulted in extensive gear damage.

Two casts with the Bathythermograph in the area of scallop concentration indicated a bottom water temperature similar to that found on the surface with an intrusion of 5° F. cooler water over the area between 180 and 260 feet.

The second phase of the exploration consisted of tows in the Jeffreys Ledge and Fippennies Ledge areas. One 20-minute tow by the Delaware on Fippennies

yielded 75 scallops of 4½" and 5" size with 37 eyes a pound. Heavy weather hampered operations all during the second phase and prohibited any further exploration in this area for its commercial potential.



North Atlantic Fisheries Investigations

YOUNG FISH DISTRIBUTION SURVEYED BY "ALBATROSS III" (Cruises 81 and 82): During the course of two cruises (November 2-10 and November 13-21, 1956), the Service's research vessel Albatross III made 94 trawl tows in New England waters--65 in the Gulf of Maine, and 29 in the offing of southern New England, Long Island, and New Jersey. Operation was favored by unusually good weather conditions for the time of year.

The objectives were to determine the distribution and number of young-of-the-year and older demersal fish in New England waters and to undertake special studies on haddock, whiting, sea herring, and red hake (ling) concerned with the distribution of stocks, food habits, and age and growth; to conduct high-frequency ground wave propagation studies relative to future work with telebouys and transponding units which will be used to transmit data on ocean conditions to receiving units ashore.

Census work on bottom fish populations and invertebrate life was successfully carried out and hydrographic data collected. Ground wave propagation transmissions were made when time permitted.

Principal species caught in the Gulf of Maine were haddock, whiting, ocean perch, fluke, red hake, skates, and dogfish in addition to over 25 other species. In the offing of southern New England whiting, butterfish, red hake, and dogfish dominated the tows.

Young-of-the-year haddock were found largely in the Gulf of Maine and were very scarce in southern New England waters. Young-of-the-year whiting were numerous over the entire fishery especially at depths between 20 and 40 fathoms.

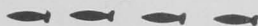
Ground-wave propagation studies so far show a workable range of 40 miles can be expected from operation on a carrier frequency of 28,100 kilocycles.

The Albatross III left Woods Hole on November 27 for three days to test an underwater TV camera as an observation device in trawl nets.

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HADDOCK AND COD TAGGED ON GEORGES BANK (M/V Albatross III, Cruise 84): Over 80 otter-trawl caught cod and haddock were tagged on Georges Bank during a cruise (December 6-14, 1956) by the Service's research vessel Albatross III. The tagging area on Georges Bank was north of 41°20' N. latitude and east of 67°40' W. longitude. Twenty-eight tows, mostly of one hour duration, were made in depths ranging from 20 to 60 fathoms. The catch was culled and specimens chosen were held for a few minutes in a large tank of running sea water at about 50° F. Only fish which appeared to be lively were tagged, and records were kept of the length of each tagged fish and its apparent condition on release. Two working days were lost because of bad weather.

The fish tagged and released included 698 haddock, 30-64 cm., yellow Petersen disc on left opercle; 113 cod, 31-115 cm., yellow Lea tag anchored by plastic strip inserted in coelom; 1 halibut, 110 cm., tagged like cod.



Oregon

TROLL-CAUGHT SALMON LANDINGS FOR 1956: The landings of troll-caught chinook or king salmon in Oregon in 1956 were the highest recorded since 1922, according to a December 19, 1956, news release by the Fish Commission of Oregon.

The high chinook salmon troll catch of approximately 4 million pounds was made even though the season opening was delayed 30 days last spring. Chinook trolling off the Columbia river was considered only fair this year, but landings at other Oregon coastal areas were up considerably from previous years.

Silver or coho salmon landings by trollers at Oregon ports in 1956 totaled more than 3 million pounds, which was considered good but not exceptional. Silver salmon troll catches through August this year were higher than the five-year average for the period, but lighter landings were made in September and October 1956, probably due to the switch from salmon fishing to albacore tuna fishing by many boats late in the season.

The Fish Commission biologist in charge of troll salmon studies said the later troll season opening in 1956 was adopted to give added protection to declining fall chinook salmon runs in the Columbia River. Previous fish tagging and fin-marking experiments have indicated that Columbia River fall chinook are concentrated between Grays Harbor and the mouth of the Columbia in early spring and are fished heavily during the first part of the trolling season.

The biologist stated that the delayed opening of the troll season resulted in increased spawning escapements of fall chinook salmon to hatcheries and natural spawning areas in the lower Columbia system in 1956. More stringent restrictions on gill-net fishing in the Columbia were also considered a factor in the increased fall Chinook escapements.

Sampling of troll catches was continued by the Fish Commission this year with examination of 147,000 chinook and silver salmon, primarily at Astoria and Newport. During the season 100 fin-marked fish were observed in the catches sampled. Analysis of the marked fish recoveries will provide further information concerning survival and ocean migration of salmon and the percentage of fish caught in different areas along the coast.



Oysters

FREE LIQUID STILL LIMITED TO 5 PERCENT BY WEIGHT: Regulations for the fresh shucked and canned oyster trade which were adopted by the National Conference of Weights and Measures at the annual meeting in Washington, D. C., the last week in May 1956 stated that:

The regulations for "Raw or Fresh Oysters" indicated that the "raw or fresh oysters in tins, glass, or other containers . . . shall not contain more than 10 per cent liquid"

The U. S. Food and Drug Administration points out that there has been no change in the standards under the Federal Food, Drug, and Cosmetic Act which provide for a limit of only 5 percent free liquid by weight.



Puget Sound Canned Salmon Pack, 1956

The total pack of canned salmon in the Puget Sound area of Washington amounted to about 278,000 standard cases (48 1-lb. cans), according to preliminary data compiled by the U. S. Fish and Wildlife Service.

Table 1 - Washington's Puget Sound Canned Salmon Pack 1952-56

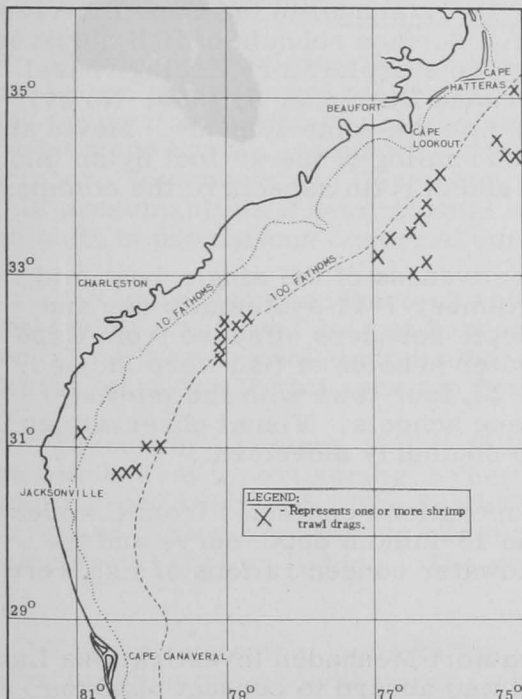
Species	1/1956	1955	1954	1953	1952
 (Standard Cases 2/)				
Red or sockeye	115,111	121,913	579,575	216,984	214,540
Chinook or king	3,000	10,177	6,281	3,985	7,887
Silver or coho	72,000	73,526	33,596	54,943	173,238
Pink	8,000	436,280	14,059	452,054	4,711
Chum or keta	80,000	88,672	294,799	154,476	297,494
Total	278,000	730,568	928,310	882,442	697,870
1/ Preliminary estimates.		2/ 48 1-lb. cans.			

The canned salmon pack includes 140,000 cases packed from Puget Sound-caught fish, 98,000 cases from Alaska-caught fish, and 40,000 cases from imported fish from British Columbia. The pack was much lower than anticipated due to a very poor run of chum salmon, both in Puget Sound and British Columbia and also because it was the off-year for pink salmon.



South Atlantic Exploratory Fishery Program

ROYAL-RED SHRIMP DISTRIBUTION SURVEYS CONTINUED (M/V Combat, Cruise 6): The coastal area of the South Atlantic, between Florida and North Carolina, was surveyed for concentrations of royal-red shrimp in two trips (mid-October to mid-November 1956) by the Service's chartered vessel M/V Combat. The first trip in October was designed to obtain further information on the apparent dispersal of the royal-red shrimp following the passing of the hurricane in September.



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Catches in the St. Augustine area, where large concentrations were located, prior to the hurricane, contained only small numbers of shrimp. Seven drags with a 40-foot shrimp trawl in 180 to 200 fathoms resulted in catches of only 15 pounds of shrimp an hour or less.

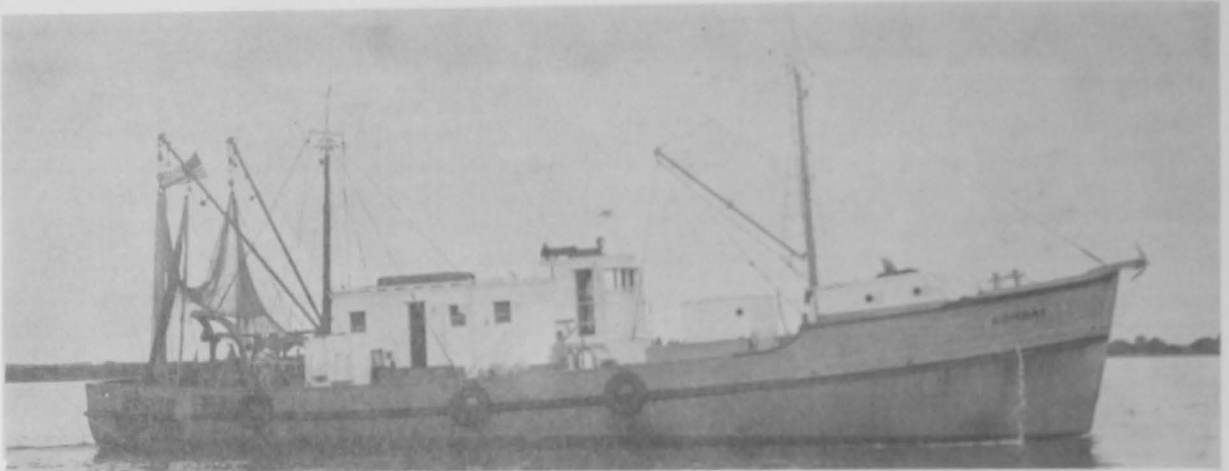
In late October, trawling coverage extended southward, out to depths of 230 fathoms. On October 25, good fishing concentrations were located in 150-160 fathoms ENE. of Daytona Beach. Twenty-four hours of round-the-clock fishing yielded over 800 pounds (heads-on) shrimp. The trip was then discontinued due to depth-recorder trouble.

During October 31-November 19, the Combat carried out exploratory dragging off the coasts of Georgia, South Carolina, and North Carolina. Using a 40-foot trawl, night trawling off South Carolina in 23-25

Location of exploratory trawling stations by the M/V Combat during October-November 1956.

fathoms caught large rock shrimp (*Sicyonia* sp.) at rates of 25 to 35 pounds an hour. Twelve drags in 18-50 fathoms in daytime failed to catch a single commercial shrimp.

Between Cape Hatteras, N. C., and Cape Fear, Fla., 15 drags were made in 125 to 250 fathoms. Two of these resulted in the loss of trawl and doors and



The shrimp vessel Combat chartered by the U. S. Fish and Wildlife Service for exploratory fishing in the South Atlantic waters between Florida and North Carolina.

several other drags severely damaged the trawls. Several species of deep-water shrimp were caught, but in very small numbers. Most abundant was the small (60 count, heads-off) *Penaeopsis megalops*, although the best catch contained only three pounds.

* * * * *

MIDWATER TRAWL TESTED ON MENHADEN (M/V George M. Bowers, Cruise 7-A): Midwater trawling for menhaden (*Brevoortia tyrannus*) in the Cape Hatteras area during November 1956 produced no fish. All surface schools of fish dispersed when trawling approaches were made by the Service's exploratory fishing vessel George M. Bowers during a 34-day cruise that ended December 4, 1956. No evidence of their subsurface scattering was detected on the depth sounder. Movie and still cameras were used to record the setting and hauling of the 40-foot nylon midwater trawl, the behavior of menhaden schools, and certain aspects of the commercial fleet's purse-seining operations.

This cruise attempted to determine the effectiveness of the single-boat midwater trawl in taking pelagic fish. Between November 7-11 systematic day and night scouting operations were conducted with depth sounders offshore from Cape Lookout to Cape Hatteras. No surface or midwater schools of fish were located. After the appearance of menhaden on November 23, four tows with the midwater trawl were unsuccessful when set on large surface schools. Visual observations of numerous menhaden schools revealed erratic southerly movement.

From November 29-December 3, scouting operations continued from Charleston, S. C., to Cape Canaveral, Fla., between the 15-fathom depth curve and the edge of the continental shelf. No surface or midwater concentrations of fish were observed.

A fisheries biologist from the Service's Beaufort Menhaden Investigations Laboratory cooperated in these field operations and was aboard to conduct plankton tows to determine the distribution of menhaden eggs and larval forms.

Considerable time was lost during the cruise due to bad weather.

The George M. Bowers was scheduled to depart Miami January 3, 1957, on a three-week cruise to the northeastern Gulf of Mexico waters of the continental shelf. Mission of the cruise was to continue experimental midwater trawling in joint operation with the U. S. Fish and Wildlife Service's exploratory fishing vessel Oregon based at Pascagoula, Miss.



South Carolina

FISHERIES BIOLOGICAL RESEARCH PROGRESS, SEPTEMBER-DECEMBER 1956: Oyster Research: In October 1956 a small lot of seed oysters was shipped from Bears Bluff to the Chesapeake Biological Laboratory at Solomons, Md., thus continuing the cooperative study on seed oysters begun 6½ years ago. An ever-increasing need for seed oysters in the Chesapeake Bay region makes these cooperative studies more important, Progress Report No. 30 (September-December 1956) of the Bears Bluff Laboratories points out.

Closely allied to seed oyster studies are the investigations made during the quarter on the growth and mortality of young of-the-year oysters. Likewise, experiments on the use of a substitute cultch for setting of young oysters will prove useful to the development of a seed oyster industry in South Carolina.

Shrimp Research: Offshore exploratory fishing during the quarter added to the present knowledge of South Carolina's offshore fishing potential. However, no startling discoveries were made. The offshore research vessel T-19 made 43 experimental drags in depths up to 45 fathoms. Commercially-valuable species caught included rock shrimp (Sicyonia brevirostris), scup or porgy, vermilion snapper, sea bass or blackfish, fluke, large croaker, but no commercial shrimp in depths greater than 6 fathoms.

Previous experimental tows made by Bears Bluff research vessels pointed out that brown shrimp were making up the bulk of the catch in May through August 1956. The proportions began to shift by September when only 35 percent of the shrimp caught were brown. During the quarter the trend was completely reversed and in October, November, and December, white shrimp made up 95 percent of the catch. This presumably is a near-normal seasonal situation except that in previous years the shift in populations occurred earlier--even in August.

The increased abundance of white over brown shrimp during the quarter can be oversimply explained by two happenings: (1) the dispersal and disappearance at sea of the large brown shrimp after spawning in September and (2) the seaward migration of small white shrimp from inshore waters.

These white shrimp, if they follow the pattern of other years, will remain under the beaches until next spring. They constitute the residual stock from which next year's crop is derived. The South Carolina General Assembly, in March 1956, gave increased protection to these shrimp by extending the limits of the closed season for commercial shrimp fishing. The season is now closed from December 15 to March 15.

The Laboratories' records for the fourth quarter compared with the same period in previous years indicate that white shrimp were not as abundant. If overfishing is solely responsible for this indicated decline in the population of white shrimp, it then follows that the longer closed season should result in a more abundant crop next spring.

Crab Research: In October 1956, the biologist in charge of crab investigations for the Department of Research and Education of Maryland, came to Bears Bluff to study and measure South Carolina blue crabs. The trawler Constance and the Laboratories' research vessel T-19 secured the necessary crabs for measurement. Studying only the adult female crabs that had already reached their maximum growth, the biologist came up with the following tabulations: South Carolina crabs are 0.2 percent smaller than Delaware Bay crabs but 14.4 percent larger than those from New Jersey; 3 percent larger than Chesapeake Bay crabs; 4 percent larger than those of North Carolina; and 6.5 percent larger than Florida crabs.

Salt Water Ponds: In late November an automatic flood gate in one experimental salt-water pond failed to close properly and due to near tides the pond water remained very low. Predation on the fish and shrimp in the pond by ducks (Mergansers) seemed heavier than usual, so this pond was completely drained on December 13.

A check-up on the shrimp and fish stocked on August 6, when last the pond was drained, showed that 5 of the 6 black drum (Pogonias cromis) were gone. The remaining one had apparently grown from 6.5 to 13 inches. All spot (Leiostomus xanthurus) were gone, as were all croaker (Micropogon undulatus). Some mullet (Mugil sp.) remained but 66.6 percent had disappeared. Those remaining showed little growth. More than 500 white shrimp (Penaeus setiferus) had been stocked in August, but now only one white shrimp was recaptured. This individual had grown about one inch in length--at least in December it measured one inch more than those of the largest shrimp stocked.

The leaking flood gate had not displaced the screens to the pond so that it is probable that the missing specimens did not escape but were either eaten by ducks or otters, or just died.

Some fish and shrimp had entered the pond since August 6. These, because of the screening, must have entered when quite small: 13 spotted shrimp (Penaeus duorarum) 4.5 inches in length; 17 winter sea trout (Cynoscion nebulosus) with a mode of 7 inches; and 5 mullet with a mode of 6 inches were harvested on December 13.

The total harvest of stocked and naturally-recruited specimens to the pond was small but the results give an indication of heavy mortality, much of which can be blamed on predation by water fowl.



Transportation

RAIL FREIGHT AND EXPRESS RATE INCREASES GRANTED: Effective December 28, 1956, the Interstate Commerce Commission granted interim rail freight rate increases. The increases will be 5 percent within the West, 7 percent within the East, and 5 percent on traffic moving between the East, West, or South. No increases were granted for traffic moving wholly within the South, as the hearing on the Southern Railroad's request for a 7 percent increase is set for January 7, 1957.

Maximum increases were prescribed on several commodities, including a 7 cents a 100-lb. maximum on canned or preserved food products. No increase was prescribed for refrigeration or demurrage charges. The Commission also stated that it would expect the railroads to refund any difference between these increases and any lesser increases that may be prescribed as a result of the forthcoming investigation of the carriers' principal petition for a 15-percent increase in Ex Parte 206.

The Commission also decided not to suspend the Railway Express Agency's tariffs providing for a 4-percent increase in all express rates and charges, effective December 27, including reicing charges. The Eastern railroads' petition for a 15-percent increase in express rates within Eastern territory was still pending.



United States Fishing Fleet^{1/} Additions

A total of 30 fishing vessels of 5 net tons and over were issued first documents as fishing craft during November 1956, according to the U. S. Bureau of Customs.

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft, by Areas, November 1956 and Comparisons

Area	Nov.		Jan. - Nov.		Total
	1956	1955	1956	1955	
	(Number)				
New England	-	1	14	18	18
Middle Atlantic	-	1	23	13	13
Chesapeake	11	7	120	51	54
South Atlantic	5	3	111	64	65
Gulf	7	5	96	97	103
Pacific	3	2	74	112	117
Great Lakes	4	2	6	9	9
Alaska	-	4	40	35	35
Hawaii	-	-	-	3	3
Virgin Islands	-	-	-	-	1
Total	30	25	484	402	418

Note: Vessels assigned to the various sections on the basis of their home ports.

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft, by Tonnage, November 1956

Net Tons	Number
5 to 9	17
10 to 19	7
20 to 29	3
30 to 39	1
40 to 49	1
100 to 109	1
Total	30

This was 5 vessels more than the number reported for the same period last year.

The Chesapeake area in November led with 11 newly-documented craft, followed by the Gulf with 7, the South Atlantic with 5, the

Great Lakes with 4, and the Pacific with 3.

A total of 484 fishing vessels was documented for the first time during the first eleven months of 1956--an increase of 82 craft or 20 percent as compared with the corresponding period of a year earlier. During the first eleven months of 1956, Chesapeake led all other areas with 120 newly-documented vessels, followed by the South Atlantic area with 111.

^{1/}Includes both commercial fishing and sport fishing craft.



U. S. Foreign Trade

Table 1 - United States Foreign Trade in Edible Fishery Products, September 1956 With Comparisons

Item	Quantity			Value		
	Sept. 1956	1955	Year 1955	Sept. 1956	1955	Year 1955
	(Millions of Lbs.)			(Millions of \$)		
Imports:						
Fish and shellfish:						
Fresh, frozen, & processed ^{1/}	56.3	58.2	769.9	17.5	16.4	206.4
Exports:						
Processed ^{1/} only (excluding fresh & frozen)	4.4	4.1	91.0	1.7	1.7	21.6

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

EDIBLE FISHERY PRODUCTS, SEPTEMBER

1956: Imports of edible fresh, frozen, and processed fish and shellfish in September decreased 24 percent in quantity and 21.9 percent in value as compared with August 1956. Compared with September 1955 the imports for Sep-

tember 1956 were lower by 3.3 percent in quantity, but were higher by 6.7 percent in value. September 1956 imports averaged 31.1 cents a pound as compared with 28.2 cents a pound for the same month in 1955.

Exports of processed fish and shellfish in September 1956 declined about 8 percent in quantity compared with the previous month, but were 8 percent above September 1955. The September 1956 value of these exports was 54.5 percent higher than the previous month, but was unchanged from September 1955 a year ago.

* * * * *

GROUND FISH FILLET IMPORTS DECLINE IN NOVEMBER 1956: During November 1956, the United States imported a total of 5.7 million pounds of cod, haddock, hake, pollock, and ocean perch fillets and blocks. This was a decrease of 5.4 million pounds (49 percent) compared with imports during the same month in 1955. The decrease was due primarily to lower imports from Canada (down 1.5 million pounds).

Groundfish and ocean perch fillets received from Canada during November 1956 amounted to 5.0 million pounds or 87 percent of the total. The remaining 13 percent was received from Iceland, Denmark, the Netherlands, France, West Germany, and Greenland.

Eleven countries exported 134.4 million pounds of groundfish and ocean perch fillets to the United States during the first 11 months of 1956 as compared with 125.7 million pounds in 1955. Canada (96.3 million pounds) led all other countries with 72 percent of the 11-month total. Iceland (26.6 million pounds) was in second place, followed by Norway (3.9 million pounds), Denmark (3.0 million pounds), and West Germany (2.0 million pounds).

* * * * *

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA PROVISIO: The quantity of tuna canned in brine which may be imported into the United States during April 16 through December 31, 1956, at the 12½-percent rate of duty is limited to 28,757,393 pounds. Any imports in excess of that quantity will be dutiable at 25 percent ad valorem.

Imports under the quota from April 16-December 1, 1956, amounted to 25,849,544 pounds, according to data compiled by the Bureau of the Customs. This leaves a balance of 2,907,849 pounds of the quota which may be imported in the last month of 1956 at the 12½-percent rate of duty.



Wholesale Prices, November 1956

Although some cold weather prevailed in some sections of the country during November 1956, conditions at sea were, on the average, more favorable to the fishermen than during the same month a year earlier. The catches in some of the major fisheries were better than past experience would indicate--particularly in the New England haddock and whiting fisheries, the Gulf shrimp fisheries, and the West Coast tuna fishery. The November 1956 wholesale price index (118.4 of the 1947-49 average) for all edible fish and shellfish (fresh, frozen, and canned), which took a step upward following a two-month downward trend, increased 5.2 percent over October and 5.7 percent over November 1955. The changes in the index from October to November 1956 were due primarily to higher wholesale prices for fresh and frozen shrimp and haddock.

The drawn, dressed, and whole finfish subgroup index for November increased by 4.5 percent when compared with October and 7.3 percent as compared with November 1955. The major change from October to November was an 81-percent

increase in the wholesale price for fresh drawn haddock at Boston. All the other varieties in this subgroup were priced lower when compared with the previous month. The downward movement of wholesale prices for halibut and salmon between October and November does not actually represent any change in the market for these species, but merely a shift in marketing and pricing frozen instead of fresh halibut and salmon. Fresh halibut and salmon were fairly scarce in October and practically disappeared from the market in November.

Because of higher prices for fresh headless shrimp at New York City and fresh haddock fillets at Boston, the November 1956 index for processed fish and shellfish increased 8.1 percent over October and 15.7 percent over the same month in 1955. Fresh haddock fillet prices in November were up 27.7 percent from October, but were lower by 4.2 percent when compared with November 1955. Fresh shrimp prices in November were also higher by 14.8 percent as compared with October and close to 28 percent higher than for November 1955. Fresh shucked oysters were unchanged from October but were up by about 9 percent from November 1955.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, October 1956 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices ^{1/} (\$)		Indexes (1947-49=100)			
			Oct. 1956	Sept. 1956	Oct. 1956	Sept. 1956	Aug. 1956	Sept. 1955
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					112.5	114.3	114.6	107.4
Fresh & Frozen Fishery Products:					122.0	125.8	126.5	110.1
Drawn, Dressed, or Whole Finfish:					122.5	132.6	131.2	115.6
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.07	.10	67.4	100.1	101.3	106.3
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.43	.45	135.5	139.2	136.9	99.3
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.67	.68	150.6	151.7	148.3	135.1
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.75	.61	185.9	151.2	121.5	161.1
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.80	.74	161.8	149.6	131.4	161.7
Lake trout, domestic, No. 1, drawn, fresh	Chicago	lb.	.75	.58	153.6	117.8	122.9	116.8
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.36	.50	83.3	117.3	129.0	75.1
Processed, Fresh (Fish & Shellfish):					125.4	126.3	122.2	108.9
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.27	.29	91.9	97.0	97.0	102.1
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.71	.72	112.2	113.0	110.2	87.1
Oysters, shucked, standards	Norfolk	gal.	6.00	6.00	148.5	148.5	142.3	136.1
Processed, Frozen (Fish & Shellfish):					106.2	102.9	114.5	93.3
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.39	.40	102.1	103.4	103.4	102.1
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.28	.28	86.3	86.3	86.3	84.7
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.27	.28	108.8	110.8	110.8	106.7
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.69	.64	105.7	99.2	120.4	83.3
Canned Fishery Products:					99.0	98.0	97.7	103.4
Salmon, pink, No.1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	22.65	22.65	122.0	120.0	120.0	114.8
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	10.85	10.60	78.2	76.4	76.4	92.3
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	7.75	7.50	90.4	87.5	87.5	88.1
Sardines, Maine, keyless oil, No. 1/4 drawn (3-1/4 oz.), 100 cans/cs.	New York	cs.	7.70	7.70	81.9	81.9	79.8	87.3

^{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.

The subgroup index in November for frozen processed fish and shellfish reflected the higher frozen shrimp prices at Chicago. Frozen fillet prices were about unchanged from October and the same month a year ago. The November 1956 index for this subgroup increased 11.7 percent as compared with October and was up 8.1

percent over November 1955. Frozen shrimp prices rose 20.4 percent from October to November and were 15.7 percent higher than in November 1955--a reversal of the usual fall trend which is generally downward.

Prices for canned fishery products in general have moved upward steadily for the previous three months due to firm markets for both the California and Maine sardines. The subgroup index for all canned fish rose 1.6 percent when compared with the previous month, but was still about 2 percent below November 1955. The season for packing Maine sardines ended on December 1 and although the pack was fair it was below the average for the last ten years. In November the catch of California sardines was disappointingly low. Although the pack of canned tuna at the end of November was at a record level, sales have been good and shorter packs of competing canned fish have tended to strengthen the canned tuna market.



OCEAN PERCH CASSEROLE IS POPULAR

Frozen ocean perch fillets--plentiful and moderately-priced--rate very high in popularity. They have the added attraction of offering welcome relief from year's-end food budget problems.

This mild and agreeably-flavored fish is excellent in combination with other foods. A casserole containing fish (which is a high quality protein food), vegetables, and topped with pastry is a well-rounded meal in itself. Baking and serving this casserole in the same dish is an easy way to bring food piping hot to the table.

The home economists of the United States Fish and Wildlife Service recommend "Ocean Perch and Vegetable Pie" as a moderately priced well-rounded casserole dish.

OCEAN PERCH AND VEGETABLE PIE

1 POUND OCEAN PERCH FILLETS, FROZEN	$\frac{1}{4}$ TEASPOON SALT
1 QUART WATER	DASH PEPPER
1 TABLESPOON SALT	1 CAN (10 $\frac{1}{2}$ OUNCES) CONDENSED
2 TABLESPOONS BUTTER OR OTHER FAT	$\frac{1}{2}$ VEGETABLE SOUP
2 TABLESPOONS FLOUR	$\frac{1}{2}$ CAN WATER
	1 CUP PASTRY MIX

Thaw fillets. Skin fillets and place in boiling salted water. Cover and return to boiling point; simmer 10 minutes or until fish flakes easily when tested with a fork. Drain and flake.

Melt butter; blend in flour and seasonings. Add soup and water; cook until thick, stirring constantly. Add fish. Pour into well-greased casserole. Prepare pastry as directed. Cover casserole with pastry. Bake in a very hot oven, 450° F., for 20 to 25 minutes or until brown. Serves 6.