

TRENDS AND DEVELOPMENTS

California

SPINY LOBSTER REGULATIONS AND SHRIMP TRAWLING QUOTAS CHANGED:

New rules adopted for the California spiny lobster fishery by the California Fish and Game Commission prohibit the pulling of traps at night and require uniform-size permit numbers on trap buoys.

Shrimp trawling quotas were changed in two areas by the Commission. The quota in the area off California between the Oregon border and False Cape, Calif., was raised from 1,250,000 to 1,500,000 pounds. The quota in the area between False Cape and Point Arena, Calif., was lowered from 850,000 to 250,000 pounds.

The Commission made the changes at its August 24, 1962, meeting in San Francisco.

GROWTH STUDIES AND ABUNDANCE OF MARKET CRABS INVESTIGATED:

M/V "Nautilus" Cruise 62-N-2a-Crab (January 15-19, 1962), 2b (February 12-16), 2c (March 12-16), 2d (April 9-13), 2e (May 7-11), 2f (June 18-22): A series of cruises by the California Department of Fish and Game research vessel *Nautilus* in the coastal waters off central California from Bodega Bay to San Francisco. The two objectives of these cruises were: (1) to collect dungeness (market) crabs (*Cancer magister*) for growth studies, using traps and a 10-foot beam trawl, and (2) to determine time of occurrence and relative abundance of crabs in areas of operations.

Collections were made at selected stations from Bodega Head to San Francisco using a 10-foot beam trawl with a 1-inch mesh net, commercial-type crab traps, and 1-inch mesh crab traps. A $\frac{1}{2}$ -inch liner was added to the cod end of the trawl net in May, in order to collect crabs in the first post-larval stages. The crab traps were baited with squid and rockfish and fished overnight. Beam trawling was done at each station.

Each drag lasted about 20 minutes and covered three-quarters of a mile. Exploratory beam trawling was accomplished at stations where traps were not set (fig. 1).

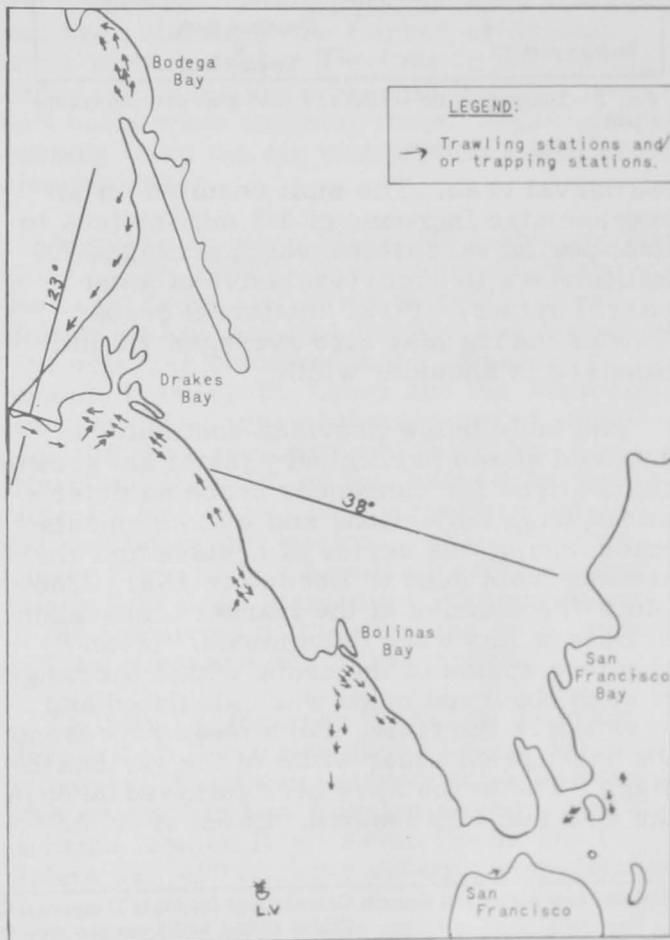


Fig. 1 - Cruises 62-N-2a through f by the research vessel *Nautilus*, showing location of trawl and trap stations.

It was possible to estimate age from the samples taken. At metamorphosis, crabs are about $4\frac{1}{2}$ to 5 months old, calculated from their January hatching. Collections of megalops in May showed the last larval stages averaged 3.7 millimeters. Those megalops were held in an aquarium for 24 to 48 hours where they molted into the first

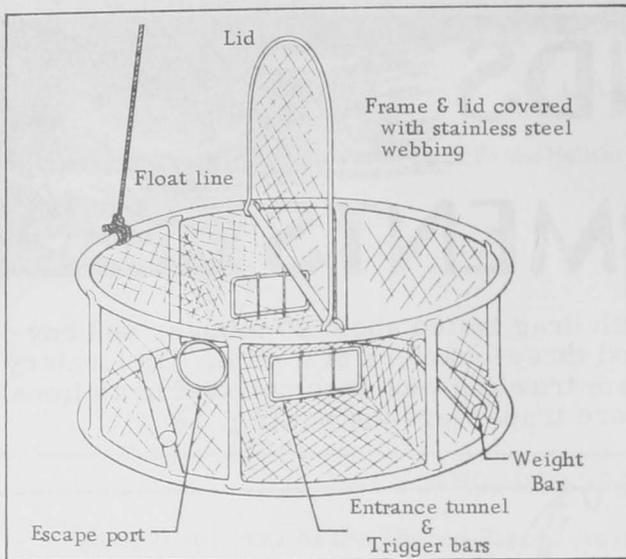


Fig. 2 - Diagrammatic sketch of a crab trap showing escape port.

postlarval crab. The molt resulted in an average size increase of 3.3 millimeters to first postlarval instars which averaged 7.0 millimeters in width (exclusive of antero-lateral spines). First postlarval crabs trawled during May also averaged 7.0 millimeters in shoulder width.

The table below provides continuity of data and shows preliminary instar and growth calculations for dungeness crabs as determined from collections and measurements made during this series of cruises and the cruises from June to December 1961. The width-frequencies of the market crabs taken in Bodega Bay were determined. Mean shoulder widths of the crabs within the range of each observed mode was calculated and is shown in the table. Each mean represents the average shoulder width of the various instars. The crabs have been followed through the 10th and 11th instars. Dates of occur-

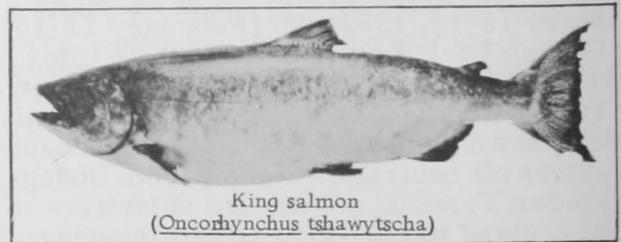
rences include the month in which the crabs were first observed and the month in which they were last observed.

Mating activity of male crabs was determined by examining chelipeds for abrasions and other marks incurred while the male was clutching the female. The smallest male examined was 65 millimeters but none less than 132 millimeters had mating marks. Males over 180 millimeters in shoulder width showed fewer abrasions or marks, and were presumed to have been less active.

MIDWATER TRAWLING FOR SALMON FINGERLINGS CONTINUED:

M/V "Nautilus" Cruise 62-N-7a-Salmon (July 12-13, 1962) and 62-N-7b (July 23-27, 1962): The capture of marked salmon fingerlings on their seaward migration was the objective of both trips by the California Department of Fish and Game research vessel Nautilus. The vessel operated in the Carquinez Strait, using a nylon midwater trawl with a 25-foot square opening. Trawling was conducted between 8 a.m. and 3 p.m., with each tow lasting 20 minutes. Tows were alternated between upstream and downstream, and between the north shore center, and south shore of the channel.

A total of 72 tows completed in the Strait during the cruises yielded a catch of 56 king



Preliminary Instar and Growth Calculations for Male Dungeness Crabs as Determined by Means of Modes from a Width Frequency Graph (Instar sizes 1 and 2 are assumed to be the same for both groups observed.)

Instar	Range in mm. 1/	Mean	Absolute Increase	Percentage Increase	Range in mm. 1/	Mean	Absolute Increase	Percentage Increase	Date of Occurrence
1	7-7	7	0	0	7-7	7	0	0	May-June
2	9-14	11.5	4.5	64.0	9-14	11.5	4.5	64.3	May-Aug.
3	14-19	16.0	4.5	39.1	14-19	15.9	4.4	38.3	June-Oct.
4	18-26	21.1	5.1	31.9	19-24	21.9	6.0	37.7	June-Dec.
5	23-33	27.8	6.7	31.8	26-33	29.2	7.3	33.3	Aug.-Feb.
6	30-41	35.6	7.8	28.1	33-44	39.0	9.8	33.6	Nov.-May
7	39-55	47.1	11.5	32.3	41-56	47.5	8.5	21.8	Nov.-May
8	54-73	63.4	16.3	34.6	56-76	65.4	17.9	37.7	Nov.-June
9	74-92	83.3	19.9	31.4	74-92	83.3	17.9	27.4	Jan.-
10	-	-	-	-	92-106	96.6	13.6	16.3	Feb.-
11	-	-	-	-	108-129	118.3	21.7	22.5	June

1/mm. = millimeters.

salmon (*Oncorhynchus tshawytscha*). None of these fish were marked.

Other Species Caught by the <i>Nautilus</i> on Cruise 62-N-7a and 62-N-7b	
Species	Number
Northern anchovy (<i>Engraulis mordax</i>)	103,000(est.)
Jacksmelt (<i>Atherinopsis californiensis</i>)	16,000(est.)
Sacramento smelt (<i>Spirinchus thaleichthys</i>)	800(est.)
Pacific herring (<i>Clupea pallasii</i>)	500(est.)
Striped bass (<i>Morone saxatilis</i>)	417
King salmon (<i>Oncorhynchus tshawytscha</i>)	56
Northern midshipman (<i>Porichthys notatus</i>)	27
Surfsmelt (<i>Hypomesus pretiosus</i>)	3
American shad (<i>Alosa sapidissima</i>)	1
Three-spined stickleback (<i>Gasterosteus aculeatus</i>)	1

The morning of July 27 was spent in collecting bottom samples in the lower Napa River, in the vicinity of the atomic submarine refueling pens. The samples were to be tested for the presence, or lack, of atomic radiation by the Public Health Department.

Note: See *Commercial Fisheries Review*, September 1962 p. 15.

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PELAGIC FISH POPULATION SURVEY CONTINUED:

Airplane Spotting Flight 62-6-Pelagic Fish (June 13-14, 1962): To determine the distribution and abundance of pelagic fish schools, the area from the United States-Mexican Border to San Luis Obispo Bay was surveyed from the air by the California Department of Fish and Game's Cessna "182" 9042T.

No flights were made on June 11 and 12 because of low overcast. On June 13, the area from the United States-Mexican Border to Pt. Conception, Calif., was surveyed. Thirty-four anchovy schools were counted from the Tia Juana River to about 5 miles north of the river. The area around Pt. Loma could not be surveyed because of military air traffic. Between Dana Pt. and the Santa Ana River, 192 schools of anchovies were counted. Some of the schools were "breezing" and were visible for several miles. From the extent of "breezing" schools visible at sea beyond the limit of the plane's safety factor, it was estimated there were between 500 and 600 schools in the area. Between Topanga Canyon and Pt. Dume, 168 anchovy schools were counted and a few dim spots were observed around Santa Barbara.

The coastline from Long Beach Harbor to San Luis Obispo Bay was surveyed on June 14 but low clouds prohibited operating farther north. In addition to the concentration

between Topanga Canyon and Pt. Dume observed on June 13, anchovy schools were sighted in the central inshore Santa Monica Bay area, and also in the Port Hueneme-Santa Barbara and Los Angeles Harbor areas. There were 44 anchovy schools off Santa Monica and 41 between Port Hueneme and Goleta. Visibility was poor around Santa Barbara, and the few schools seen there were very dim. More schools probably would have been visible if weather conditions had been better.

For the first time in many months anchovy schools were seen from the air in the Los Angeles-Long Beach Harbor, and 61 schools were counted. Although no anchovy schools had been visible in the Harbor or around Santa Monica during previous flights during 1962, anchovies were present because live-bait boats were catching them. Sighting those schools from the air was probably because of clearer water.

Airplane Spotting Flight 62-7-Pelagic Fish (July 18-20, 1962): On the first day's flight, the coast from the United States-Mexican Border to Los Angeles Harbor was surveyed. The only fish observed were 54 anchovy schools between Pt. Loma and the Mexican Border. The large concentration of anchovies that was seen between the Santa Ana River and Dana Pt. on the June flight, apparently had moved out. This resulted in the bait boats that normally work the area having to go to Los Angeles Harbor for bait. The bait haulers blamed the disappearance of the anchovies on the clearing of the water, and the presence of bonito inshore.

On July 19, the area from Los Angeles Harbor to a few miles above Goleta Pt. was surveyed. Fourteen anchovy schools were spotted outside Los Angeles Harbor, and 21 in Santa Monica Bay. From Gorda Pt. to Goleta Pt., 400 anchovy schools were counted.

An attempt was made on the last day of the flight to survey the area from Monterey Bay to San Luis Obispo Bay. But because of a solid cloud bank along most of the coast, only San Luis Obispo Bay, Estero Bay, San Simeon Bay, and a small part of Monterey Bay could be covered. The fish count in those areas was 15 anchovy schools, which were sighted off the Cayucos pier in Estero Bay.

Note: See *Commercial Fisheries Review*, August 1962 p. 15.



Cans--Shipments for Fishery Products, January-June 1962

The amount of steel and aluminum consumed to make cans shipped to fish and shellfish canning plants during January-June 1962 was 4.1 percent above that used during the same period in 1961. Prior to this year, the figures covered only tinplate cans, but beginning with January 1962 aluminum cans are included. It is believed that only a small amount of aluminum is being used in cans used for fishery products at present.



A total of 1,511,133 base boxes of steel (tinplate) and aluminum were used in the manufacture of cans shipped to fishery plants during the first six months of 1962, whereas in the same period of 1961 (when only tinplate was reported) 1,452,246 base boxes of steel were consumed. The increase was mainly due to larger packs of Maine sardines and tuna during the first six months of 1962.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. A "base box" is an area 31,360 square inches, equivalent to 112 sheets 14" x 20" size. The 1962 data are derived by use of the factor 21.8 base boxes per short ton of steel.



Central Pacific Fisheries Investigations

SKIPJACK TUNA SUBPOPULATION IDENTIFICATION STUDIES:

The relationship between seasonal changes in the abundance of skipjack (aku) tuna and changes in the chemical and physical properties of the ocean in the vicinity of the Hawaiian Islands is being studied by the U. S. Bureau of Commercial Fisheries Biological Laboratory at Honolulu, Hawaii. By studying the physical properties of the ocean, it has been possible to predict whether or not the total annual landings of skipjack for a year will exceed or fall below a figure based on the average catch for about 10 years.

In the skipjack fishery of the Hawaiian Islands, it has long been known that large fish, called "season" fish, enter the fishery



in large numbers in the spring and summer only to disappear again in the fall and winter.

It is now known that there is a relationship between the changes which occur in the early spring in the physical properties of the ocean circulation systems in the Hawaiian chain and the relative abundance of "season" skipjack found later in the spring and summer.

In order to understand more completely the biological significance of those findings, the Laboratory has been carrying out a sampling program in which two measures of the skipjack population have been obtained.

One of the two measures involves a study of chemical substances which occur on the red blood cells of nearly all red-blooded animals. These chemicals, called blood group substances (like the A and B substances of man, for example) are products of genes, the units of inheritance, which govern the basic developmental processes of all living things. Because blood group substances are produced by genes, it is possible to genetically classify populations by means of counting the relative proportions of one or more blood group substances which occur in the population. If two samples of skipjack have different frequencies of the same substance, it is certain that they were taken from two different populations. It has recently been observed that in skipjack samples obtained from Hawaiian waters, two distinctly different frequencies of the same substance in the B-system of aku blood groups occur.

The second measure of the populations studied has to do with measuring the lengths of a large number of fish. In some years, the relative numbers of fish that are two years old (judged by length) is very much greater than the number of 1-year old fish present in the previous year. This finding

implies that many 2-year old fish are entering the fishery from another population.

Both lines of evidence presented are consistent with the idea that there are two different populations of aku which enter the fishery. One population composed of fish of all sizes, both large and small, and classified by blood group studies as population I fish, are found in all seasons. Fish of the other population, or population II fish, have only been found to be large.

The question that arises is, where do the group II fish come from? So far this is not known. But it is interesting to note that a skipjack tagged near Baja California, Mexico, was caught on June 12 near Oahu, Hawaii, weighing 26 pounds when caught, just slightly larger than the mean of group II fish sampled in the summer of 1962.

The next step in the study being made is to attempt to determine the relationship between group II fish and skipjack populations to the east of Hawaii, and also to ascertain the relationship between those fish and the physical oceanography which plays such an important role in their migratory habits.

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



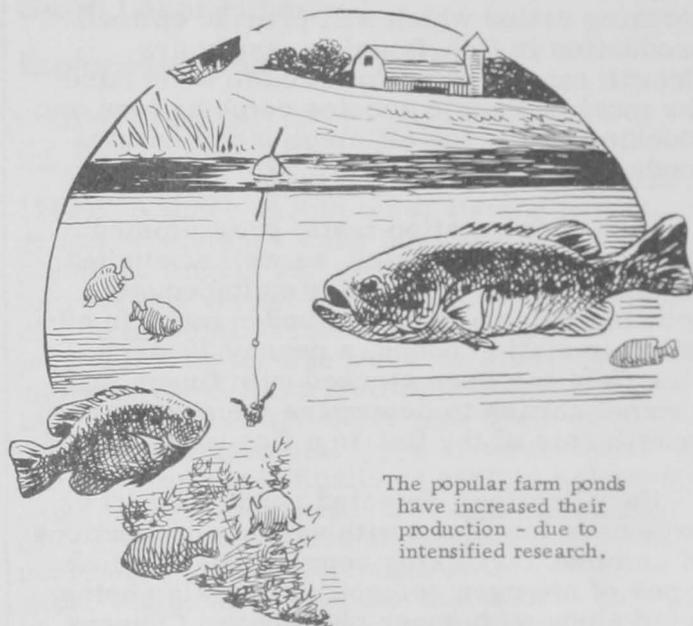
Fish Farming

Some of the highlights of the program at the Stuttgart, Arkansas, Fish Farming Experimental Station of the Bureau of Sport Fisheries and Wildlife during April-June 1962:

CONSTRUCTION OF FACILITIES: Forty-five experimental ponds (including 20 0.1-acre ponds, 20 0.25-acre ponds, and 5 1.0-acre ponds) were accepted by the Regional Engineer of the Bureau on April 27, 1962. Three well houses with pumps and the storage reservoir were accepted at the same time. All completed experimental ponds at the new station had been filled with either surface or ground water and stocked with fish by June 1962. A contract will probably be negotiated before the end of 1962 to complete 36 additional experimental ponds (including 16 0.1-acre ponds, 16 0.25-acre ponds, and 4 1.0-acre ponds) by installing water supply lines, drains, and concrete structures with valves.

Severe problems due to water quality became very prominent in early May and a contract was let on May 16, 1962, for the construction of a water-treatment plant. The plant, which will remove excess iron and manganese from the water supplied to the laboratory and service buildings, was completed in the summer of 1962.

RESEARCH: Nutrition: Sixteen 0.25-acre ponds were stocked with fingerling channel catfish and fed experimental feeds. Some of the feeds are available commercially and others were formulated at the Experimental Station.



The popular farm ponds have increased their production - due to intensified research.

Protein studies were interrupted in the spring of 1962 by water quality problems. But new studies were started July 1, 1962, using channel catfish fry kept in troughs. They were fed test rations to get comparative data on various high protein meals which are commercially available.

Fish Cultural Studies: Successful spawning of channel catfish, flathead catfish, Israeli carp, and buffalofish was accomplished with the use of 700 international units of chorionic gonadotrophins per pound of body weight. Catfish eggs of both species hatched well but considerable difficulty was experienced in getting the flathead fry to feed. The carp and buffalofish eggs failed to hatch probably because of water quality problems.

Hybridization attempts between species of catfish, buffalofish, and carp-buffalofish

crosses were unsuccessful. In addition to chorionic gonadotrophin injections of the females, delatestryl (testosterone enanthate) was administered intraperitoneally into the males to intensify the spawning drive. Some response was apparent in Israeli carp males when placed in spawning aquaria with buffalo-fish females.

Studies began on the possible sterilization of Israeli carp fingerlings by using diethylstilbesterol in the daily ration at levels of 1 and 2 percent.

Studies have been started to determine the best combinations of species and the proper stocking ratios which will provide optimal production in fish-farming reservoirs. Growth rates will be followed to determine the most desirable species combinations and stocking ratios for efficient use of natural foods.

Fish-rice rotation tests, programmed over a four-year period, as well as studies on the effect on yields of simultaneously growing fish and rice are under way. In addition to station ponds, a nearby 20-acre rice field has been stocked with fingerling channel catfish to determine the survival and growth rate of the fish in a flooded rice field.

Fertilization: Selected ponds (0.1 acre) have been fertilized with varying proportions of common fertilizing compounds. Various types of nitrogen compounds are also being tried along with super phosphate. Changes in the flora and fauna and in total plankton are being followed. Laboratory experiments are also in progress.

Note: See Commercial Fisheries Review, September 1962 p. 23.



Food Congress

INTERIOR DEPARTMENT EXHIBIT AT FIFTH INTERNATIONAL FOOD CONGRESS:

Helping the fishing industry bring seafood to home and institutional tables in the most efficient way possible and in conserving the wealth of fishery resources was the theme of a special exhibit by the U. S. Department of the Interior at the Fifth International Food Congress and Exhibition. The Congress, held at the New York Coliseum, New York City, September 8-16, 1962, was attended by delegates from more than 30 countries.

This was the first time it was held in the United States.

The Department of the Interior's Bureau of Commercial Fisheries exhibit was located in the International Pavilion. Four panels, with special lighting effects, comprised the exhibit, and each panel depicted a different phase of the Bureau's efforts in furthering the use of fishery resources.

The title of the first panel was "The Resource," and it showed the Bureau's biological fishery research work. Four telephones connected with the panel carried taped messages for the 50,000 or more executives of food and allied industries, and the more than 250,000 consumers who were expected to visit the exposition and view the exhibits.

The panel named "Harvesting" depicted some of the efficient fishing methods that have been developed, including the air bubble curtain which is capable of catching a school of fish, plane spotting of fish from the air, bottom and midwater trawling, and electronic fishing.

The third panel illustrated newly-developed fish products made possible by technological research and advancement--irradiated fish which have a much longer shelf life than fresh fish, and fish protein concentrate (fish flour) which could be the lifeline of the future for millions of the world's undernourished and protein-deficient populations.

The services of the Bureau of Commercial Fisheries in the field of marketing, and the collection and dissemination of market news were shown in the final panel of the exhibit, including research conducted in test kitchens at the Bureau's Technological Laboratory at College Park, Md. Some of the research equipment used by the Bureau and illustrations of the various market forms of fish completed the display.

"Fishery products play such an important role in a nutritious diet today that it has been decided that this source of nutrition merits special consideration," the Food Congress said in inviting the Bureau to participate in the international event.

In acknowledging the invitation on behalf of the Department, Secretary of the Interior Stewart L. Udall said fisheries research heralds new frontiers in nutrition and health for America's citizens and its neighbors across the seas.

In his June 11 letter of acknowledgment, the Secretary wrote that the United States Department of the Interior was very much interested in the Congress, especially since it afforded a unique opportunity for an exchange of ideas on the international plane.

The Secretary mentioned that in September 1961, the United States hosted the International Conference on Fish in Nutrition, sponsored by the Food and Agriculture Organization of the United Nations. That conference was held in Washington, D. C., and was attended by scientists and industrialists from 33 nations. At that conference, it was pointed out that more than half of the peoples of the world are suffering from malnutrition. Many millions lack enough of the proper food ingredients for an adequate and balanced diet and numbers are suffering from diet associated diseases. The Secretary said it was clearly established that protein from the sea was the key to meeting these worldwide dietary associated problems. Fish protein offers the most practical way of meeting the dietary needs of the undernourished of the world. This, he said, was the message to be presented to the food industry through the Department of the Interior's exhibit.

Secretary of the Interior Udall was a member of the Committee of Honor of the Fifth International Food Congress and was represented at the meetings by officials of the Bureau of Commercial Fisheries.



Frozen Fish

NEW MECHANIZED MICROWAVE OVEN FOR THAWING FROZEN FISH:

A United States firm has designed a new microwave oven defroster with openings on both ends so that a conveyor belt can pass through the oven. The conveyor belt can feed frozen fish into the oven and remove the fish after they are thawed. Previous microwave ovens had to be completely enclosed to trap the microwave energy. An innovation in design enables the new oven to trap the microwave energy without being sealed.

The microwave energy compartment in the new oven is three feet long. As frozen fish pass through the compartment; they are penetrated by ultra-high-frequency deep heat and thawed in 60 seconds.

A Canadian biochemist researcher is still testing the effects of microwave defrosting on fish. The researcher plans to refreeze radar-defrosted fish, store the fish for one year, and then defrost them again for flavor and food-value analyses. Also, another phase of the study, in progress for one year, has been the evaluation of the most efficient method of freezing fish at sea. (South African Shipping News and Fishing Industry Review, May 1962.)



Great Lakes Fisheries

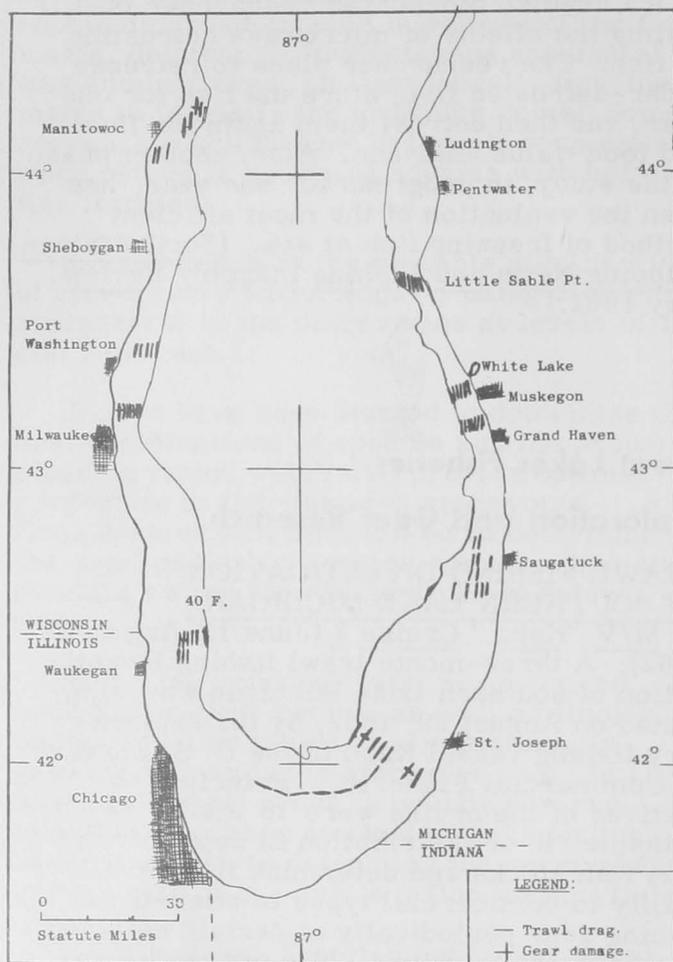
Exploration and Gear Research

TRAWL FISHING INVESTIGATION OF SOUTHERN LAKE MICHIGAN:

M/V "Kaho" Cruise 3 (June 12-August 29, 1962): A three-month trawl fishing investigation of southern Lake Michigan was completed on August 29, 1962, by the exploratory fishing vessel Kaho of the U. S. Bureau of Commercial Fisheries. Principal objectives of the cruise were to study the bathymetric or distribution in depth of various fish stocks and determine their availability to commercial types of otter-trawl fishing gear periodically at certain selected geographical locations. The over-all area of operations extended around the southern perimeter of Lake Michigan from Little Sable Point, Mich., on the east shore, to Manitowoc, Wis., on the west shore.

A total of 142 30-minute drags were made at depths ranging from 9.5 to 40.5 fathoms at sampling stations established during previous cruises (see chart). An additional 40 drags (ranging from 15 minutes to 2 hours duration) were made to compare effectiveness of fishing gear modifications and day-night fishing.

Commercially-significant catches were taken during each of the 3 phases; however, the final phase in August was considerably more productive than either the June or July phases. Catches were all poor (less than 400 pounds per hour) on the east shore during the June phase. On the west shore, however, catches of over 600 and up to 830 pounds per hour were taken at all but 1 of the 4 sampling stations. During the July phase, catches of 510 to 640 pounds per hour were taken at 3 of the 5 east shore sampling stations, and 648



Lake Michigan explorations by M/V Kaho on Cruise 3 (June 12-August 29, 1962).

to 1,242 pounds per hour at 2 of the 4 west shore sampling stations. All 9 stations yielded 636 or more pounds per hour during the August phase.

Catches of over 1,000 pounds per hour were taken as follows: phase I--none; phase II--at 15 and 20 fathoms off Waukegan; phase III--at 10, 15, and 20 fathoms off Little Sable Point, at 15 fathoms off Grand Haven, at 35 fathoms off Milwaukee, and at 20 and 25 fathoms off Port Washington. The best catch (1,200 pounds) was taken in a 30-minute drag at 20 fathoms off Port Washington.

Depths yielding best catches varied within each sampling station from period to period, but did not vary uniformly from area to area during any particular period.

The percentage breakdown of principal species making up the total actual catch of 35,949 pounds of fish taken during the cruise

was as follows: chub (*Coregonus hoyi*)--82.6 percent, large chub--8.3, alewife--7.6, yellow perch--1.2, and smelt--0.2 percent. All other species accounted for less than 0.1 percent of the total catch. Alewife appeared in a total of 69 catches, and from 50 to 520 pounds were taken in 15 drags at 10 to 25 fathoms. Yellow perch appeared in 48 catches, and from 15 to 145 pounds were taken in 5 drags at 10 and 15 fathoms in phases II and III. Smelt appeared in 26 catches; less than 15 pounds per drag were taken in 25 drags, and one catch of 50 pounds was taken at 15 fathoms off Waukegan during phase II. Only 4 individual whitefish were taken in 4 separate drags. Herring appeared only in amounts of less than 1 pound and in only 5 drags. Other species noted in the catches included: lake trout (two only), cottids (sculpins), sea lamprey, suckers, and trout-perch.

A special test designed to compare day and night trawling effectiveness was conducted off Saugatuck in June and August and off St. Joseph in July. Each of the tests were confined to a limited area and depth zone. In June, 6 daylight drags averaged 215 pounds per hour and 5 night drags averaged only 86 pounds per hour. In July, 3 daylight drags averaged 167 pounds per hour and the 3 night drags, 149 pounds per hour. In August, the catches averaged 618 pounds per hour for 2 daylight drags as compared to 75 pounds per hour for 2 night drags.

During July 10-12, operations were conducted in cooperation with the U. S. Department of Agriculture to obtain and process *C. hoyi* chubs for Agriculture's mink-feeding experiments at the Cornell University Fur Animal Research Farm. A refrigerated water system was used to hold about 2 tons of the fish in a preliminary study to determine the practicality and problems involved in this type of storage aboard Great Lakes' commercial fishing vessels.

Surface temperatures ranged from 47° to 70° F. during phase I; 57° to 72° F. during phase II; and 48° to 75° F. during phase III.

A standard 52-foot (headrope) Gulf of Mexico semiballoon-type trawl net was fished on the routine sampling stations. A new 65-foot nylon modified-West Coast box-type trawl was compared with the standard net with favorable results, but the data obtained were insufficient to make exacting determinations.

Slight to moderate gear damage was incurred by bottom obstacles during 7 of the 182 drags.

Underwater television tests were conducted in cooperation with a private firm during the final 2 days of phases I and III. Gear configuration and fish behavior within the net were studied with good results.

The Kaho was expected to depart Saugatuck, Mich., September 19, 1962, on cruise en route to Lake Erie for 29 days of exploratory trawl fishing operations. All United States waters of Lake Erie were to be explored. The primary objective of the cruise was to extend seasonal knowledge regarding the location, bathymetric or distribution in depth, relative abundance, and availability of various species of fish to standard otter trawl fishing gear. Echo-sounding equipment was to be used to survey bottom conditions and record fish concentrations. Bathythermograph casts and bottom samples were to be taken at each fishing station. A 52-foot (headrope) Gulf of Mexico-type otter trawl was to be used at standard stations to assess the commercial trawling potential. A newly-designed 65-foot western-style otter trawl was to be tested to determine its effectiveness on Lake Erie fish.

Note: See Commercial Fisheries Review, July 1962 p. 20.



Great Lakes Fishery Investigations

DISTRIBUTION OF LAKE TROUT IN WESTERN LAKE SUPERIOR STUDIED:

M/V "Siscowet" Cruise 5 (August 14-19, 1962): Studies to obtain information on the abundance and distribution of native and hatchery-reared lake trout in western Lake Superior waters were conducted by the U. S. Bureau of Commercial Fisheries research vessel Siscowet. Work was done at Shelter Bay (near Laughing Fish Point), Keweenaw Bay, and Traverse Bay, Mich.

Semiballoon trawls were fished at depths of 16 to 42 fathoms and standard gangs of experimental gill nets (1- to 5-inch mesh by 1/2-inch intervals) were fished at 17 to 77 fathoms.

Five 10-minute trawl tows in Shelter Bay yielded only 6 lake trout, all of which were hatchery-reared fish planted at Munising

(4 were from the 1962 plant, and 1 each from the 1961 and 1960 plant). In Keweenaw Bay, 13 tows yielded 26 small lake trout, of which 18 had been stocked as yearlings in Keweenaw Bay in 1961 and 8 in 1960 (2 planted from shore and 6 by boat). The average length of the recaptured lake trout from the 1961 plant (8.2 inches) was 3.2 inches longer than at the time of planting. Four tows in Traverse Bay yielded 12 lake trout, all of which were fin-clipped. Nine of those fish had been planted in Traverse Bay in 1962, 2 in Keweenaw Bay in 1961, and 1 in Keweenaw Bay in 1960. Other species caught in trawls at the different stations included smelt, pygmy whitefish, sculpins, ninespine sticklebacks, and small coregonines (family of whitefishes).

Experimental gill nets were set in Keweenaw Bay northwest of Point Abbaye and northeast of Pequaming (see table).

Species	Location and Depth (Fathoms)		
	Point Abbaye	Pequaming	
	17-24	20-33	63-77
 (Number)		
<u>Chub:</u>			
<u>C. hoyi</u>	31	68	170
<u>C. kiyi</u>	18	7	34
<u>C. zenithicus</u>	7	39	50
Lake herring	15	8	1
Lake trout	13	24	-
Smelt	69	55	-

Of the 37 lake trout caught, 25 fish or 68 percent were fin-clipped. The fish ranged in length from 9.1 to 20.0 inches.

The chub were in various stages of sexual development. Of the Coregonus zenithicus, about half were nearly ripe and the other half were spent. Most of the C. kiyi had well-developed gonads (sexual glands), although 2 were spent, and 2 were ripe. All C. hoyi had well-developed gonads.

Surface water temperatures ranged from 56.3° F. in Traverse Bay to 60.8° F. in Keweenaw Bay.

Scheduled cruises 3 and 4 were cancelled to allow time for extensive alteration of the Siscowet at a Wisconsin shipyard. The addition of five feet to the length of the vessel, and reconstruction of the stern, added much-needed work space to the back deck. The improvements greatly facilitate the operation of trawls, gill nets, and other experimental gear.

Note: See Commercial Fisheries Review, September 1962 p. 26.

LAKE MICHIGAN FISH POPULATION SURVEY CONTINUED:

M/V "Cisco" Cruise 6 (August 7-20, 1962): The depth distribution of fish during and after an extensive upwelling, and the distribution of small coregonines (fresh-water whitefish), were the principal objectives of Cruise 6 in southeastern Lake Michigan by the U. S. Bureau of Commercial Fisheries research vessel Cisco.

A moderately strong upwelling near shore persisted throughout much of the cruise. According to unofficial reports from various sources, it extended as far south as Michigan City, Ind., at the southern extremity of the lake, and at least as far north as Grand Haven, Mich. Off Saugatuck, Mich., the coldest surface water temperatures (near 11° C. or about 52° F.) were within 3 or 4 miles from shore (out to depths of 10 or 15 fathoms), but strong currents and eroded metalimnions extended as far as 33 miles offshore (84 fathoms). Trawl hauls in shallow water during and after an upwelling on August 15 and 17 indicated drastic changes in fish distribution as shown in table.

Date (Aug.)	Depth (Fms.)	Bottom Water Temperature (°F.)	Species ^{1/}				
			Chub	Yellow perch	Alewives	Smelt	Trout-perch
15	5	47	4	1,600	48	18	0
15	7	46	34	138	22	62	78
17	7	64	0	30	60	2	4
15	10	44	45	470	51	47	3
17	10	62	0	7	43	1	21
15	12	43	154	704	7	28	0
17	12	60	3	83	12	7	14
15	15	42	199	38	29	32	0
17	15	51	28	450	17	51	112
15	17	47	485	178	50	138	3
15	20	42	365	0	12	0	0
17	20	46	304	2	23	5	1
15	25	41	75	0	2	0	0

^{1/}In addition to the species shown in the table, a few spottail shiners were collected at depths of 5 to 12 fathoms, and moderate numbers of slimy sculpins at 15 to 25 fathoms. The chubs taken were Coregonus (Leucichthys) hoyi, with extremely few exceptions. About 75 percent of the yellow perch caught at 5 fathoms on August 15, and all of the perch caught at 7 fathoms on August 17 were yearlings; all other perch catches included very few yearlings, and no young of year.

Both yellow perch (except yearlings) and chubs moved into deeper, colder water as the cold water near shore was replaced. The chubs remained in colder water than the yellow perch, both during and after the upwelling. Smelt also moved out as the warm water moved in, but the distribution of alewives seemed to be unaffected.

Attempts to locate chubs less than 7 inches long with a midwater trawl, large-mesh half-meter plankton nets, and a 4-foot tow net of $\frac{1}{4}$ -inch mesh (stretched) were unsuccessful. The midwater trawl, of a modified British Columbia design, caught a few alewives and C. hoyi (7.7 to 10.4 inches long) in several midwater tows over bottom depths of 15 and 40 fathoms. Fry, tentatively identified as alewives, were widely distributed in the upper 10 fathoms of water, out to a depth of at least 40 fathoms. Several alewife fingerlings (1.1 to 1.4 inches) were caught in the upper 15 fathoms of water, over the 30-fathom depth. Two fry, believed to be deep-water sculpin, were caught in a tow between 16 and 28 fathoms, over the 84-fathom depth.

Gangs of nylon gill nets were set at 40 and 84 fathoms to collect chubs for blood samples for an electrophoresis and serological study. The deeper set made a good catch of Coregonus kiyi, some of which were rather large.

Two days of the cruise were lost due to valve trouble on the main engine.

During Cruise 5 (July 17-31, 1962) the M/V Cisco was under contract to the U. S. Public Health Service. Hydrographic and bacteriological data were collected at 30 stations in southern and central Lake Michigan. No report on that cruise will be issued by the Bureau's Ann Arbor Biological Laboratory.

Note: See Commercial Fisheries Review, August 1962 p. 23.

* * * * *

LAKE ERIE FISH POPULATION SURVEY CONTINUED:

M/V "Musky II" (August 1962): The fish population survey in Lake Erie was continued by the U. S. Bureau of Commercial Fisheries. Operations of the research vessel Musky II in August included the seasonal three day-night series of trawl hauls (two 10-minute tows at each of three depths during the morning, afternoon, and evening) at stations 4 (East Harbor) and 49 (Bono) and the annual week-long cruise to seven index stations distributed about the western basin.

The summer series of three day-night trawl hauls provided further evidence of good spawning success and subsequent survival for most species of fish. Young yellow perch, white bass, and yellow pike (walleye) were particularly abundant as compared to other

recent years. Yellow perch were plentiful in all areas sampled; thousands were caught in many 10-minute drags of the trawl. Young yellow pike were abundant, but their distribution was less uniform (catches may have been influenced by meteorological conditions). A total of 447 young were taken at station 4 and 37 at station 49.

The fishery-limnological cruise to the seven index stations was conducted to preserve continuity and for comparison with similar operations of the past 3 years. Two trawl tows were taken at each station and turbidity, pH, temperature, alkalinity, and dissolved-oxygen content of the water were determined. The water was stratified at two of the stations (off Monroe, Mich., and north of Pelee Island), but no oxygen deficiencies were observed.

Growth of young-of-year fish of most species appeared to be about average. The mean length of young yellow pike at the end of August was about 7.0 inches, an increase of 2 inches over the preceding month. This represents slightly faster growth than in 1960 or 1961, but slower than in 1959. Average total lengths in inches of young fish of other species were as follows: yellow perch, 2.5; white bass, 2.7; gizzard shad, 4.2; sheepshead, 2.8; alewife, 3.8; smelt 2.1; spottail shiner, 2.1; and emerald shiner, 1.9.

The large population of older perch is still dominated by 3-year-old fish of the 1959 year class. The average length of these perch is now 8.2 inches; they should reach about 8.5 inches toward the end of the Ohio commercial fishing season.

Water temperatures averaged 74° F. in the western end of the lake. Critically low dissolved oxygen was observed for the first time this year (toward the end of August) in the deeper areas of the central basin off Lorain, Ohio. Observations will be continued to determine the extent and duration of the deficiency.

Note: See Commercial Fisheries Review, September 1962 p. 26.

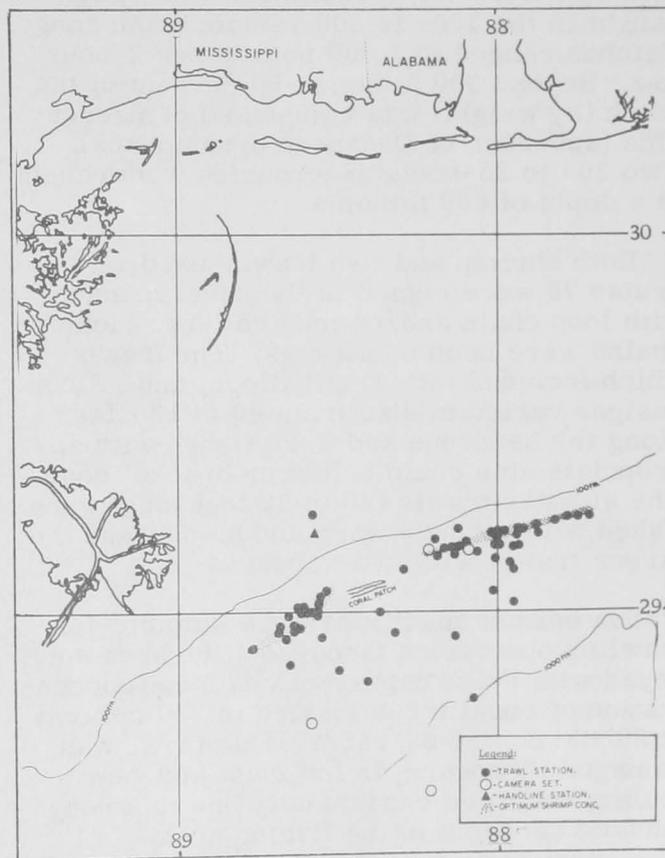


Gulf Exploratory Fishery Program

NORTHERN GULF OF MEXICO
EXPLORATION FOR POTENTIALLY-
VALUABLE DEEP-WATER SPECIES:

M/V "Oregon" Cruise 79 (July 24-August 14, 1962): The primary objectives of cruise

79 by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon in the northern Gulf of Mexico were in two phases: (1) to explore the continental slope between 150 and 1,000 fathoms to assess the deep-water crustacean and fish potential of that area, and (2) to gather additional information on the seasonal distribution and occurrence of the royal-red shrimp (H. robustus) and a smaller deep-water shrimp (P. megalops).



Northern Gulf of Mexico explorations by M/V Oregon Cruise 79 (July 24-August 14, 1962).

A total of 60 trawl drags were completed during the cruise, 35 of which were made in the royal-red shrimp depth range between the Mississippi Delta and Pensacola, Fla. Royal-red shrimp were caught in small to moderate quantities -- up to 109 pounds (heads-off) per 2-hour tow -- in all drags completed between 200 and 260 fathoms with the largest catches in the 200- to 225-fathom depth range. Twenty-five tows completed in that depth range yielded 1,135 pounds of 31-35 count (heads-off) royal-red shrimp. Smaller deep-water shrimp (P. megalops) averaging 52 count heads-on were caught in quantities up to 150 pounds per 2-hour drag at depths ranging from 180 to 200 fathoms. The scarlet

prawn (*P. edwardsianus*) was caught most frequently in 350 fathoms--up to 4 pounds of the 10-count size were caught in each drag.

Large red crabs (*Geryon* sp.) were caught in 600 to 750 fathoms at rates up to 140 pounds (75 individuals) per drag. Young crabs of the same species were found to be heavily concentrated in 200 fathoms.

Hake (*Urophycis* sp.) and whiting (*Merluccius* sp.) were the predominant fish species caught in the 100- to 300-fathom depth range. Catches ranged to 1,000 pounds per 2-hour tow. Beyond 300 fathoms, 90 percent of the catch (by weight) was comprised of macrourids (suborder of Decapoda crustaceans). Two 20- to 25-pound macrourids were caught at a depth of 600 fathoms.

Both shrimp and fish trawls used on cruise 79 were rigged in the usual manner with loop chain and/or mud rollers. Tickler chains were used on all rigs. The trawls which included flat, semiballoon, and balloon designs varied in size from 40 to 130 feet along the headrope and were fished with appropriate size chain bridle or bracket doors. The smaller trawls (40 to 70 feet long) were fished with a single warp and bridle, and the larger trawls with two warps.

Sea bottom conditions were suitable for trawling operations throughout the area surveyed with the exception of one large concentration of coral trees located in 230 fathoms at 29°03' N. and 88°25' W. One trawl was damaged by bogging in the mud, and gear fouling occurred occasionally due to strong surface currents in the fishing area.

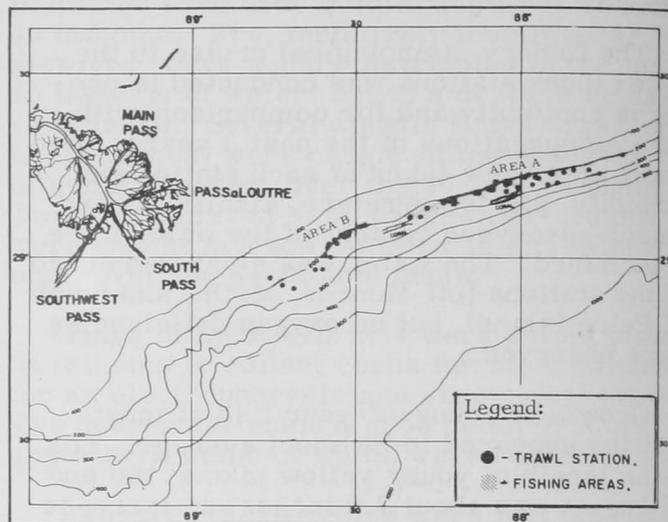
Sea bottom temperatures and sediment samples were obtained at each transectional trawling station between 150 to 1,000 fathoms. Marine life data were tabulated and entered on station sheets. Representative fish and shellfish samples were preserved and stored for future study by the Bureau's staff biologists.

* * * * *

GOOD ROYAL-RED SHRIMP CATCHES BY RESEARCH VESSEL:

M/V "Oregon" Cruise 80 (August 21-31, 1962): To determine the current production potential of royal-red shrimp (*Hymenopenaeus robustus*) in the areas east of the Mississippi Delta was the main objective of this 10-

day cruise in the northern Gulf of Mexico. The areas worked on Cruise 80 had been delineated on previous cruises by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon, which returned to her base at Pascagoula, Miss., on August 31.



Northern Gulf of Mexico explorations by M/V Oregon Cruise 80 (August 21-31, 1962).

A total of 51 drags in the 200-300 fathom depth range between longitude 88°46' W. and 87°41' W. yielded 2,616 pounds of 31-35 count heads-off ungraded royal-red shrimp. Major fishing effort by the Oregon was concentrated in the two areas shown on the cruise chart as A and B.

Another 23 drags completed in 225 fathoms (optimum depth) in Area A yielded 1,393 pounds of 31-35 count heads-off shrimp. The best catch in Area A amounted to 130 pounds of heads-off shrimp in a 2-hour drag.

Eight tows made in 200 fathoms (optimum depth) in Area B produced 801 pounds of 31-35 count heads-off shrimp. The best catch was 261 pounds of 31-35 count heads-off shrimp in a 3-hour drag. Smaller catches (10 to 50 pounds heads-off) were made beyond the optimum depth range in both areas. Larger shrimp (21-25 to 26-30 count, all heads-off) were caught in small quantities in 240 to 250 fathoms at the western end of Area B.

Peneopsis megalops shrimp (average 52-count heads-on) were caught in amounts up to 183 pounds per two-hour tow at depths ranging from 190 to 200 fathoms.

A 900-pound sample of royal-red shrimp from both areas was graded, and yielded 500 pounds of 26-30 count (55 percent), 325 pounds of 40-50 count (36 percent), and 75 pounds of 50-60 count (8 percent) shrimp, all heads-off.

Hake (*Urophycis* sp.) and whiting (*Merluccius* sp.) dominated the fish species caught in Areas A and B beyond 200 fathoms. Catches of those species combined ranged to 1,000 pounds per 2-hour drag. In Area B, large catches of macrourids (other species of crustaceans such as shrimp and lobsters) averaging 1,500 pounds per 2-hour drag were caught in 190-195 fathoms.

Two broadbill swordfish (*Xiphias gladius*) weighing 46 and 57 pounds each were caught in one trawl tow in 190 fathoms in Area B.

A two-seam 2-inch mesh nylon balloon-trawl measuring 112 feet along the headrope and fished with 14-foot chain bridle doors, was used in the production trials. The trawl was fished with both loop chain and mudrollers and was equipped with a tickler chain. No difficulty was experienced in fishing the area, and gear damage and fouling was negligible. Some catches were lost in Area B due to shark damage to the cod end. That was overcome by the addition of a twine and chain cover over the cod end.

Bottom temperatures in the red shrimp depth range varied from 9° C. to 12° C. (48.2° F. to 53.6° F.).

Information on gear used and results of catches was relayed by radiotelephone to interested industry members. A commercial shrimp vessel from Freeport, Tex., arrived on the red shrimp grounds and fished in company with the *Oregon*. Catches of 1 to 2 boxes of heads-off shrimp per three-hour drag were reported by the commercial vessel.

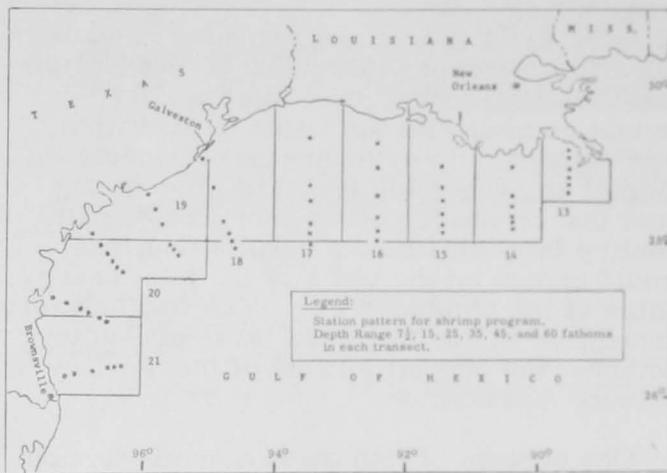


Gulf Fishery Investigations

SHRIMP DISTRIBUTION STUDIES:

M/V "Belle of Texas" Cruise BT-26 (August 17-23, 1962): Shrimp catches by the research vessel *Belle of Texas* on this cruise were composed of 50 percent large brown shrimp (a little more than 100 pounds) counting 12-15 and 15-20 to the pound. The

rest of the catches (better than 100 pounds) consisted of modest quantities of smaller brown shrimp ranging from 21-25 to 41-50 count per pound, and only a handful of white and pink shrimp. The best catches of small and medium brown shrimp were made in the 20-40 fathom depth range. The vessel (operated by the Galveston Biological Laboratory of the U. S. Bureau of Commercial Fisheries in studying the distribution of shrimp in the Gulf of Mexico) returned to her home port on August 23.



Shows the station pattern for Cruise BT-26 of the M/V *Belle of Texas*, August 17-23, 1962.

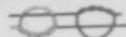
Five statistical areas were worked during the 7 day cruise, and a 45-foot shrimp trawl was used. One 3-hour tow was made in each of the 3 depth ranges in each area.

The largest single catches of 33 pounds each were in the 20-40 fathom depth range in 3 separate areas. These were all brown shrimp of 3 different sizes: 12-15 count in area 16, 21-25 count in area 15, and 31-40 count in area 13.

Area 14 yielded 28 pounds of 12-15 count brown shrimp in the 40-60 fathom depth, and 16 pounds of the same size brown shrimp in 20-40 fathoms.

The largest catch of any area was 59 pounds in area 15 which netted 24 pounds of 41-50 count brown shrimp and 5 pounds of 15-20 count white shrimp in the depth up to 20 fathoms, as well as the 33 pounds of 21-25 count shrimp from 20-40 fathoms. Less than one pound of 12-15 count pink shrimp was caught in 0-20 fathoms of that area.

- Notes: (1) Shrimp catches are heads-on weight; shrimp sizes are the number of heads-off shrimp per pound.
 (2) See *Commercial Fisheries Review*, Sept. 1962 p. 29.



Industrial Fishery Products

MENHADEN OIL STIMULATES GROWTH OF CHICKS:

Menhaden oil may have unique value in poultry feeds. A scientist at the Lipman Research Center, Augusta, Maine, conducted comparative tests on various poultry feeds. Chicks fed a mixture containing 1 percent menhaden oil and 5 percent poultry fat gained more weight than those fed rations containing 6 percent of either hydrolyzed animal and vegetable fat or poultry fat or various combinations of those fats with menhaden oil other than the combination of 1 percent menhaden oil with 5 percent poultry fat. Efficiency of feed utilization (feed consumed divided by weight gained) with the latter combination was equaled only by 6 percent of hydrolyzed animal and vegetable fat. The results suggest that menhaden oil in combination with poultry fat yields better results than one would expect on the basis of the total energy value of the combined fats. The findings were announced in the July 1962 issue of Poultry Science, the official journal of the Poultry Science Association.

One percent of fish oil in a broiler ration is very near the maximum ordinarily recommended and 2 percent is excessive. A taste panel judged the meat of broilers that had received 1 percent menhaden oil "acceptable," that of the ones which received 2 percent "questionable," and meat of broilers that received over 2 percent of the oil "unacceptable" because of "off" flavors.

The high rates of weight-gain and levels of feed efficiency obtained from menhaden oil and poultry fat raise the question as to whether or not the fish oil in combination with various other fats would yield results as good as, or even better than, the results with poultry fat. Further research also should show whether or not menhaden oil will retain its growth-promoting effect in the presence of an antioxidant such as ordinarily is added to a highly unsaturated oil.

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FISH SOLUBLES STIMULATE GROWTH OF CHICKS:

There is distinct evidence that fish solubles stimulate the growth of chicks. This finding was announced recently by a group of poultry nutritionists who analyzed data compiled at the U. S. Department of Agriculture's Research Center, Beltsville, Md.,

between 1952 and 1960. The analysis showed that 4-week-old chicks fed fish solubles were significantly heavier than were the controls that received no solubles. The average difference in weight was 6 percent. The number of chicks involved in the study was over 8,000. Half that number of chicks were fed a ration containing solubles but no other non-vegetable protein. The other half were fed an identical ration without solubles.

The nutritional study was made with growth data accumulated from routine feeding trials, in order to answer questions as to the growth-promoting effect of fish solubles (the liquid separated from fish in the production of fish meal and oil is called fish solubles). Most investigators who have worked with the product have reported that fish solubles are effective in promoting growth of chicks, but some groups have reported negative results. Because of such findings, many specialists have questioned the chick growth-stimulating property of fish solubles, and this prompted the Beltsville nutritionists to analyze the 8-year accumulation of data. With the new and more recent information at hand, there is little doubt that fish solubles stimulate the growth of chicks.

The study was conducted by the Agricultural Research Center's poultry nutritionists who used data obtained with crossbred male chicks between the ages of 6 and 28 days. Their findings were reported in the July 1962 issue of Poultry Science, the official journal of the Poultry Science Association.

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U. S. FISH MEAL AND SOLUBLES:

Production and Imports, January-July 1962: Based on domestic production and imports, the United States available supply of fish meal for the first 7 months of 1962 was 41,219 short tons or 14.1 percent greater than during the same period of 1961. Domestic production was 1,012 tons or 0.6 percent higher, and imports were 40,207 tons or 31.8 percent greater than in the same 7 months of 1961. Peru continued to lead other countries with shipments of 123,859 tons during the first 7 months of 1962--41,709 tons above the imports in the same period of 1961.

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

U. S. Supply of Fish Meal and Solubles, January-July 1961-62 and Total for 1961			
Item	January-July		Total
	1/1962	1961	1961
..... (Short Tons)			
Fish Meal and Scrap:			
Domestic production:			
Menhaden	141,012	141,359	247,551
Tuna and mackerel	11,617	11,378	21,243
Herring	1,839	3,283	5,268
Other	12,481	9,917	37,203
Total production	166,949	165,937	311,265
Imports:			
Canada	27,232	26,265	38,218
Peru	123,859	82,150	151,439
Chile	7,157	8,080	12,074
Angola	-	1,433	1,543
So. Africa Republic	7,984	7,716	13,026
Other Countries	511	892	1,545
Total imports	166,743	126,536	217,845
Available fish meal supply ..	333,692	292,473	529,110
Fish Solubles:			
Domestic production 2/			
	72,534	62,789	112,241
Imports:			
Canada	1,006	699	1,001
So. Africa Republic	789	796	1,351
Other Countries	2,801	432	4,387
Total imports	4,596	1,927	6,739
Available fish solubles supply .	77,130	64,716	118,980
1/ Preliminary.			
2/ 50-percent solids. Includes production of homogenized condensed fish.			



At Moss Point, Miss., workers play heavy streams of water onto the fish in the hold of a menhaden vessel. This operation is necessary in order to make the menhaden flow into the stand-pipe and then through a discharge pump located on the dock of the fish reduction plant.

as collected by the U. S. Bureau of Commercial Fisheries and submitted to the International Association of Fish Meal Manufacturers are shown in the table.

U. S. Production, July 1962: During July 1962, 52,600 tons of fish meal and scrap and 6 million gallons of marine-animal oils were produced in the United States. Compared with July 1961, this was a decrease of



Chemist examining fish meal scrap in a fish reduction plant at Empire, La.

The United States supply of fish solubles (including homogenized fish) during January-July 1962 was 12,414 tons more than during the same period in 1961. Solubles and homogenized fish of 72,534 tons manufactured from domestically-caught fish made up 94 percent of the 7-months supply in 1962.

FISH MEAL, OIL, AND SOLUBLES:

U. S. Production, August 1962: Preliminary data on U. S. production of fish meal, oil, and solubles for August 1962

U. S. Production 1/ of Fish Meal, Oil, and Solubles, August 1962 (Preliminary) with Comparisons				
Area	Meal Short Tons	Oil 1,000 Gallons	Solubles Homogenized 3/ ... (Short Tons) ...	
August 1962:				
East & Gulf Coasts	34,664	4,166	14,581	-
West Coast 2/	2,633	288	2,226	-
Total	37,297	4,454	16,807	-
Jan.-Aug. 1962 Tot.	207,942	22,248	38,223	6,570
Jan.-Aug. 1961 Tot.	223,474	26,120	73,777	8,697

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

U.S. Production of Fish Meal, Oil, and Solubles, July 1962, with Comparisons					
Product	July		Jan.-July		Total
	1/ 1962	1961	1/ 1962	1961	1961
..... (Short Tons)					
Fish Meal and Scrap:					
Herring	1,013	1,424	1,839	3,283	5,268
Menhaden 2/	47,474	57,459	141,012	141,359	247,551
Sardine, Pacific	-	-	689	-	2,518
Tuna and mackerel	1,649	1,673	2/11,617	11,378	21,243
Unclassified	2,438	2,879	11,792	9,917	14,757
Total	52,574	63,435	166,949	165,937	291,337
Shellfish, marine-animal meal and scrap	3/	3/	3/	3/	19,928
Grand total meal and scrap	3/	3/	3/	3/	311,265
Fish solubles	20,965	20,342	64,469	56,894	100,551
Homogenized condensed fish	1,200	2,247	8,065	5,895	11,690
..... (Gallons)					
Oil, body:					
Herring	219,457	189,827	333,657	406,757	818,017
Menhaden 2/	5,601,930	7,057,597	16,675,825	18,105,058	31,355,570
Sardine, Pacific	-	-	19,111	-	86,167
Tuna and mackerel	64,170	65,608	325,553	292,825	762,509
Other (including whale)	128,315	318,461	474,057	692,948	1,386,542
Total oil	6,013,872	7,631,493	17,828,200	19,497,588	34,408,805

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

10,900 tons or 17 percent in meal and scrap production and 1.6 million gallons or 21 percent in oil.

In July, menhaden meal amounted to 47,500 tons or 90 percent of the meal total and 5.6 million gallons of the oil production.

There were 21,000 tons of fish solubles produced in July 1962--600 tons above the same month of 1961. The production of homogenized condensed fish amounted to 1,200 tons--about 1,000 tons less than in July 1961.

During the first 7 months of 1962, meal and scrap production amounted to 166,900 tons--1,000 tons above the same period of 1961. The marine-animal oil yield totaled 17.8 million gallons--a drop of 1.7 million gallons.

* * * * *

Major Indicators for U. S. Supply, August 1962: For the first eight months of 1962, fish meal and fish oil production was lower by 5.2 percent and 12.0 percent, respectively, as compared with the same period of 1961. Fish solubles production showed an increase of 8.0 percent.

Major Indicators for U. S. Supply of Fish Meal, Solubles, and Oil, August 1962					
Item and Period	1962	1961	1960	1959	1958
..... (Short Tons)					
Fish Meal:					
Production 1/:					
October	-	16,852	24,455	22,026	11,630
September	-	28,642	36,239	36,874	33,185
August	41,100	57,031	49,709	47,364	40,783
January-July	166,949	162,400	130,443	144,865	103,632
Jan.-Dec. prelim. totals 2/	-	289,039	257,969	275,396	216,510
Jan.-Dec. final tots.	-	311,265	290,137	306,551	248,140
Imports:					
October	-	9,425	12,515	3,821	5,899
September	-	13,941	9,487	9,224	5,079
August	-	19,026	8,340	5,695	5,310
July	25,857	18,710	13,131	4,303	13,546
January-June	140,886	107,826	66,375	101,421	55,946
January-December	-	217,846	131,561	132,925	100,352
Fish Solubles:					
Production 3/:					
October	-	8,459	7,192	12,487	8,867
September	-	11,232	12,573	23,979	23,049
August	16,700	19,685	16,921	29,785	24,653
January-July	72,534	62,969	55,822	89,051	58,415
Jan.-Dec. totals	-	112,241	98,929	165,359	130,177
Imports:					
October	-	110	-	1,908	2,548
September	-	263	38	1,732	253
August	-	318	180	4,718	2,819
July	306	708	96	4,938	607
January-June	4,290	1,219	2,518	9,073	2,293
Jan.-Dec. totals	-	6,739	3,174	26,630	14,567
..... (1,000 Gallons)					
Fish Body Oils:					
Production:					
October	-	1,901	3,024	2,176	1,139

(Table continued on following page)

Major Indicators for U. S. Supply of Fish Meal, Solubles, and Oil, August 1962 (Contd.)

Item and Period	1962	1961	1960	1959	1958
 (1,000 Gallons)				
September	-	3,224	3,939	2,888	3,689
August	4,500	6,548	4,910	3,877	4,160
January-July 4/ ..	17,828	18,815	12,572	12,318	9,620
Jan.-Dec. prelim. totals	-	33,471	26,690	24,418	21,625
Jan.-Dec. final tots.	-	34,416	27,886	24,978	22,028
Exports:					
October	-	2,027	591	1,911	3,591
September	-	1,269	1,861	1,129	665
August	-	1,774	186	2,449	752
July	17	589	5,414	3,770	791
January-June ...	8,401	9,084	7,043	6,581	4,320
Jan.-Dec. totals ..	-	16,331	19,154	19,264	12,539

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

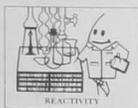


Irradiation Preservation

IRRADIATED CLAM MEATS TESTED FOR QUALITY IMPROVEMENT AFTER REFRIGERATION:

A series of sensory tests to determine if refrigeration of clam meats during irradiation results in a detectable improvement in quality was conducted by the U. S. Bureau of Commercial Fisheries Technological Laboratory at Gloucester, Mass. Initially, the vitamin content of clams sampled during the spawning season was determined by using a part of a sample which was irradiated at 350,000 rads ^{1/} and stored for 30 days at 33° F. The experiment showed no significant difference in quality after that period of storage.

^{1/}Rad = The quantity of ionizing radiation which results in the absorption of 100 ergs per gram of irradiated material at the point of interest. Erg = unit of energy.
 Note: See Commercial Fisheries Review, April 1962 p. 24.



Michigan

NATURAL LAKE TROUT REPRODUCTION PROJECT COMPLETED:

A community conservation project which may set the stage for natural lake trout reproduction in Higgins Lake, Roscommon County, Mich., was completed early in August 1962, the State of Michigan Conservation Department reports.

The project is a new spawning reef for lake trout located about one mile out from the lake's west shore. The reef measures about half the length and twice the width of a football field in an area where the fish are known to concentrate during the fall spawning season.

Selection of the project site was also pinpointed by Michigan Conservation Department studies which showed the area is free of siltation, and has suitable water temperatures and currents for egg hatching.

Some 200 yards of broken concrete were hauled on barges and dumped in the area by Michigan Conservation Department fisheries workers to create the artificial spawning bar.

Lake trout are expected to place their spawn in crevices of concrete chunks where the eggs will be protected from predation by perch and mud puppies.

A skin-diving fisheries biologist will check the reef for eggs in early November during the fall spawning season. Plans also call for placing some boxes of lake trout eggs in the area to study hatching results.



Mullet

DEVELOPMENT OF NEW PRODUCTS:

Experiments towards finding new uses for mullet were conducted this summer by the U. S. Bureau of Commercial Fisheries Technological Laboratory at Pascagoula, Miss., in a joint program with the Florida Conservation Department.

Butterfly mullet fillets cut from 500 pounds of fish were canned in brine at the Laboratory. The canned product was to go to Florida State institutions for consumer taste-testing. If the canned mullet is acceptable to Florida's State institutions along the Gulf and South Atlantic Coasts, it is believed that a new market could be developed for a large amount of unutilized fish.

Another 100 pounds of dressed mullet was shipped from Pascagoula to the Fishing Corporation's Research Department in Chicago in a joint program to use mullet in a smoked fish sausage. A meat packer in the Pascagoula area has agreed to try a consumer market test on the new product.



Navigable Waters

DUMPING ILLEGAL:

The dumping of petroleum products, garbage, and other refuse into the navigable waters of the United States with resulting pollution is of common concern to everyone.

The laws of the United States, Section 13 of the River and Harbor Act of 3 March 1899 (33 USC 407), make it unlawful to discharge, or suffer, cause, or permit the discharge of petroleum products, garbage, or other refuse matter of any kind or description into the navigable waters of the United States. This includes placement on shore or in tributaries so as to be washed into navigable waters; refuse thrown from shore is also included. Every person and every corporation that shall violate, or that shall knowingly aid, abet, authorize, or instigate a violation of this provision shall be guilty of a misdemeanor. Conviction carries a fine not exceeding \$2,500 nor less than \$500, or imprisonment for not less than 30 days nor more than one year, or by both such fine and imprisonment, in the discretion of the court. One-half of said fine is to be paid to the person or persons giving information which shall lead to conviction (Federal employees are not to benefit).

Section 16 of the River and Harbor Act of 3 March 1899 (33 USC 412) states that any boat, vessel, scow, raft, or other craft used or employed in violating any of the provisions listed above shall be liable for the pecuniary penalties specified above and in addition thereto for the damages done by said boat, vessel, scow, raft, or other craft, which latter sum shall be placed to the credit of the appropriation for the improvement of the harbor or waterway in which the damage occurred, and said boat, vessel, scow, raft, or other craft may be proceeded against summarily by way of libel in any district court of the United States having jurisdiction thereof.



Oceanography

COAST AND GEODETIC SURVEY TO PARTICIPATE IN INTERNATIONAL INDIAN OCEAN EXPEDITION:

Plans were announced in August by the U. S. Coast and Geodetic Survey for its vessel Pioneer to participate in the International Indian Ocean Expedition. The program has been planned to cover areas where little has been done to date, and to supplement work of the other expeditions. The Pioneer is scheduled to sail in mid-February 1964 from San Francisco, Calif., and will return to San Francisco the following September. In addition to under way observations en route to and from the Indian Ocean, the Pioneer will concentrate on gravity, magnetic, and hydrographic operations in the Andaman Sea and in the eastern Bay of Bengal.

Three north-south profiles of oceanographic stations are planned from 5° N. to 5° S. across the Equator south of the Bay of Bengal. Between San Francisco and Honolulu the Pioneer will carry out track-line hydrographic, gravity, and magnetic observations for coverage between the West Coast

and 155° W. Under way observations will include bathythermograph, surface salinity, and temperature, surface weather and upper air observations, visual observations of sea, swell, marine life, etc. Also included will be such under way biological observations as may be programmed by the biologists. From Honolulu to Guam, under way observations will continue along a track planned to cover a route not previously crossed for such observations. The Pioneer will make three crossings over the Marianas Trench. A similar program will be carried out with three crossings of the Phillipine Trench northeast of Samar. Under way observations will be continued to Manila. From Manila to Singapore, under way operations will continue with one long oblique crossing of the Palawan-North Borneo Trench.

From Singapore, the track will be northwest through the Malacca Straits into the Andaman Sea. Sediment cores and bottom photographs will be taken in the Andaman Sea. At the northern end of the Andaman Sea, special lines will be run to determine if submarine channeling extends seaward of the mouths of the Irrawaddi River.

From the Andaman Sea, the ship will pass into the Bay of Bengal where the under way operations, cores (or dredgings), and bottom photography will continue along a series of east-west lines from the coast of Burma out to approximately 88° E.

Special care will be taken along the more northerly of those lines to look for any southerly extension of the Ganges Canyon. The Pioneer will carry out a detailed survey of the Ganges Canyon seaward of the continental shelf, which will be traced as far seaward as possible. Cores will be obtained from the canyon floor, where possible, and attempts will be made to dredge the canyon walls. At the termination of this project the ship will proceed to Trincomalle, Ceylon.

When the Pioneer leaves Trincomalle, a supposedly existing canyon will be traced seaward with a set of profiles and an attempt will be made to dredge the walls. Upon completion of the Canyon Survey, three north-south sections of oceanographic stations will be occupied from 5° N. to 5° S. along 84° E., 88° E., and 92° E. The track to Djakarta is tentatively planned to accomplish two crossings of the northeastward extension of the trend of the Java Trench.

From Djakarta, under way observations will be carried out through the Java Sea, Macassar Strait, Celebes Sea, and from there to the Palau Islands. Under way observations will be continued to Guam. From Guam, three more crossings would be made of the Marianas Trench, and then to Honolulu along a line parallel to the track run on the way out. From Honolulu to San Francisco the track would be along one of the predetermined routes.

These preliminary plans are only tentative and may change as biologists and meteorologists' ideas take shape, and results of other ships operating in the Eastern Indian Ocean become available. (National Oceanographic Data Center Newsletter, August 15, 1962.)

* * * * *

OCEANOGRAPHIC PROGRAM DEVELOPED BY DUKE UNIVERSITY:

Recent developments in the Biological Oceanography Program of Duke University's Marine Laboratory (located at Beaufort, N.C.) were announced in August. Much of the data collected under the program are to be given to the National Oceanographic Data Center, Washington, D. C. The laboratory's area of operations is likely to extend from Beaufort, N. C., south to Florida, and north to Virginia. Going eastward, the laboratory will probably concentrate its investigations in the Gulf Stream and the Sargasso Sea. The majority of the work scheduled in the program will be on shallow-water processes along the continental shelf, but some work will be done in deep water off Cape Hatteras.

The work to be undertaken will involve hydrographic observations, submarine geology, fisheries studies, and basic marine biological studies at sea. Those are the major aspects of the study programmed by Duke University, and also by various universities and laboratories involved in the Cooperative Ship Program.

As it now stands, the program has three major phases: (1) Cooperative Ship Program as a means of reaching the research goals of the cooperating agencies and institutions; (2) teaching of oceanography; and (3) graduate research in oceanography. (National Oceanographic Data Center Newsletter, August 15, 1962.)



Oregon

EFFECTS OF SEISMIC EXPLOSIONS ON MARINE LIFE PROBED:

Seismic explosions detonated by oil exploration crews operating off the Oregon coasts were charged to be seriously damaging fish, shellfish, and other marine life. The charges were to be probed in an investigation scheduled for September 6-7, 1962, by the Oregon Fish Commission. Oregon's water resources analyst for the State fisheries agency stated the initial biological experiment would be conducted off Astoria on September 6. That phase of the investigation was to determine if appreciable damage was being done to such species as sole, flounder, and Pacific ocean perch, which comprise a high percentage of Oregon's important trawl fishery landings.

A chartered Astoria trawler, the Betty, accompanied by the Shell Oil Company seismic boat Miss Ida, and an observer boat, were to move into an area between the Columbia lightship and Cape Falcon, in waters from 20 to 50 fathoms. When fish were located with fish-detection equipment, the trawler was to make two 1-hour tows, the second following as closely as possible the course of the first tow. At the end of the second tow, the seismic boat would begin detonating a series of charges suspended 3 to 5 feet beneath the surface along the same track, spacing the blasts at $\frac{1}{4}$ -mile intervals. The powder charges were to be the same as those used in routine seismic work--5-pound charges in water up to 200 feet in depth, and $16\frac{2}{3}$ pounds in water deeper than 200 feet. The trawler would again lay down fishing gear and follow closely behind the shot boat in an effort to determine if there were any change in abundance of fish. A second post-blast tow would be made back along the shot line in an attempt to pick up possible fish kills sinking to the bottom.

Catches were to be analyzed closely for species composition, size composition, total poundage, and for dead or injured fish. The catches were to be retained aboard the trawler and later marketed in the regular manner by the fisherman. Filleting operations were to be observed by Oregon Fish Commission biologists for signs of damage to individual fish attributed to the seismic explosions.

Expenses for the biological investigation are to be paid by the oil companies engaged in seismic operations.

In another phase of the project, Dungeness crabs of various sizes held in commercial crab pots in waters off Newport were to be subjected to typical seismic explosions. Half of the experimental pots would be pulled for examination immediately following the explosions, while others would be left for 72 hours to determine if there was any delayed mortality. Crabs held in pots not subjected to explosions were to be compared with experimental animals. The Oregon State Police were to provide a boat and crew to assist Oregon Fish Commission biologists in conducting that phase of the investigation.

SCUBA divers from both the Washington Department of Fisheries and Oregon Fish Commission were to make underwater observations during the two phases of the study.



Oysters

LONG ISLAND SOUND OBSERVATIONS ON SPAWNING AND SETTING AS OF AUGUST 17:

Setting of Starfish: Observations showed that setting of starfish continued from the latter part of July through the middle of August 1962, reports the U. S. Bureau of Commercial Fisheries Biological Laboratory, Milford, Conn. With the exception of the Bridgeport area, setting remained very light, especially in New Haven Harbor where virtually none occurred during that period.

Setting of Oysters: Examination of plankton samples collected on July 30 showed an almost complete absence of bivalve larvae. The situation had improved somewhat by August 2 when only two early umbo oyster larvae were found. On August 6 a small number of young oyster larvae was found at 3 stations and at a recently established station, but none was found at another station. The majority of the larvae was less than 150 microns long.

Samples collected on August 13 contained a few oyster larvae at 4 stations, but none at another station. The majority of the larvae was less than 200 microns long except for several that were somewhat larger, and up to 290 microns long. The larger larvae were found at stations established in Lewis Gut.

Plankton samples collected on August 16 indicated irregular distribution of larvae.

But since a comparatively large number of mature larvae was found at the New Haven and Bridgeport stations, an increase in intensity of setting may develop in the vicinity of those two points. It is also possible that the small patches of oyster larvae found at 2 stations may be carried by currents for some distances before they set.

Setting of oysters began July 18, but was largely confined to 3 stations in the New Haven area. That wave of setting continued until about July 29 and then ended, without spreading to other areas, especially Bridgeport. With the exception of a single spat recorded from time to time on some collectors, virtually no setting of oysters occurred at any of the stations from the latter part of July to the middle of August.

An auxiliary station was recently established in the Bridgeport area at the point where 4 lots join. The new auxiliary station serves as the control for the stations established in Lewis Gut, which had been chemically treated, and also because several oyster companies planted shells in that area. (Bulletin No. 3, August 17, 1962, issued by the Milford Biological Laboratory.)

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LONG ISLAND SOUND OBSERVATIONS ON SPAWNING AND SETTING AS OF AUGUST 27:

Setting of Oysters: As reported earlier in August 1962, the first wave of oyster setting, confined largely to the New Haven stations, continued until about July 29 and then virtually ceased. However, the presence of a comparatively large number of mature larvae, found around August 16 at a station in New Haven and one in Bridgeport, indicated a second wave of setting, reports the U. S. Bureau of Commercial Fisheries Biological Laboratory, Milford, Conn. This proved to be correct and on August 17 oysters began to set in shallow stations in Milford and 2 stations in the New Haven area. The Bridgeport stations showed a light set until about August 22 when a good number of recently set oysters were found on the collectors from a Bridgeport station.

At one station located near Lighthouse Point in New Haven Harbor, the second wave of setting had been comparatively light but continued, while at a recently-established station in Bridgeport oysters set rather heavily on August 23. Judging that the majority of recently-set oysters found on the collectors on August 23 were less than one day old, setting was expected to continue for several days. This is especially true of 2 stations in the Bridgeport area.

Setting of Starfish: Contrary to the increase in intensity of setting of oysters, starfish setting remained light throughout the oyster-producing area, especially at the shallow stations of Milford and all stations of the New Haven area.

Development of Method for Chemical Control of Oyster Enemies: Continuing observations under natural conditions on the effectiveness of the Milford method upon



Biologists of U. S. Bureau of Commercial Fisheries Biological Laboratory, Milford, Conn., spraying a chemical over oyster drill-infested bed.

boring gastropods, an experiment was conducted in cooperation with the Northern Oyster Company, Inc., at Fireplace, Long Island, where ten acres of oyster bottom heavily infested with drills were covered on August 10 at the rate of 3.5 yards of chemically-treated sand per acre. After the treatment, a trap line (with 10 traps baited with mussels) was placed across the treated area and an identical line was placed on the untreated section. One week after the treatment the trap lines were fished and examined. The examination indicated that over 90 percent of the drills on the treated area were killed. A week later examination of the traps gave only 6 drills and no starfish, while the traps from the control area contained 306 drills and 74 starfish. Thus, 2 weeks after treatment the population of drills on the treated area was reduced by approximately 98 percent.

In connection with this experiment it should be emphasized that the Fireplace oyster bed, located near the tip of Long Island, lies virtually in the open ocean at a considerable depth. Thus, treatment of such an area presented many difficulties, nevertheless, it apparently has been a success. Properly trained employees of the Northern Oyster Company, Inc., will continue trap studies as long as necessary.

Observations in Lewis Gut, Bridgeport, which was treated earlier in the season, indicate that drills are still virtually absent.

In trying various anti-drill compounds last year, two experimental lots in New Haven Harbor were treated with different quantities of a crystalline material, paradichlorobenzene. The treatment reduced the drill population but not as effectively as the mixture of sand, Polystream and Sevin. At present, tests are being made to determine whether the addition of Sevin to crystals of paradichlorobenzene increases its effectiveness against drills. Laboratory experiments conducted so far indicate that when Sevin is added to paradichlorobenzene the drills are affected more quickly and more severely. This experiment will continue and may develop into another modification of the basic method developed by the Laboratory. (Bulletin No. 4, August 27, 1962.)

* * * * *

FUNGUS PARASITE THAT KILLS OYSTERS TO BE STUDIED:

Research on a fungus parasite that is killing oysters in the Gulf of Mexico and South Atlantic is to be conducted by a marine biologist of the Texas Agricultural and Mining College.

The marine biologist will investigate the effects of antibiotics on fungus parasites in oysters with the help of a \$5,175 grant from the National Institutes of Health. He is an assistant professor of oceanography at Texas A & M College, and will conduct his research at the College's Marine Laboratory at Fort Crockett, Galveston.

The fungus parasite (Dermocystidium marinum) is the cause of considerable mortality to oysters in warm seasons in relatively high salinity ocean areas, the researcher said. Oyster beds are being depleted drastically and the industry is failing.

The biologist doing the research will conduct physiological and nutritional studies of oysters under laboratory conditions. All commercially available antifungal antibiotics will be tested for effects on the oyster fungus parasite. (Science News Letter, September 1, 1962.)



Shrimp

RESEARCH PROGRAM EXPANDED:

The Gulf of Mexico shrimp research program of the U. S. Bureau of Commercial Fisheries will be expanded this year because of the additional funds voted by the United States Congress. The sharp drop in landings of shrimp from the Gulf of Mexico in 1961, because of unknown natural factors, emphasized the need for more knowledge about the causes of fluctuation in this important marine resource. Commercial landings by Gulf fishermen in 1961 were little more than half the amount expected normally. With the addition of \$325,000 this year, the Bureau's biological research program, aimed at ultimately developing a method of predicting the seasonal abundance of shrimp and better management of this valuable resource, will reach a level of \$750,000 annually.

Another \$100,000 has been added to studies of fishing gear improvement in the hope of reducing costs through more efficient shrimp fishing. A considerable amount of research has been done along this line, but it needs to be accelerated, because of the constantly increasing pressure of competition of foreign fishery products in the United States markets. Price is one of the competitive factors, and under normal producing conditions United

States fishermen must seize every opportunity to hold a favorable position.

Because of the wide-spread interest in shrimp research by all of the States bordering the Gulf of Mexico, the Gulf States Marine Fisheries Commission sponsored a joint meeting between Federal representatives and State research men early in September to work out final details of the expanded shrimp research program.

UNITED STATES SHRIMP SUPPLY INDICATORS, AUGUST 1962:

Item and Period	1962	1961	1960	1959	1958
. . . . (1,000 Lbs., Heads-Off)					
Total Landings, So. Atl. and Gulf States:					
October	-	12,696	21,690	19,601	16,462
September	-	9,691	18,832	18,331	15,847
August	11,200	10,944	20,441	18,595	14,173
January-July	44,200	41,530	58,521	53,004	49,555
January-December	-	91,395	141,035	130,660	116,552
Quantity canned, Gulf States 1/:					
October	-	2,307	2,567	2,531	3,489
September	-	785	2,236	2,108	2,825
August	1,400	1,206	5,041	2,427	2,809
January-July	11,600	8,447	16,159	14,023	11,914
January-December	-	15,760	28,594	24,679	26,404
Frozen inventories (as of end of each mo.) 2/:					
October 31	-	17,811	31,209	33,057	24,620
September 30	-	13,361	26,119	18,079	16,896
August 31	4/	12,728	20,171	23,780	15,274
July 31	13,677	14,849	17,397	22,357	12,351
June 30	13,796	19,416	15,338	19,283	10,664
May 31	13,904	24,696	17,540	21,137	11,013
January 31	-	31,842	34,332	30,858	17,963
Imports 3/:					
October	-	16,831	14,211	15,340	11,463
September	-	8,629	8,190	7,541	7,620
August	4/	6,743	6,407	5,107	6,628
July	8,265	6,635	7,319	7,861	6,340
January-June	64,001	57,168	51,365	49,826	32,278
January-December	-	126,268	113,418	106,555	85,393

1/Founds of headless shrimp determined by multiplying the number of standard cases by 33.
 2/Raw headless only; excludes breaded, peeled and deveined, etc.
 3/Includes fresh, frozen, canned, dried, and other shrimp products as reported by the Bureau of the Census.
 4/Not available.
 Note: Data for 1962 and 1961 are preliminary. August 1962 data estimated from information published daily by the New Orleans Fishery Market News Service. To convert shrimp to heads-on weight multiply by 1.68.



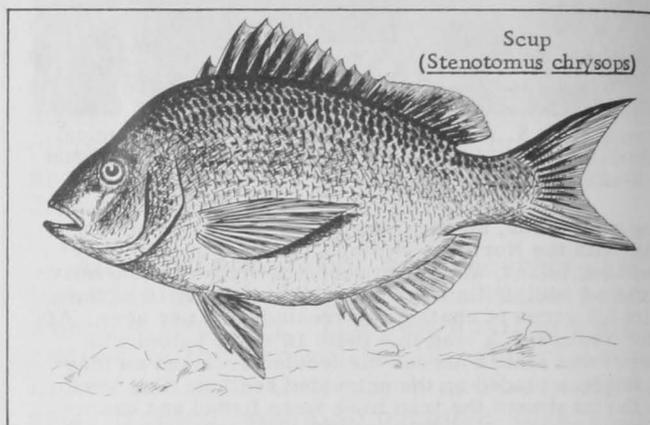
South Atlantic Exploratory Fishery Program

ANIMAL LIFE EXPLORATIONS OFF NORTH CAROLINA COAST:

M/V "Silver Bay" Cruise 40: To assess the animal life in Onslow Bay off the North Carolina coast, an 18-day trip was made by the exploratory fishing vessel Silver Bay of the U. S. Bureau of Commercial Fisheries.

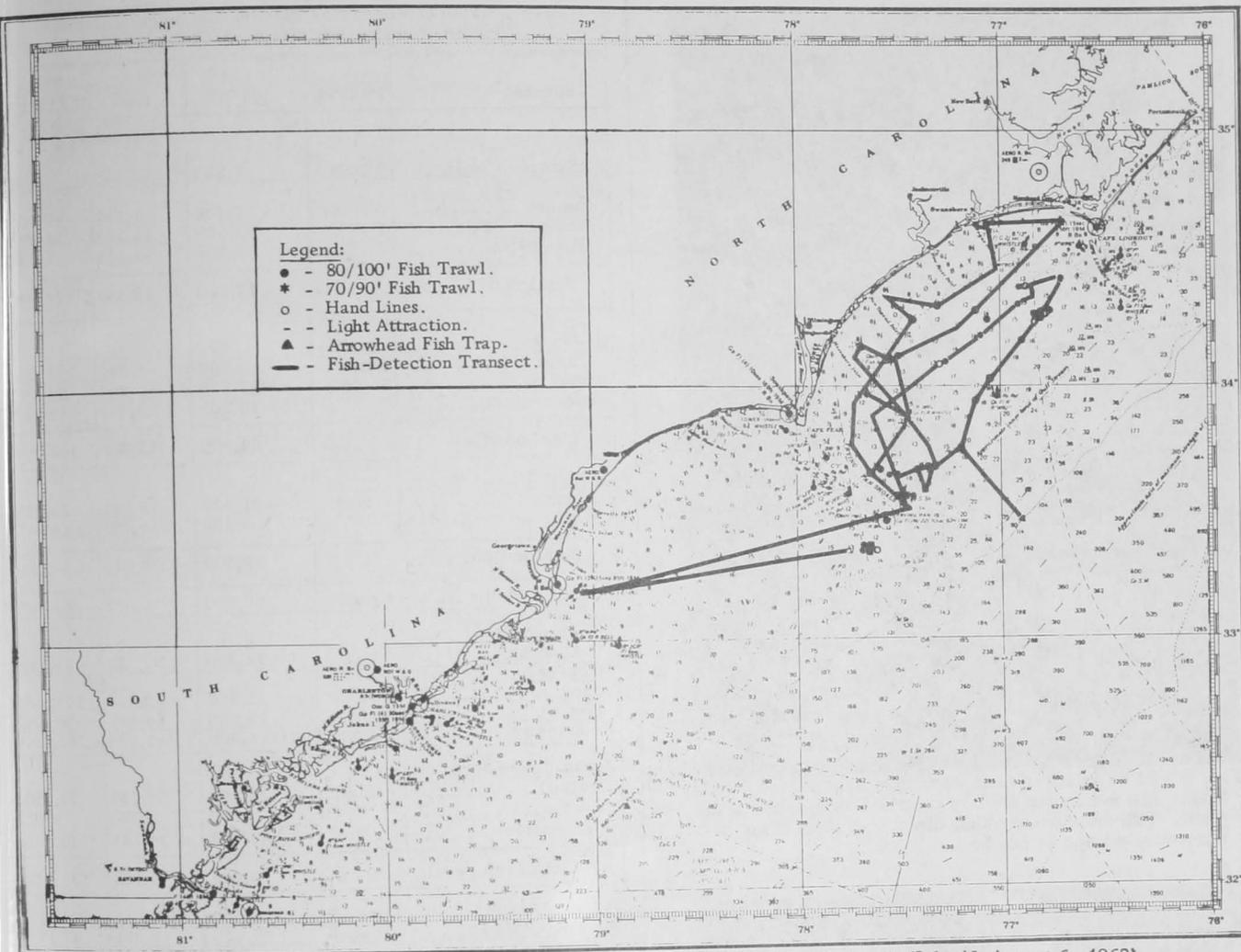
The vessel returned to its base at Brunswick, Ga., on August 6, 1962.

Approximately 425 miles of "searching" transects were made between Capes Lookout and Fear. Most fishing was done with 70/90- and 80/100-foot roller-rigged nylon fish trawls. An arrowhead fish trap and hand lines were also used, and the white-line depth-recorder was used for fish detection.



Extensive areas of slab rock caused some gear damage even though much of the sea bottom appeared trawlable on the depth recorder. Total catches ranged up to 2,300 pounds per 90-minute drag. Scup (*Stenotomus chrysops*) were the dominant species, ranging up to 1,500 pounds per drag. Small amounts of spot-tail pinfish (*Diplodus holbrooki*), up to 250 pounds per drag, were caught throughout the area in nearly every drag. Most scup averaged three fish to the pound and the spot-tail pinfish averaged one pound each. Over broken bottom areas, catches of vermilion snapper (*Rhomboplites aurorubens*) ranged up to 600 pounds per drag. Red snapper (*Lutjanus blackfordi*) up to 68 pounds per drag, and grouper (*Mycteroperca* sp.) up to 30 pounds per drag were caught in trawls, traps, and by hand lines. Extensive fish tracings of large concentrations of midwater and near-bottom fish were recorded throughout Onslow Bay. These were believed to be scad (*Decapterus* sp.) with catches in large-mesh fish trawls of up to 900 pounds per drag.

It appeared at that time of year that fish species (primarily scup) commonly found north of Cape Lookout inhabit the inshore area of Onslow Bay. Snapper and grouper, which are commonly found south



Onslow Bay explorations off the North Carolina coast by M/V Silver Bay Cruise 40 (July 19-August 6, 1962).

of Cape Fear, were found also in the off-shore area of Onslow Bay. The area beyond the 20-fathoms depth is still unexplored.



United States Fisheries

COMMERCIAL FISHERY LANDINGS, JANUARY-JULY 1962:

Total Landings: Landings of fish and shellfish in the United States during the first 7 months of 1962 were 5 percent less than during the same period of 1961. The decline was due largely to a sharp drop in menhaden landings.

Menhaden: Total landings for the first 8 months of 1962 amounted to 1.6 billion pounds--177 million pounds less than for the same period in 1961. The catch was off sharply in the New England, Middle Atlantic, and Gulf States.

Salmon: On the basis of the reported pack of canned salmon, it was estimated that the Alaska catch for the 1962 season totaled approximately 272 million pounds--a gain of 7 million pounds compared with the 1961 season.

Shrimp: The South Atlantic and Gulf States landings through August 1962 amounted to about 93 million pounds, an increase of 5 million pounds as compared with the same period in 1961.



Fig. 1 - Scene inside a crab plant in Biloxi, Miss. Some plants use rotary washers for cleaning the debacked crabs.

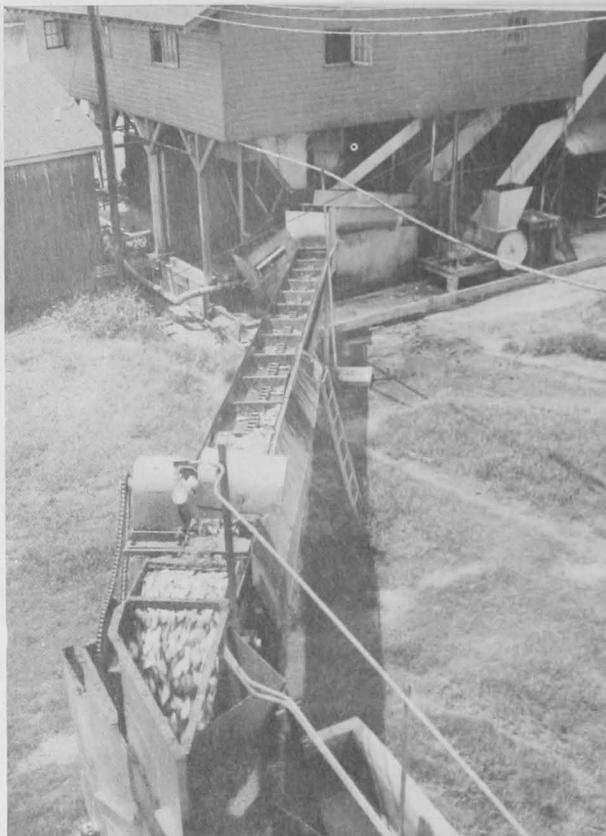


Fig. 2 - At an industrial fishery products plant in Moss Point, Miss., raw menhaden are being carried on a belt into the plant. Fish are carried either directly to a cooker or to temporary storage in raw box.



Fig. 3 - Oyster shucker in a New Orleans oyster plant. Shucker cuts muscle holding the top shell of the oyster, after billing oyster with hammer.

United States Commercial Fishery Landings of Certain Species for Periods Shown, 1962 and 1961				
Species	Period	1/1962	1961	Total 1961
. (1,000 lbs.)				
Anchovies, Calif. . .	7 mos.	1,300	2,560	6,500
Cod:				
Maine	6 mos.	1,400	1,507	2,500
Boston	7 "	14,500	13,226	18,831
Gloucester	7 "	2,000	1,615	3,351
Total cod		17,900	16,348	24,701
Haddock:				
Maine	6 mos.	900	1,299	2,940
Boston	7 "	53,800	52,297	84,093
Gloucester	7 "	10,200	9,033	15,025
Total haddock		64,900	62,629	102,058
Halibut 2/:				
Alaska	7 mos.	21,500	18,831	25,077
Wash. & Oreg.	7 "	8,400	10,792	14,947
Total halibut		29,900	29,623	40,024
Herring, Maine . . .	7 mos.	58,800	11,699	54,463
Industrial Fish, Me., & Mass. 3/. . .	7 mos.	24,300	22,521	41,851
Mackerel:				
Jack	7 mos.	41,200	29,824	102,958
Pacific	7 "	19,300	20,628	38,428
Menhaden	8 mos.	1,614,400	1,791,059	2,308,000
Ocean Perch:				
Maine	6 mos.	36,800	39,887	77,350
Boston	7 "	400	320	700
Gloucester	7 "	38,700	34,946	53,951
Total ocean perch		75,900	75,153	132,042
Salmon, Alaska . . .	Year	272,000	264,814	264,814
Sardine, Pacific . . .	to Sept. 6	12,000	8,801	43,159
Scallops, sea, New Bedford (meats) . . .	7 mos.	12,100	11,851	20,643
Shrimp (heads-on):				
So. Atl. & Gulf . . .	8 mos.	93,100	88,156	153,500
Washington	7 "	800	951	1,451
Squid, Calif.	7 "	6,900	1,064	5,400
Tuna, Calif.	8 "	208,400	225,214	307,258
Whiting:				
Maine	6 mos.	4,500	2,279	14,147
Boston	7 "	100	63	1,400
Gloucester	7 "	21,700	24,296	51,593
Total whiting		26,300	26,638	65,888
Total all above items		2,579,500	2,689,533	3,713,166
Other 4/.		367,000	408,637	1,441,831
Grand Total		2,946,500	3,098,170	5,155,000

1/Preliminary.
 2/Dressed weight.
 3/Excludes menhaden.
 4/Includes landings for species not listed.
 Note: Finfish generally converted to round weight, crustaceans to weight in the shell, and mollusks reported in meats only.

Tuna: Landings in California (including transshipments of United States-caught fish from South America) amounted to about 208 million pounds through August 1962--17 million pounds less than for the same period in the previous year.

Maine Herring: Landings through July of this year (58.8 million pounds) were up 47 million pounds--a sharp increase over the same period of 1961. The 28 million pounds caught in July almost doubled the amount taken in the first half of the year.



U. S. Fishing Vessels

DOCUMENTATIONS ISSUED AND CANCELLED, AUGUST 1962:

During August 1962, a total of 42 vessels of 5 net tons and over were issued first documents as fishing craft, as compared with 41 in August 1961. There were 22 documents cancelled for fishing vessels in August 1962 as compared with 26 in August 1961.

Table 1-U.S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, August 1962 with Comparisons

Area (Home Port)	Aug.		Jan.-Aug.		Total 1961
	1962	1961	1962	1961	
.....(Number).....					
Issued first documents 2/:					
New England	2	5	22	26	33
Middle Atlantic	-	4	2	9	12
Chesapeake	3	2	26	43	75
South Atlantic	10	5	31	34	47
Gulf	16	10	78	83	100
Pacific	10	13	110	137	149
Great Lakes	1	2	2	11	12
Puerto Rico	-	-	-	2	2
Total	42	41	271	345	430
Removed from documentation 3/:					
New England	2	2	14	13	20
Middle Atlantic	2	1	28	19	34
Chesapeake	4	5	17	26	28
South Atlantic	3	1	25	19	30
Gulf	2	10	71	70	103
Pacific	6	3	78	63	112
Great Lakes	3	4	15	12	14
Hawaii	-	-	3	-	-
Puerto Rico	-	-	1	-	-
Total	22	26	252	222	341

1/For explanation of footnotes, see table 2.

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

Gross Tonnage	Issued 2/	Cancelled 3/
.....(Number).....		
5-9	6	7
10-19	10	5
20-29	6	2
30-39	10	1
40-49	1	-
50-59	3	1
60-69	2	1
70-79	4	1
80-89	-	1
90-99	-	1
110-119	-	1
140-149	-	1
Total	42	22

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: 30 in 1962, 2 in 1961, 8 prior to 1951, and 2 unknown. Assigned to areas on the basis of their home ports.

3/Includes vessels reported lost, abandoned, forfeited, sold alien, etc.
Source: Monthly Supplement to Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.



U.S. Foreign Trade

EDIBLE FISHERY PRODUCTS, JUNE 1962:

Imports of fresh, frozen, and processed edible fish and shellfish into the United States in June 1962 were down 29.7 percent in quantity and 8.2 percent in value as compared with the previous month. The quantity dropped more than the value because lower-priced imports declined more than higher-priced imports. Imports were down in June for fish blocks or slabs (decline mostly from Iceland), groundfish fillets other than ocean perch (decline mostly from Iceland), swordfish fillets, sea catfish fillets (decline mostly from Iceland), canned salmon (from Japan), frozen tuna (decline mostly from Japan, British West Africa, and Ecuador), canned sardines in oil (decline mostly from Norway and Denmark), canned crab meat (from Japan), canned lobster meat (from Canada), frozen shrimp (decline mostly from Mexico), and sea scallops (from Canada). The declines were partly offset by a gain in imports of ocean perch fillets (mostly from Canada), flounder fillets (mostly from Canada), halibut and salmon fillets (mostly from Canada), yellow pike fillets (from Canada), fresh and frozen salmon (mostly from Canada), canned tuna in brine other than albacore (mostly from Japan), frozen spiny lobster tails (increase mostly from Australia), canned oysters (mostly from Japan), and frozen frog legs (mostly from Japan).

Compared with the same month in 1961, the imports in June 1962 were up 1.1 percent in quantity and 16.5 percent in value. Imports were up this June for canned salmon (from Canada and Japan), canned tuna in brine (mostly from Japan), canned sardines in oil, canned sardines not in oil (mostly from South Africa), canned crab meat (mostly from Japan), frozen spiny lobster tails (increase mostly from Australia), frozen shrimp, and sea scallops (mostly from Canada). But imports were down for fish blocks or slabs, groundfish fillets other than haddock fillets, flounder fillets (mostly from Canada), sea catfish fillets, fresh and frozen salmon (mostly from Canada), frozen tuna, and canned oysters (mostly from Japan).

In the first six months of 1962, imports were up 14.6 percent in quantity and 23.3 percent in value as compared to the same period in 1961. The greater increase in value was because of the higher prices which prevailed in the first part of this year for nearly all imported fishery products. Most fishery products were imported in greater quantity this year and imports were up substantially for fish blocks or slabs, canned salmon (mostly from Canada and Japan), frozen tuna (increase mostly from Japan, Peru, and British West Africa), canned tuna (mostly from Japan), canned sardines in oil, canned sardines not in oil, frozen shrimp, and sea scallops. Imports were down for the following products: cod fillets, haddock fillets, fresh and frozen salmon (mostly from Canada), canned bonito and yellowtail, canned oysters (mostly from Japan), and frozen frog legs. The increase in canned sardines in oil reflects the small Maine pack for the 1961 season.

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

Item	Quantity				Value			
	June		Jan.-June		June		Jan.-June	
	1962	1961	1962	1961	1962	1961	1962	1961
(Millions of Lbs.) . (Millions of \$) .								
Imports:								
Fish & Shellfish:								
Fresh, frozen, & processed 1/ . . .	84.1	83.2	559.9	488.4	31.8	27.3	191.3	155.1
Exports:								
Fish & Shellfish:								
Processed only 1/ (excluding fresh & frozen)	3.2	1.2	17.4	12.9	1.0	0.8	6.9	6.6

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

United States exports of processed fish and shellfish in June 1962 were up 166.7 percent in quantity and only 25.0 percent in value as compared with June 1961. Exports of the lower-priced canned sardines not in oil and canned squid (to Greece and the Philippines) were much higher this June. There was some increase in exports of canned mackerel, canned salmon, and canned sardines in oil. But exports of the higher-priced canned shrimp (principally to Canada and the United Kingdom) were down.

Compared with the previous month, the exports in June 1962 were up 52.4 percent in quantity, and 42.9 percent in value. Exports were up for canned mackerel, canned salmon, canned sardines in oil, canned shrimp (principally to Canada and the United Kingdom), and canned squid (to Greece and the Philippines). There was a modest decline in exports of canned sardines not in oil.

Processed fish and shellfish exports for the first six months of 1962 were up 34.9 percent in quantity, but the value was up only 4.5 percent as compared with the same period of 1961. The following were exported in substantially greater quantities in 1962: canned mackerel and canned squid (to Greece and the Philippines). Exports were slightly higher for canned salmon and canned sardines not in oil. But exports were down for canned shrimp (principally to Canada and the United Kingdom) and canned sardines in oil. Since most of the increase in exports January-June this year was in the lower-priced products, the value did not increase at the same rate as the quantity.

* * * * *

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

United States imports of tuna canned in brine during January 1-September 1, 1962, amounted to 37,272,804 pounds (about 1,774,895 std. cases), according to data compiled by the Bureau of Customs. This was 4.9 percent more than the 35,537,369 pounds (about 1,692,256 std. cases) imported during January 1-September 2, 1961.

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

* * * * *

AIRBORNE IMPORTS OF FISHERY PRODUCTS:

January-April 1962: Shrimp was the leading U. S. airborne fishery import during the first part of 1962. Shrimp accounted for 82.1 percent of the quantity and 83.1 percent of the value of airborne imports of fishery products in April 1962. All of the U. S. airborne shrimp imports during the first four months of 1962 originated in Central and South American countries. The leading suppliers of airborne shrimp imports during January-April 1962 were Venezuela with 40.9 percent of the total, Nicaragua with 28.5 percent of the total, and Panama with 18.1 percent of the

total. Mexico was the most important supplier of fishery products other than shrimp during January-April 1962. The data as issued do not show the state of the product—fresh, frozen, or canned, but it is believed that the bulk of these airborne imports is fresh and frozen products.

Product and Origin 1/	April		Jan.-April	
	Qty. 2/	Value 3/	Qty. 2/	Value 3/
	Pounds	US\$	Pounds	US\$
Fish:				
Canada	-	-	1,000	368
Mexico	25,142	6,759	153,062	26,078
France	-	-	155	461
Rumania	100	997	100	997
Panama	7,807	1,312	7,807	1,312
Total Fish	33,049	9,068	162,124	29,215
Shrimp:				
Guatemala	11,272	6,702	66,068	34,085
El Salvador	23,410	16,880	125,744	84,721
Nicaragua	77,535	29,174	603,543	201,611
Costa Rica	18,742	8,458	52,411	21,245
Panama	150,840	75,928	384,068	194,540
Venezuela	197,322	109,891	865,847	415,895
Ecuador	-	-	12,210	3,440
Mexico	-	-	6,072	3,850
Netherlands Antilles	3,075	2,722	3,075	2,722
Total Shrimp	482,196	249,755	2,119,038	962,105
Shellfish other than Shrimp:				
British Honduras . .	15,210	8,813	61,884	38,550
Honduras	4,590	850	60,203	47,706
Costa Rica	-	-	1,400	1,247
Panama	-	-	1,040	1,011
Jamaica	13,288	9,664	28,188	20,544
Netherlands Antilles	12,398	8,580	14,159	9,264
Venezuela	3,560	1,466	22,263	13,624
Mexico	16,067	9,161	27,793	16,050
Guatemala	-	-	2,370	1,880
Leeward and Windward Islands	5,611	1,933	14,823	5,200
Nicaragua	-	-	390	280
Japan	-	-	26	30
France	70	212	150	410
Colombia	140	236	140	230
Ecuador	940	704	940	700
Total Shellfish (exc. shrimp)	71,874	41,619	235,769	157,047
Grand Total	587,119	300,442	2,516,931	1,148,372

1/When the country of origin is not known, the country of shipment is shown.
 2/Gross weight of shipments, including the weight of containers, wrappings, crates, and moisture content.
 3/F.o.b. point of shipment. Does not include U. S. import duties, air freight, or insurance.
 Note: These data are included in the over-all import figures for total imports; i.e., these imports are not to be added to other import data published.
 Source: United States Airborne General Imports of Merchandise, FT 380, April 1962, U. S. Department of Commerce.

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January-March 1962: United States airborne imports of fishery products during the first quarter of 1962 amounted to 1,929,812 pounds valued at \$847,930. Shrimp and prawns accounted for 84.8 percent of the quantity and 84.0 percent of the value of the

U. S. Airborne Imports of Fishery Products, January-March 1962		
Product and Origin 1/	January-March 1962	
	Quantity 2/	Value 3/
	Pounds	US\$
Fish:		
Canada	1,000	368
Mexico	127,920	19,317
France	155	463
Total Fish	129,075	20,148
Shrimp:		
Guatemala	54,796	27,383
El Salvador	102,334	67,841
Nicaragua	526,008	172,437
Costa Rica	33,669	12,787
Panama	233,228	118,612
Venezuela	668,525	306,004
Ecuador	12,210	3,440
Mexico	6,072	3,850
Total Shrimp	1,636,842	712,354
Shellfish other than Shrimp:		
British Honduras	46,674	29,737
Honduras	55,613	46,856
Costa Rica	1,400	1,247
Panama	1,040	1,011
Jamaica	14,900	10,880
Netherlands Antilles	1,761	684
Venezuela	18,703	12,158
Mexico	11,726	6,889
Guatemala	2,370	1,880
Leeward and Windward Islands	9,212	3,268
Nicaragua	390	281
Japan	26	330
France	80	207
Total Shellfish (exc. shrimp)	163,895	115,428
Grand Total	1,929,812	847,930

1/When the country of origin is not known, the country of shipment is shown.
2/Gross weight of shipments, including the weight of containers, wrappings, crates, and moisture content.
3/F.o.b. point of shipment. Does not include U. S. import duties, air freight, or insurance.
Note: These data are included in the over-all import figures for total imports, i. e., these imports are not to be added to other import data published.
Source: United States Airborne General Imports of Merchandise, FT 380, January, February, and March 1962, U. S. Department of Commerce.

airborne imports in the first quarter of 1962. The leading suppliers of airborne imports of shrimp and prawns during the period were Venezuela with 40.8 percent of the total and Nicaragua with 32.1 percent of the total. The data as issued do not show the state of the product--fresh, frozen, or canned, but it is believed that the bulk of these airborne imports is fresh and frozen products.



Wholesale Prices

EDIBLE FISH AND SHELLFISH, AUGUST 1962:

The August 1962 wholesale price index for edible fishery products (fresh, frozen, and canned) at 121.6 percent of the 1957-59 base was up 2.2 percent from the previous month, and was also higher by 10.1 percent from August 1961. Higher wholesale prices for fresh large haddock, fresh halibut,



Fig. 1 - Hand-weighing shrimp in a cannery located in Biloxi, Miss.

and salmon, and fresh and frozen shrimp this August were mainly responsible for the increase over July, but prices for Maine canned sardines dropped sharply from July to August.

The fresh and frozen drawn, dressed, or whole finfish subgroup this August rose 6.7 percent from July. Prices this August were higher for all products in the subgroup, except for fresh Lake Superior drawn whitefish at Chicago (down 12.4 percent). Prices were higher at Boston for large ex-vessel haddock (up 11.4 percent), and at New York City for fresh dressed Pacific halibut (up 4.4 percent) and fresh dressed king salmon (up 7.7 percent). Great Lakes yellow pike at New York City was up 5.3 percent from July to August. Compared with the same month the previous year, the subgroup index this August was 15.4 percent higher. Substantially higher prices at New York City for fresh dressed halibut (up 23.6 percent) and fresh dressed king salmon (up 20.0 percent) and at Boston for large ex-vessel haddock (up 11.1 percent), were offset only slightly by the lower prices for Lake Superior whitefish (down 17.9 percent) and yellow pike (down 9.1 percent).

Higher fresh shrimp prices at New York City (up 8.3 percent) were responsible for a 3.7-percent increase in the processed fresh fish and shellfish subgroup index this August. The demand for shrimp was good and market conditions were even stronger despite some increase in seasonal South Atlantic shrimp landings. Prices for fresh haddock fillets at Boston were down 5.2 percent from July to August because of



Fig. 2 - View in front of wholesaler's stand in the "old shed" of the salt-water section of Fulton Fish Market, New York City. Boxed fish ready for shipment.

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

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ (\$)		Indexes 2/ (1957-59=100)						
			Aug. 1962	July 1962	Aug. 1962	July 1962	June 1962	Aug. 3/1961			
			ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)								121.6
<u>Fresh & Frozen Fishery Products:</u>								124.3	118.5	117.5	109.4
<u>Drawn, Dressed, or Whole Finfish:</u>								131.6	123.3	114.3	114.0
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.14	.13	109.8	98.6	59.5	98.8			
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.47	.45	138.9	133.0	130.1	112.4			
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	1.05	.98	146.7	136.2	134.5	122.2			
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.53	.60	78.4	89.5	103.0	95.5			
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.50	.48	81.9	77.8	73.7	90.1			
<u>Processed, Fresh (Fish & Shellfish):</u>								117.6	113.4	120.6	113.2
Fillets, haddock, sml., skins on, 20-lb. tins.	Boston	lb.	.37	.39	89.8	94.7	76.5	74.1			
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.98	.90	114.3	105.5	121.9	101.4			
Oysters, shucked, standards	Norfolk	gal.	7.50	7.50	126.5	126.5	126.5	134.9			
<u>Processed, Frozen (Fish & Shellfish):</u>								117.8	113.3	112.7	97.4
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.40	.39	100.1	98.9	96.3	97.6			
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.35	.34	101.1	98.2	96.7	95.2			
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.30	.30	105.2	103.4	106.1	99.9			
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	1.08	1.03	128.1	122.2	122.2	96.7			
<u>Canned Fishery Products:</u>								117.4	120.1	120.1	112.5
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	28.50	28.50	124.2	124.2	124.2	122.0			
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	12.15	12.15	107.9	107.9	107.9	97.7			
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 24 cans/cs.	Los Angeles	cs.	5.25	5.25	118.5	118.5	118.5	101.5			
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	9.31	11.31	119.4	145.1	145.1	132.2			
<p>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.</p> <p>2/Beginning with January 1962 indexes, the reference base of 1947-49=100 was superseded by the new reference base of 1957-59=100.</p> <p>3/Recomputed to be comparable to 1957-59=100 base indexes.</p>											

heavier small haddock landings as compared to the substantially lower landings of large haddock. When compared with August 1961, the subgroup index this August was 3.9 percent higher because of increased prices for fresh haddock fillets (up 21.2 percent) and a 12.7 percent increase in fresh shrimp prices at New York City.

The price index for processed frozen fish and shellfish this August rose 4.0 percent from July and was up 20.9 percent from August 1961. From July to August, the market was stronger for frozen shrimp at Chicago (prices were up 4.8 percent) because of very low supplies, and those prices were up 32.5 percent from August 1961. In August, prices for frozen haddock fillets were up 3.0 percent, ocean perch fillets rose 1.7 percent, and flounder fillets were up 1.2 percent as com-

pared to the previous month. As compared with August 1961, prices for all fillets in the subgroup were higher.

Canned fishery products prices this August were unchanged for all items except canned Maine sardines. A 17.7-percent drop in canned Maine sardine prices from July to August was responsible for a 2.3-percent decline in the subgroup index. At the end of August, the Maine sardine pack of about 1.5 million standard cases was about 3 times greater than the previous season's pack and prices were 9.7 percent lower than at the same time last year. Canned tuna stocks at the end of August 1962 were liberal, but prices were still 10.4 percent higher than a year earlier. Stocks of California sardines this August were about exhausted and prices for that product were 16.7 percent higher than in August 1961.

